

TAXONOMIC STUDIES IN THE FAMILY ARACEAE FROM BANGLADESH



**Ph.D. THESIS
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THESIS**

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**TAXONOMIC STUDIES IN THE FAMILY
ARACEAE FROM BANGLADESH**



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*Dedicated
To
My Beloved Parents,
Husband
and Only Son*

DECLARATION

I hereby declare that this thesis entitled “**Taxonomic Studies in the Family Araceae from Bangladesh**” has been written by myself and all the work presented here is my own. All sources of information have been specifically acknowledged by referring to the authors.

April 2016

(Hosne Ara)

CERTIFICATE

This is to certify that the thesis entitled “**Taxonomic Studies in the Family Araceae from Bangladesh**” submitted by Hosne Ara has been carried out under my guidance and supervision at the Plant Taxonomy and Ethnobotany Laboratory, Department of Botany, University of Dhaka.

This is further to certify that it is an original research work and suitable for submission for the award of Doctor of Philosophy in Botany (Plant Taxonomy).

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Abstract

1. The family Araceae has been investigated throughout the country by extensive field trips (137 field trips) during the period from 1988 to 2014. Collection, preservation and identification of specimens have been made following standard taxonomic procedures.
2. Taxonomically important 60 plant specimens, which were not readily identifiable, were collected and planted in the Bangladesh National Herbarium Garden, Dhaka University Botanical Garden and Home Garden for critical study.
3. A total of 27 genera, 105 species and 6 varieties have been recorded from Bangladesh territory.
4. The study has identified 4 new generic (*Ariopsis* Nimmo, *Caladium* Vent., *Gonatopus* J.D. Hook. ex Engl. and *Remusatia* Schott) and 38 new species records for Bangladesh.
5. Six new species and four new varieties have been ascertained. These are,

New species

1. *Alocasia hararganjensis* H. Ara & M.A. Hassan
2. *Alocasia salarkhanii* H. Ara & M.A. Hassan
3. *Colocasia hassanii* H. Ara
4. *Lasia viridis* H. Ara & M.A. Hassan
5. *Typhonium elatum* H. Ara & M.A. Hassan
6. *Typhonium geniculatum* H. Ara & M.A. Hassan

New varieties

1. *Colocasia fallax* Schott var. *purpurea* H. Ara & M.A. Hassan
2. *Colocasia oresbia* A. Hay var. *obtusifolia* H. Ara & M.A. Hassan
3. *Rhaphidophora calophyllum* Schott var. *violaceus* H. Ara & M.A. Hassan
4. *Typhonium trilobatum* (L.) Schott var. *fulvus* H. Ara & M.A. Hassan

6. *Alocasia macrorrhizos* (L.) G. Don, *Amorphophallus paeoniifolius* (Dennst.) Nocolson var. *campanulatus* (Dence.) Sivadasan, *Colocasia esculenta* (L.) Schott, *Xanthosoma sagittifolium* (L.) Schott and *Xanthosoma violaceum* Schott are widely cultivated in Bangladesh and are used for edible purposes. Moreover, many varieties of *Colocasia esculenta* (L.) Schott are also used for this purpose.
7. A total of 24 species, cultivated for ornamental purposes, have been identified.
8. Pollen morphology of 16 species under 12 genera were studied, their taxonomic value was assessed, and found insignificant.
9. Ecology and distribution of taxa, recorded from Bangladesh, have been discussed.
10. Investigation and determination of threatened taxa of Bangladesh aroids have also been made. 30 species are recognized as threatened and placed according to IUCN red list categories. Of these, 9 species are Critically Endangered (CR), 7 Endangered (EN), 13 Vulnerable (VU) and 1 supposed to be Extinct (EX).
11. Dichotomous bracketed keys to the family, genera and species have been provided. The genera and species have been arranged alphabetically.
12. Nomenclature has been brought up to date with all possible synonyms.
13. For each taxon detailed description, habitat, distribution and specimens examined have been provided. Local name, English name, flowering and fruiting time, chromosome number, mention of type, economic uses or harmful aspects and ethnobotanical information have been added where available. Taxonomic and nomenclatural notes are given wherever necessary.
14. Colour photographs and free hand drawings have been provided for all the taxa.

Synopsis of recognized taxa of Araceae occurring in Bangladesh

This synopsis is the presentation of the recognized taxa of the aroid of Bangladesh with the author's citation, the year of publication, current nomenclature of a taxon and synonyms.

The synopsis mentioned below represent a total number of 27 genera, 105 species, 6 varieties and 260 synonyms those occur in Bangladesh.

1. Genus: *Aglaonema* Schott (1829)

1. *Aglaonema commutatum* Schott (1856)

Aglaonema oblongifolium sensu Alston (1931)

2. *Aglaonema costatum* N.E. Brown (1892)

3. *Aglaonema crispum* (Pitcher & Manda) Nicolson (1968)

Schismatoglottis crispa Pitcher & Manda (1892)

Aglaonema roebelinii Pitcher & Manda (1894)

Schismatoglottis roebelinii (Pitcher & Manda) Pitcher and Manda (1895)

4. *Aglaonema hookerianum* Schott (1859)

Aglaonema clarkei Hook. f. (1893)

5. *Aglaonema marantifolium* Blume (1837)

Calla oblongifolia Roxburgh (1832).

Aglaonema oblongifolium (Roxb.) Kunth (1841)

Scindapsus erectus Presl (1851)

Aglaonema novoguineense Engler (1898)

6. *Aglaonema modestum* Schott ex Engler (1879)

Aglaonema acutispathum N.E. Brown (1885)

Aglaonema laoticum Gangnepain (1941)

7. *Aglaonema nitidum* (Jack) Kunth (1841)

Calla nitida Jack (1820)

Arum interifolium Link (1822)

2. Genus: Alocasia (Schott) G. Don (1939)

8. Alocasia acuminata Schott (1859)

9. Alocasia cucullata (Lour.) G. Don (1839)

Arum cucullatum Lour. (1790)

Caladium cucullatum (Lour.) Pers. (1807)

Colocasia cucullata (Lour.) Schott (1832)

10. Alocasia cuprea (C. Koch & Bouché) C. Koch (1861)

Caladium cupreum C. Koch & Bouché (1854)

11. Alocasia decipiens Schott (1859)

Arum fornicatum Wight (1844)

12. Alocasia fallax Schott (1859)

13. Alocasia fornicata (Roxb.) Schott (1854)

Arum fornicatum Roxb. (1832)

Colocasia fornicata (Roxb.) Kunth (1841)

14. Alocasia hararganjensis H. Ara & M.A. Hassan, **sp. nov.** (2016)

15. Alocasia macrorrhizos (L.) G. Don (1839)

Arum macrorrhizon. L. (1753)

Arum indicum Lour. (1790)

Colocasia indica (Lour.) Kunth (1841)

Alocasia indica (Lour.) Spach (1846)

16. Alocasia navicularis K. Koch & Bouche' (1853)

Colocasia navicularis Koch et Bouche' (1854)

17. Alocasia odora (Roxb.) K. Koch (1854)

Arum odorum Roxb. (1832)

Alocasia tonkinensis Engl. (1920)

18. Alocasia portei Schott (1862)

Schizocasia portei (Schott) Engl. (1883)

Schizocasia regnieri L. Linden & Rodigas (1887)

19. *Alocasia salarkhanii* H. Ara & M.A. Hassan, **sp. nov.** (2016)

20. *Alocasia sanderiana* W. Bull (1884)

Schizocasia sanderiana (W. Bull) Engl. (1898)

3. Genus: *Amorphophallus* Blume *ex* Decaisne (1834)

21. *Amorphophallus bulbifer* (Roxb.) Blume (1837)

Arum bulbiferum Roxb. (1832)

Pythonium bulbiferum (Sims) Schott (1832)

Conophallus bulbifer (Sims) Schott (1856)

Conophallus tuberculiger Schott (1856)

Amorphophallus tuberculiger (Schott) Engler (1879)

Amorphophallus bulbifer var. *marmoratus* Engler (1911)

Amorphophallus bulbifer var. *atroviridimaculatus* Engler (1911)

Amorphophallus bulbifer var. *tuberculiger* (Schott) Engler (1911)

22. *Amorphophallus excentricus* Hett. (1994)

23. *Amorphophallus krausei* Engl. (1911)

Amorphophallus ximengensior H. Li (1988)

24. *Amorphophallus longituberosus* (Engl.) Engl. *et* Gehrm. (1911)

Hydrosme longituberosa Engl. (1902)

25. *Amorphophallus margaritifer* (Roxb.) Kunth (1841)

Arum margaritifer Roxb. (1832)

Plesmonium margaritiferum (Roxb.) Schott (1856)

Plesmonium margaritiferum f. *minor* Engl. (1911)

26. *Amorphophallus napalensis* (Wall.) Bogner & Mayo (1985)

Thomsonia napalensis Wall. (1830)

Pythonium wallichianum Schott (1832)

Amorphophallus chlorospathus auct. non Kurz (1963)

- 27. Amorphophallus paeoniifolius** (Dennst.) Nicolson var. **campanulatus** (Decne.) Sivadasan (1983)

Dracontium polyphyllum sensu Dennst. (1818)

Arum campanulatum Roxb. (1820)

Amorphophallus campanulatus Decne. (1834)

Amorphophallus dubius Blume (1837)

Amorphophallus sativus Blume (1837)

Amorphophallus campanulatus var. *blumei* Prain (1903)

4. Genus: Anthurium Schott (1829)

- 28. Anthurium andreanum** Linden (1877)

- 29. Anthurium crystallinum** Linden & André (1873)

5. Genus: Ariopsis Nimmo (1839)

- 30. Ariopsis peltata** Nimmo (1839)

Remusatia vivipara sensu Wight (1845)

Ariopsis protanthera N.E. Brown (1877)

Ariopsis peltata f. *coaetanea* Engl. (1920)

- 31. Ariopsis protanthera** N.E. Br. (1877)

Ariopsis peltata f. *protanthera* (N.E. Br.) Engl. (1920)

6. Genus: Caladium Ventenat (1801)

- 32. Caladium bicolor** (Ait.) Vent. (1801)

Arum bicolor Ait. (1789)

Cyrtospadix bicolor (Aiton) Britton & P. Wilson (1923)

Xanthosoma sylvestre Bello (1883)

- 33. Caladium humboldtii** Schott (1854)

Caladium myriostigma C. Koch (1862)

Caladium humboldtii var. *myriostigma* (C. Koch) Engler (1879)

7. Genus: Colocasia Schott (1832)**34. Colocasia affinis** Schott (1859)*Alocasia jenningsii* Veitch (1868)*Colocasia affinis* var. *jenningsii* (Veitch) Engl. (1879)**35. Colocasia esculenta** (L.) Schott (1832)*Arum esculentum* L. (1753)*Arum colocasia* L. (1753)*Arum nymphaeaefolium* (Vent.) Roxb. (1832)*Caladium nymphaeaefolium* Vent. (1801)*Caladium acre* R. Brown (1810)*Arum colocasioides* Desfontaines (1829)*Arum nymphaeifolium* (Vent.) Roxb. (1832)*Colocasia nymphaeifolia* (Vent.) Kunth (1841)*Colocasia acris* (R. Br.) Schott (1832)*Colocasia antiquorum* Schott (1832)*Colocasia pereorine* Rafinesque (1836)*Colocasia vulgeris* Rafinesque (1836)*Colocasia himalensis* Royle (1893)*Colocasia euchlora* C. Koch & Sello (1854)*Colocaia fontanesii* Schott (1854)*Colocasia illustris* Bull (1873)*Colocasia antiquorum* var. *euchlora* (C. Koch) Schott ex Engl. (1879)*Colocasia antiquorum* var. *illustris* (Bull) Engl. (1879)*Colocasia antiquorum* var. *esculenta* (L.) Schott ex Engl. (1879)*Colocasia antiquorum* Schott var. *acris* (R. Br.) Schott ex Engl. (1879)*Alocasia dussii* Hort. ex Dammann (1892)

Caladium colocasia (L.) W.F. Wight (1905)

Colocasia antiquorum var. *globulifera* Engler & Krause (1920)

Colocasia esculenta var. *illustris* (Bull) Hill (1939)

Colocasia esculenta var. *acris* (R. Br.) Hill (1939)

36. Colocasia esculenta (L.) Schott var. **antiquorum** (Schott) Hubb. & Rehder (1932)

37. Colocasia esculenta (L.) Schott var. **aqualitis** Hassk. (1848)

38. Colocasia fallax Schott (1859)

Colocasia kerrii Gagnep. (1941)

39. Colocasia fallax Schott var. **purpurea** H. Ara & M.A. Hassan, **var. nov.** (2016)

40. Colocasia gigantea (Blume) Hook. f. (1893)

Caladium giganteum Blume *ex* Hassk (1844)

Leucocasia gigantea (Blume) Schott (1857)

Colocasia indica Engl. (1879)

41. Colocasia hassanii H. Ara, **sp. nov.** (2016)

42. Colocasia heterochroma H. Li *et* Z.X. & Wei (1993)

43. Colocasia lihengiae C.L. Long *et* K.M. Liu (2001)

44. Colocasia mannii Hook. f. (1893)

45. Colocasia oresbia A. Hay (1996)

46. Colocasia oresbia A. Hay var. **obtusifolia** H. Ara & M.A. Hassan, **var. nov.** (2016)

47. Colocasia virosa Kunth (1841)

Calla virosa Roxb. (1832)

Zantedeschia virosa C. Koch (1854)

8. Genus: Cryptocoryne Fischer *ex* Wydler (1830)

48. Cryptocoryne ciliata (Roxb.) Fischer *ex* Wydler (1830)

Ambrosina ciliata Roxb. (1820)

Cryptocoryne elata Griff. (1851)

49. Cryptocoryne retrospiralis (Roxb.) Kunth (1841)

Ambrosinia retrospiralis Roxb. (1814)

Ambrosinia unilocularis Roxb. (1832)

Cryptocoryne unilocularis (Roxb.) Kunth (1941)

50. *Cryptocoryne spiralis* (Retz.) Fischer ex Wydler (1830)

Arum spiralis Retz. (1779)

Ambrosinia spiralis (Retz.) Roxb. (1814)

Cryptocoryne huegelii Schott (1853)

Cryptocoryne tortuosa Blatter & McCann (1931)

9. Genus: *Dieffenbachia* Schott (1829)

51. *Dieffenbachia seguine* (Jacq.) Schott (1829)

Arum seguine Jacq. (1760)

Caladium seguine (Jacq.) Vent. (1800)

Dieffenbachia picta Schott (1852)

Caladium maculatum Lodd. (1822)

Dieffenbachia maculatum (Lodd.) G. Don (1839)

10. Genus: *Epipremnum* Schott (1857)

52. *Epipremnum pinnatum* (L.) Engl. (1908)

Pothos pinnata L. (1763)

Monstera pinnata Schott (1830)

Rhaphidophora pinnata (L.) Schott (1857)

Epipremnum mirabile Schott (1858)

11. Genus: *Gonatopus* J.D. Hook. ex Engl. (1879)

53. *Gonatopus boivinii* (Decne.) Engl. (1879)

Zamioculcas boivinii Decne. (1870)

12. Genus: *Homalomena* Schott (1832)

54. *Homalomena aromatica* (Roxb. ex Sim) Schott (1832)

Calla aromatica Roxb. ex Sim (1832)

Calla occulta Lodd. (1817)

Zantedeschia occulta Spreng. (1826)

Zantedeschia aromatica Spreng. (1826)

Zantedeschia fortida C. Koch (1854)

55. Homalomena coerulescens Jungh. (1859)

Homalomena minor Griff. (1851)

Homalomena major Griff. (1851)

Homalomena wallichii Schott (1859)

56. Homalomena gigantea Engler (1912)

57. Homalomena pendula (Blume) Bakh. f. (1963)

Caladium pendulum Bl. (1823)

Calla rubescens Roxb. (1832)

Homalomena rubescens (Roxb.) Kunth (1841)

58. Homalomena wallisii Regel (1876)

Curmeria wallisii Masters (1977)

13. Genus: Lagenandra Dalzell (1852)

59. Lagenandra gomezii (Schott) Bogner & Jacobson (1987)

Cryptocoryne gomezii Schott (1857)

14. Genus: Lasia Loureiro (1790)

60. Lasia spinosa (L.) Thw. (1864)

Dracontium spinosum L. (1753)

Lasia aculeata Lour. (1790)

Pothos heterophylla Roxb. (1820)

Pothos lasia Roxb. (1820)

Lasia heterophylla (Roxb.) Schott (1832)

Lasia loureirii Schott (1832)

- Lasia roxburghii* Griff. (1851)
Lasia hermanni Schott (1857)
Lasia zollingeri Schott (1857)
Lasia deciscens Schott (1863)
Lasia spinosa var. *hermannii* Engler (1879)
Lasia crassifolia Engl. (1883)
Lasia crassifolia f. *angustisecta* Engler (1883)
Lasia crassifolia f. *latisecta* Engler (1898)
Lasia spinosa f. *diversifolia* Alderw. (1920)
Lasia spinosa f. *simplex* Alderw. (1920)

61. *Lasia viridis* H. Ara & M.A. Hassan, **sp. nov.** (2016)

15. Genus: *Monstera* Adanson (1763)

62. *Monstera deliciosa* Liebmann (1849)

Monstera borsigiana Engler (1879)

Monstera tacanaensis Matuda (1972)

63. *Monstera obliqua* Miq. (1844)

Monstera microstachya Schott (1855)

Monstera expilata Schott (1860)

16. Genus: *Philodendron* Schott (1829)

64. *Philodendron bipinnatifidum* Schott *ex* Endl. (1837)

Philodendron selloum C. Koch (1853)

Philodendron lundii Warming (1867)

65. *Philodendron lacerum* (Jacq.) Schott (1832)

Arum lacerum Jacq. (1804)

Caladium lacerum Willd. (1805)

66. *Philodendron mamei* Andre' (1883)

67. *Philodendron scandens* C. Koch & Sello *ex* Koch (1853)

Pothos discolor Hort. (1931)

17. Genus: Pistia L. (1753)

68. Pistia stratiotes L. (1753)

Zala asiatica Lour. (1790)

Pistia minor Blume (1836)

Pistia occidentalis Blume (1836)

Pistia stratiotes L. var. *linquiformis* Engler (1878)

Pistia stratiotes L. var. *cuneata* Engler (1878)

Pistia stratiotes L. var. *spathulata* Engler (1878)

Pistia stratiotes L. var. *obcordata* Engler (1878)

18. Genus: Pothos L. (1753)

69. Pothos chinensis (Raf.) Merr. (1948)

Tapanava chinensis Raf. (1837)

Pothos seemanii Schott (1857)

Pothos cathcartii Schott (1858)

Pothos warburgii Engl. (1898)

Pothos balansae Engl. (1898)

Pothos yunnanensis Engl. (1905)

Pothos chinensis (Raf.) Merr. var. *lotienensis* C.Y. Wu & H. Li (1977)

70. Pothos junghuhnii de Vriese (1851)

Pothos macrophyllus de Vriese (1851)

Pothos scandens var. *javanicus* de vriese (1851)

Pothos roxburghii Schott (1856)

Pothos vrieseanus Schott (1856)

Pothos junghuhnianus Schott (1860)

71. Pothos scandens L. (1753)

- Batis hermaphrodita* Blanco (1837)
- Pothos longifolius* Presl (1849)
- Pothos angustifolius* Presl (1849)
- Pothos microphyllus* Presl (1849)
- Pothos scandens* L. var. *javanica* de Vriese (1851)
- Pothos scandens* L. var. *zeylanica* de Vriese (1851)
- Pothos scandens* L. var. *sumatrana* de Vriese (1851)
- Pothos leptospadix* de Vriese (1851)
- Pothos zollingerianus* Schott (1855)
- Pothos scandens* L. var. *zollingerianus* (Schott) Engler (1905)
- Pothos horsfieldii* Miq. (1856)
- Pothos exiguiiflorus* Schott (1856-1857)
- Pothos vrieseanus* Schott (1853)
- Pothos chapelieri* Schott (1856-1857)
- Pothos cognatus* Schott (1856-1857)
- Pothos scandens* L. var. *cognatus* (Schott) Engler (1879)
- Pothos decipiens* Schott (1859)
- Pothos fallax* Schott (1860)
- Pothos scandens* L. forma. *angustior* Engl. (1902)
- Pothos scandens* L. var. *helferianus* Engler (1905)

19. Genus: Remusetia Schott (1832)

72. Remusatia pumila (D. Don) Li & Hay (1992)

- Gonatanthus pumilus* (D. Don) Engler & Krause (1920)
- Caladium pumilum* D. Don (1825)
- Colocasia pumila* (D. Don) Kunth (1841)
- Gonatanthus sermentosus* Klotzsch. & Otto (1841)

73. Remusatia vivipara (Roxb.) Schott (1832)*Arum viviparum* Roxb. (1814)*Caladium viviparum* (Roxb.) Loddiges (1818)*Colocasia vivipara* (Roxb.) Thw. (1864)**20. Genus: Rhapsidophora** Hasskarl. (1842)**74. Rhapsidophora affinis** Schott (1857)**75. Rhapsidophora aurea** (Linden & André) Birdsey (1880)*Scindapsus aureus* (Linden & André) Engl. (1908)*Pothos aureus* Linden & André (1880)**76. Rhapsidophora calophyllum** Schott (1857)*Rhapsidophora lancifolia* Schott (1857)**77. Rhapsidophora calophyllum** Schott var. **violaceus** H. Ara & M.A. Hassan, var. nov. (2016)**78. Rhapsidophora decursiva** (Roxb.) Schott (1857)*Pothos decursivus* Roxb. (1820)*Scindapsus decursivus* (Roxb.) Schott (1832)*Rhapsidophora eximia* Schott (1857)**79. Rhapsidophora glauca** (Wall.) Schott (1857)*Pothos glaucus* Wall. (1831)*Pothos wallichii* Steud. (1841)*Scindapsus glaucus* (Wall.) Schott (1832)*Monstera glauca* (Wall.) Koch ex Ender (1864)*Rhapsidophora glauca* (Wall.) Schott var. *hasiana*
Hook. f. (1893)**80. Rhapsidophora grandis** Schott (1858)*Rhapsidophora eximia* Hook. f. (1893)**81. Rhapsidophora hookeri** Schott (1857)

82. Rhapsidophora peepla Schott (1857)

Scindapsus peepla Schott (1832)

Pothos peepla Roxb. (1820)

Monstera peepla Schott (1831)

83. Rhapsidophora pertusa (Roxb.) Schott (1857)

Pothos pertusa Roxb. (1814)

Monstera pertusa (Roxb.) Schott (1830)

Scindapsus pertusus (Roxb.) Schott (1832)

84. Rhapsidophora schottii Hook. f. (1893)

21. Genus: Schismatoglottis Zollinger & Moritzi (1846)

85. Schismatoglottis picta Schott (1858)

Schismatoglottis calyprata (Roxb.) Zoll. et Moritzi var. *picta*
(Schott) Hallier f. (1897)

22. Genus: Scindapsus Schott (1832)

86. Scindapsus officinalis (Roxb.) Schott (1832)

Pothos officinalis Roxb. (1832)

87. Scindapsus perakensis Hook. f. (1893)

88. Scindapsus pictus Hassk. (1842)

Scindapsus pothoides Schott (1860)

Pothos argyraeus Engl. (1879)

Scindapsus argyraeus Engl. (1879)

Pothos argenteus W. Bull (1887)

Scindapsus pictus var. *oblongifolius* Engl. (1898)

89. Scindapsus scortechinii Hook. f. (1893)

23. Genus: Spathiphyllum Schott (1832)

90. Spathiphyllum floribundum (Lind. et Andre') N.E. Br.
(1878)

Anthurium floribundum Linden et Andre' (1874)

Amomophyllum floribundum (Linden et Andre') Engl. (1877)

91. Spathiphyllum wallisii Regel. (1877)

24. Genus: Steudnera K. Koch (1862)

92. Steudnera colocasiifolia K. Koch (1862)

Gonatanthus peltatus Hort. ex Van Houtte (1875)

93. Steudnera colocasioides Hook. f. (1893)

Steudnera virosa Prain (1903)

94. Steudnera discolor N.E. Br. (1875)

Steudnera colocasiifolia var. *discolor* (W. Bull) Engl. (1879)

95. Steudnera gagei Krause (1920)

25. Genus: Syngonium Schott (1829)

96. Syngonium macrophyllum Engler (1920)

97. Syngonium podophyllum Schott (1851)

Pothos auritus Willd. ex Schult. (1827)

Arum auritum Vell. non L. (1827)

26. Genus: Typhonium Schott (1829)

98. Typhonium blumei Nicolson & Sivadasan (1981)

Arum trilobatum var. β *auriculatum* Sims (1822)

Arum trilobatum auct. non L.: Thunb. (1984)

Arum divaricatum auct. non L.: Roxb. (1814)

Typhonium divaricatum auct. non Bl., nom. illegit.: Bl. (1837)

99. Typhonium cochleare A. Hay (1993)

100. Typhonium elatum H. Ara & M.A. Hassan, **sp. nov.** (2016)

101. Typhonium flagelliforme (Lodd.) Blume (1837)

Arum flagelliforme Lodd. (1819)

Typhonium cuspidatum (Blume) Decne (1834)

102. *Typhonium geniculatum* H. Ara & M.A. Hassan, **sp. nov.** (2016)

103. *Typhonium gracile* (Roxb.) Schott (1855)

Arum gracile Roxb. (1814)

Arisaema gracile (Roxb.) Kunth (1841)

104. *Typhonium listeri* Prain (1895)

105. *Typhonium roxburghii* Schott (1855)

Arum trilobatum sensu Roxburgh (1814)

Arum diversifolium Blume (1823)

Arum divaricatum sensu Moon (1824)

Typhonium divericatum Blume (1834)

Arum roxburghii (Schott) Thw. (1864)

Typhonium divericatum var. *roxburghii* (Schott) Engler (1879)

Typhonium motleyanum Schott (1860)

Typhonium schottii Prain (1878)

Typhinum trilobatum var. *schottii* (Prain) Engler (1920)

Typhonium amboinense Blatter & McCann (1931)

Typhonium trilobatum auct., non (L.) Schott (1829)

106. *Typhonium trilobatum* (L.) Schott (1829)

Arum trilobatum L. (1753)

Arum orixense Roxb. ex Andrew (1804)

107. *Typhonium trilobatum* (L.) Schott var. **fulvus** H. Ara & M.A. Hassan, **var. nov.** (2016)

27. Genus: *Xanthosoma* Schott (1832)

108. *Xanthosoma lindenii* (André) Engler (1840)

Phyllotaenium lindenii André (1872)

109. *Xanthosoma sagittifolium* (L.) Schott (1832)

Arum sagittifolium L. (1753)

Arum xanthorrhizon Jacq. (1797)

Caladium xanthorrhizon (Jacq.) Willd. (1800)

Caladium sagittifolium (L.) Vent. (1801)

Xanthosoma xanthorrhizon (Jacq.) Koch (1856)

110. Xanthosoma undipes (K. Koch) K. Koch (1856)

Alocasia undipes K. Koch (1854-55)

Xanthosoma jacquinii sensu Schott (1856)

111. Xanthosoma violaceum Schott (1853)

Arum nigrum Vell. (1831)

Xanthosoma nigrum Stellfeld. (1944)

CHAPTER 1

INTRODUCTION

CHAPTER 1**INTRODUCTION****1.1 Introductory Words**

Plant taxonomy, the science of plant Identification, Nomenclature and Classification, although traditionally was based mainly on gross morphological features, now it takes data from other related branches of plant science like Palynology, Anatomy, Cytology, Ecology, Phytochemistry, Genetics etc. Taxonomic studies in a group (like a family) of an area or of a country usually require repeated fieldtrips, collecting fresh materials, critical examination of the collected samples and taking data from other branches, examination of the specimens preserved in different herbaria, consultation of relevant taxonomic literature, confirmation of botanical identity of the samples and finally placement of the named taxa in an ordered hierarchy. For such a taxonomic studies in Bangladesh, family Araceae has been chosen.

Araceae, the Arum family, is commonly known as “Aroids”. Araceae A. L. de Jussieu (1789) is distributed all over the world but they are abundant in tropics and sub-tropics. Major concentration of them occurs in South-East Asia, South and Central America, Africa and the West Indies. The plants, 'aroid', grow well in wet, damp and shady environment. They are usually herbaceous terrestrial plants, sometimes climbing or epiphytic, rarely free-floating. It forms a large and natural group of Monocotyledons and the species are remarkable for their wide range of morphological features. The inflorescence is the most characteristic feature with small or minute ebracteate regular flowers, often with a foetid odour, massed together on a cylindrical spadix enclosed in a spathe. There is considerable differences of opinion with regard to the number of constituent species within the family. In global context, the number of genera and species of the Araceae family according to different authors are shown below.

Table 1.1.1: Number of genera and species of the Araceae family according to different authors.

Author	Genera	Species
Bailey (1949)	100	1500

Author	Genera	Species
Lawrence (1951)	105	1400-1500
Willis (1897)	115	2000
Bogner (1978)	110	>2000
Croat (1979)	110	2500
Cronquist (1981)	110	1800
Mayo, Bogner & Boyce (1997)	105	3300

The family Araceae is significantly well known for its economic value. They play a vital role by providing green vegetables, food, fodder, fencing, medicines, insecticides, flavours, ornamentals etc. Aroids cultivation in Bangladesh is attractive both from economic, climatic and nutrition point of view. The monsoon season of the country (June to October) brings a lot of rainfall and consequently a vast area of the country remains water logged during this time. This situation is favourable for the growth of aroids. Because of water logged situation in monsoon, supply of vegetables during monsoon and post monsoon period becomes scarce, aroids play a vital role to meet up the scarcity. Besides, aroids need minimum investment and care during its life-cycle. Even housewives and children can cultivate it in kitchen garden. As aroids are less vulnerable to diseases and attack of pests and insects; farmers need to spend less money for buying fungicides or pesticides/insecticides. Since, aroids are rich source of nutrients, its cultivation is rather easy and less costly and climatic condition of the country favours its cultivation.

There are many scattered taxonomic reports on different taxa of Araceae of the World in relation to establishment of new genera and species, changes in nomenclature, enumeration, revision and monographs of different genera and the like. Revisions of the following genera have already been done: *Spathiphyllum* Schott (Bunting, 1960), *Amydrium* Schott (Nicolson, 1968), *Aglaonema* Schott (Nicolson, 1969), *Pycnospatha* Thorel ex Gagnepain (Bogner, 1973), *Zantedeschia* K. Sprengel (Letty, 1973), *Cryptocoryne* Fischer ex Wydler (Rataj, 1975), *Monstera* Adanson (Madison, 1977), *Lagenandra* Dalzell (De Wit, 1978), *Anubias* Schott (Crusio, 1979), *Theriophonum* Blume (Sivadasan and Nicolson, 1982), *Syngonium* Schott (Croat, 1981), *Philodendron* Schott

(Mayo, 1991), *Anthurium* Schott (Croat, 1991), *Typhonium* Schott (Sriboonma *et al.* 1994) and *Amorphophallus* Blume *ex* Decaisne (Ittenbach 2003).

J.D. Hooker (1893) has made the taxonomic account of Araceae of Indian subcontinent including the area of present Bangladesh in his “Flora of British India”. Later some workers, like Prain (1903, 1903a), Haines (1924), Heinig (1925), Datta & Mitra (1953), Sinclair (1956), Mitra (1958), Rao & Verma (1976) and Karthikeyan *et al.* (1989) have treated the family in their accounts. However, there is no up to date and separate taxonomic account on the family from the flora of Bangladesh.

Though considerable amount of work has been done in various disciplines on many families, the knowledge about Araceae has been fragmentary and scattered without a comprehensive understanding of the family in Bangladesh.

1.2 Taxonomic History and Previous Works

Theophrastus (ca. 371-285 B.C.) recorded *Arum* in his treatise (Prime 1960) and described a number of tropical aroids and their uses. European *Araceae* were described in detail by botanists such as Fuchs (1542) and Ray (1686) while R. Dodoens (1574) arranged all *Araceae* known to him into a single group. Linnaeus (1753, 1754) classified the known species according to his artificial sexual system but it was not until later that the inflorescence was recognized as a spike (spadix) of tiny flowers surrounded by an often colourful bract (spathe).

A. L. de Jussieu (1789) established the *Araceae* as a natural family but recognized only a few small or rather broadly conceived genera, probably because of the paucity of good material of non-European taxa. All the climbing species were grouped under the name *Pothos* L. and most of the terrestrial species were placed in the genera *Arum* L. and *Dracontium* L.

Modern systematic studies of *Araceae* began with the work of the Austrian botanist and gardener Heinrich Wilhelm Schott. He was the first monographer of the family and the first botanist to make careful comparative studies of aroid inflorescences, flower and fruit. Using these observations he was able to put the family on a sound taxonomic footing.

Schott described many new genera and species and created the first major natural classification of the whole family. Though his taxon concepts were narrow, many of his genera and species have withstood the test of time. He created the basis of *Araceae* taxonomy, not only for Engler, who soon followed him in studying the family comprehensively and also for succeeding generations. A notable aspect of Schott's work was that he used a combination of herbarium material, living plants and field work in the study of a largely tropical plant group at a time when such a wide-ranging approach was most unusual. Schott's most important works were the account of *Araceae* in the *Meletemata botanica* (Schott 1832), the illustrated *Genera Aroidearum* (Schott 1858) and the *Prodomus systematis Aroidearum* (Schott 1860). Other significant works on the family published during Schott's lifetime include Kunth's treatment for his *Enumeratio Plantarum* (Kunth 1841), which was the first post-Linnean treatment at species level, and Blume's *Rumphia* (Blume 1836-1837), which was important especially for Asian genera and included very fine coloured plates.

The second great monographer of *Araceae* was Adolf Engler. Right from the start he established himself as an authority on the family by a series of prodigious works. His first major publication on the family outlined a new system on phylogenetic lines (Engler 1876b) which was substantially different from Schott's classification, especially at the higher ranks. The following year he presented a pioneering comparative study of araceous shoot organization, based on original observations (Engler 1877). In 1905 he visited South and East Africa and also Zimbabwe, Zambia and the Zambezi region, after which he went to India and Sri Lanka, where he paid particular attention to economic plants and *Araceae*.

K. Krause who was contemporary with Engler continued to work the *Araceae* at Berlin until 1942, publishing new species collected by various field botanists and collectors, especially those working in South America, but he did not take up his studies again after the Second World War ended in 1945 and died in obscurity in 1963 (Mayo, Bogner & Boyce 1997).

Nicolas Edward Brown (1849-1934), working at the Herbarium of the Royal Botanic Gardens, Kew, made significant contributions to *Araceae* systematics. His largest and most important publication on *Araceae* was the family treatment for *Flora of Tropical Africa* (Brown 1901), but in addition to this he published various other flora treatments,

many new species and various new genera. Brown's work is particularly notable for his meticulous descriptions based on accurate observation and it is evident that his grasp of *Araceae* systematics was profound.

Joseph Dalton Hooker (1883), in Bentham & Hooker's *Genera Plantarum*, published a classification of *Araceae* based largely on Schott's (1860) work which was later revised and modified by John Hutchinson (1934, 1959, 1973), another Kew botanist. Hutchinson made an impact on *Araceae* taxonomy because his treatment included a key to all genera in English.

T. Nakai (1943) published a new classification in which he recognized the *Pistiaceae*, *Cryptocorynaceae* and *Acoraceae* as separate families from the *Araceae*. He also made important contributions to the systematics of the genus *Arisaema*.

In 1950 and early 1960s George S. Bunting, Monroe Birdsey, Dan H. Nicolson and Joseph Bogner began working on the family. M. Hotta began to publish on *Araceae* in the 1960s (Hotta 1965, 1966a, 1966b & 1967) and later he presented a classification for Eastern Asian and Malesian genera and an influential study of vegetative and floral morphology (Hotta 1970 & 1971).

Bogner (1979) published an updated list of the Englerian system, adding newly described genera and taking account of new synonyms. Nicolson (1983) published an English translation from Latin of Engler's system, using Bogner's updated list. Bogner & Nicolson (1991) published a revised synoptic key to all the genera, which incorporates a number of important changes from Engler's concepts, particularly in the subfamilies *Pothoideae* and *Lasioideae*. M. H. Grayum (1984, 1990) presented a new phylogenetic classification which is especially notable for recommending and justifying the removal of *Acorus* from *Araceae* into its own family and the large scale reorganization of Engler's subfamilies.

Mayo, Bogner and Boyce (1997) published the recent classification of the family *Araceae*.

1.3 Odds and Prospects

In all national and international Herbaria, aroids are poorly represented, because :

1. Certain genera can not be located easily in the field because they become devoid of aerial parts and survived only by the underground corm. So, it is difficult to locate them.
2. For few genera, the flowers and the leaves do not appear simultaneously. So, collection of both inflorescence and leaf at the same time is difficult.
3. Many genera are succulent. So, special technique is required for its preparation and preservation. This drawback discourages working with the members of this family.
4. Large size of the plants in general, discourage working with it.
5. Very short flowering period.
6. A few taxa come in flowering stage at an interval of six or seven years.
7. Soft tissue and starchy stem of the preserved specimen attract insect and destroy it.
8. The plant of this family cause itching in human skin, which makes collection and preservation as a non-attractive job.

Although so many odds are against, I have chosen Araceae because

1. In Bangladesh, studies on Araceae family are fragmentary and scattered. No comprehensive work was undertaken before.
2. To find out new species with edible rootstocks, as the members of Araceae family are important source of edible rootstocks, viz. *Colocasia esculenta* (Kachhu), *Xanthosoma sagittifolium* (Duth kachhu), *Alocasia macrorrhizos* (Maan Kachhu) and *Amorphophallus paeoniifolius* (Ol Kachhu). In Bangladesh, due to high rainfall and consequent water logging during rainy season the supply of general vegetables in markets become scarce and aroids play an important role in meeting up the demand.

3. Many aroids are ornamental which should be identified correctly.
4. We need variety of plants for indoor decoration, aroids can fulfill this demand but need careful selection.
5. Collecting aroid material need repeated fieldtrips which is possible for a researcher working in an institution like Bangladesh National Herbarium.

1.4 Aims and Objectives of the Present Study

The present investigations have been undertaken with the Bangladesh Araceae to fulfill the following aims and objectives :

- To make a complete inventory by collecting voucher specimens of all aroid species occurring in Bangladesh and living germplasm for further study and Ex-situ conservation.
- To prepare an analytical key to identify species based on morphological characters.
- To record the geographical distribution and ecology of aroids of Bangladesh.
- To resolve nomenclatural problems.
- To identify threatened aroid species and species with other economic importance.
- Additional exercises on characters of pollen morphology (with light microscope and electron microscope) on some selected species.
- To prepare a taxonomic revision of the family for Bangladesh.

CHAPTER 2

**GEO-CLIMATE AND
VEGETATION OF
BANGLADESH**

CHAPTER 2

GEO-CLIMATE AND VEGETATION OF BANGLADESH

2.1 Geographical Position and Topography

Bangladesh covers an area of 147,570 sq km. It extends from 20°34' N to 26°38' N latitude and from 88°01' E to 92°41' E longitude. Maximum extension is about 440 km in the E-W direction and 760 km in the NNW-SSE direction. It is bordered in the west and north by West Bengal, Meghalaya and Assam, and in the east by Assam, Tripura and Mizoram states of India and Arakan province of Myanmar. In the south the Bay of Bengal (Map 1) bound it. Bangladesh is unique in possessing one of the largest deltaic plains of the world with extensive inland depressions. The low-lying areas are crisscrossed by innumerable rivers and creeks. With a population of approximately 150 millions, the country is divided into 7 administrative divisions, 64 districts, and 488 upazilas, Dhaka being the capital city.

2.2 Temperature

According to the Yearbook of Agricultural Statistics-2013 maximum and minimum temperature is recorded during the year of 2012 and 2013 of selected stations. (Source: Bangladesh Meteorological Department)

Table 2.2.1: Average annual temperature of the year 2012 and 2013

Selected stations	Maximum temperature / °C (annual average)		Minimum temperature / °C (annual average)	
	2012	2013	2012	2013
Chittagong	29.7	29.7	22.8	21.9
Comilla	30.2	30.4	21.3	21.2
Rangamati	31.1	31.3	20.4	20.5
Sylhet	30.3	31.2	20.9	20.7
Dhaka	30.8	30.9	22.2	22.1
Mymensingh	29.6	30.0	20.0	20.8
Barisal	30.9	30.6	21.6	21.3
Khulna	31.6	31.6	22.0	21.7
Dinajpur	30.0	30.2	20.0	20.0
Rajshahi	31.7	31.5	20.4	21.3
Rangpur	29.5	29.7	20.1	20.4

(Map)

2.3 Rainfall

According to the Yearbook of Agricultural Statistics-2013, average annual rainfall is recorded during the year of 2012 and 2013 of selected stations (Source: Bangladesh Meteorological Department).

Table 2.3.1: Average annual rainfall of the year 2012 and 2013

Selected stations	Annual average rainfall / mm	
	2012	2013
Chittagong	3643	2561
Rangamati	2817	1950
Comilla	1929	1643
Sylhet	4610	3825
Dhaka	1329	1590
Mymensingh	1479	1739
Barisal	1617	2321
Khulna	1645	2064
Dinajpur	1511	1827
Rajshahi	1164	1248
Rangpur	1877	1916

2.4 Relative Humidity

The relative humidity remains over 82% during June to September throughout the country, but in other parts of the year it sometimes goes down below 70% (Source: Monthly Statistical Bulletin-Bangladesh, April-2015).

2.5 Main Seasons

The climate of Bangladesh is marked by three distinct seasons: summer from March to May, Monsoon extending from June to October, followed by a short, fairly cool and dry winter (November to February).

2.6 Geology and Soil

Bangladesh is formed of the major part of Bengal basin covered with Halocene and Neocene sediments. The Neocene sediments are exposed in the northern, northeastern and southeatern part, and are folded pleistocene sediments occupy the Madhupur Tract (Dhaka, Gazipur, Tangail, Sherpur and Mymensingh), the Barind (parts of Rajshahi, Rangpur and

Dinajpur districts) and the Lalmai elevation (Comilla district). The rest of the country comprises of recent to sub-recent alluvial sediments carried by the three mighty rivers, the Padma (Ganges), the Jamuna (Brahmaputra) and the Meghna.

2.7 Vegetation

Vegetation of Bangladesh can be presented under the following heads according to Khan (1977).

The Lower Gangetic Plain

This constitutes the major part of the country with perfectly flat plains build up by the enormous load of alluvial deposits laid down by the three mighty rivers systems (The Padma, The Megna & The Jamuna) with their numerous tributaries and distributaries that criss-cross the country on their way southwards to the Bay of Bengal. The plains, regarded as very fertile on account of rich alluvial soils, are given over to cultivation of rice and jute and remain mostly inundated during rains. The fallow ground is studded with ponds, *beels*, *jheels* and *haors* of various sizes.

The Sundarbans

This littoral forest occupies a little over 518 sq. kilometres out of which about 90.65 sq. kilometres lie in the southwest corner of Patuakhali district, and the rest covers the southern part of greater Khulna bounded by the Baleshwar river in the east and the Raimangal river in the west. The forest faces the Bay of Bengal towards the south. It is a vast deltaic swamp, hardly more than 1.8 m above sea level. The bases of Mangrove trees standing on soft mud are rhythmically flooded by saline water. The name of the tract may have been derived from the dominant tree species, "Sundari" (*Heritiera fomes* Buch.-Ham.) which forms mixed stands with *Excoecaria agallocha* L. and varying proportion of other species.

Madhupur Tract or Sal Forests

The once rich deciduous forest dominated by 'Sal' (*Shorea robusta* Gaertn.) is now represented by a secondary formation in the districts of Gazipur, Mymensingh and Tangail.

Another stand of 'Sal' (*Shorea robusta* Gaertn.) forest is found in Dinajpur district in the northern region. The Madhupur Tract consists of several hundred separate blocks of trees interrupted by depressions cleared for cultivation of rice.

Chittagong Forests

This constitutes the hilly terrain, which is exceedingly irregular with a series of ridges and valleys in all directions. In the north, northeasterly slopes and in deep valleys sheltered from sun, the forests tend to be semi-evergreen. But towards the south, southwest, and westerly aspects, the exposure of the forests makes them truly deciduous.

Chakaria Sundarbans: The Chakaria Sundarbans, in the delta of the Matamohuri river is situated in longitude 92° east and latitude 21°- 41° north in the district of Cox's Bazar. This mangrove formation, lying about half way between the Sundarbans of the Gangetic delta and the littoral forests of Irrawady in Burma (Myanmar). The Chakaria Sundarban is no longer in existence now, used for shrimp culture.

Sand dune vegetation: On the sandy beach stretching from Cox's Bazar to Teknaf, patches of Casuarina are met with, and the dune vegetation is dominated by *Ipomoea pes-caprae* (L.) R. Br. This typical vegetation along with dense growth of *Pandanus* L. f. is also found on the St. Martin's island which is the southernmost part of the country in the Bay of Bengal.

Chittagong Hill Tracts

These extensively hilly tracts are now distributed under three hill districts viz. Bandarban, Khagrachari and Rangamati, and are bounded on the north by Tripura State of India, on the south by Akhyab region of Myanmar and on the east by the Lushi hills (India). The configuration of the ground is a system of low and elongated hill ranges running almost north-south with fairly broad valleys. The average rainfall is over 2286 mm (90 inches) with the forest composition that can be classified broadly into (1) rain forests (2) semideciduous forests (3) bamboo brakes and (4) grass lands. Floristically and geographically, the region of Chittagong and the Hill Tracts is more related to Indo-China

and Arakan than to any part of the Indian Subcontinent. The flora also shows a considerable admixture of Cachar and Khasia elements.

Vegetation of Sylhet and adjoining regions

The former Sylhet, now distributed under the four districts namely Habiganj, Moulvibazar, Sunamganj and Sylhet, has a varied flora comprising of semideciduous forest, vast water bodies called haors, and extensive tea gardens. The rainfall of this vegetation is the highest in the country. Rattans form impenetrable thorny thickets and there is a prevalence of epiphytes on the forest trees represented by orchids, ferns and mosses.

Flora of the northern and western districts

The region is comparatively dry with an annual rainfall ranging from 1520 mm (60 inches) to 182 mm (72 inches) with *Acacia catechu* Willd. and *Acacia nilotica* (L.) Del. thriving well. Deciduous forest predominates in the neighbourhood of Dinajpur district with 'Sal' (*Shorea robusta* Gaertn.) forming the major crop. There are mango and litchi groves at Rajshahi, Dinajpur and Kushtia yielding the best quality fruit in Bangladesh. Large areas are under sugarcane plantation, while tobacco and cotton are also grown as winter crops.

The Lalmai Elevation

In this region, the elevation is from 6-12 m and the direction of hillocks is roughly from north to south at the southwest of Comilla town. The vegetation is mainly scrub jungle with a few natural patches of Sal forest.

(Sundarbans)

(Chittagong)

(CHT)

(Sylhet)

In total 32 Photographs on the vegetation of Bangladesh have been provided here. Not all of them harbour aroids in good number. Saline vegetation (photo 1-3), Sand dune vegetation (photo 11-14), Sal forest vegetation (photo 4-6, 29-32) harbour less number of aroids. Vegetation of Chittagong, Chittagong Hill Tracts and specially vegetation of greater Sylhet (photo 8-10, 15-28) support more aroids. Aroid richness depends mainly on the amount of annual rainfall and shaded nature of habitats.

CHAPTER 3

MATERIALS AND METHODS

CHAPTER 3**MATERIALS AND METHODS****3.1 Materials**

The present work is mainly based on the living materials collected from different areas of the country through repeated field trips. Some taxonomically important aroids collected from different parts of the country, were also planted in the Bangladesh National Herbarium Garden, Botanical Garden of Dhaka University and Home Garden which later on were used for the critical study. The study is also partially based on the herbarium species deposited in various herbaria, and also on relevant literature.

3.2 Methods of study**Collection of Specimens**

In total 137 field surveys were conducted in different parts of the country for collecting specimens with flowering and/or fruiting materials from 1988-2014 in various seasons. After collection, all materials were brought to the Bangladesh National Herbarium. Then they were dried and preserved under proper herbarium technique (Croat, 1985). Naphthalene and insecticides have been applied when necessary. All the materials have been kept in the Bangladesh National Herbarium (DACB).

Table 3.2.1: A table showing date of trip/collection, collection nos., locality and districts

Sl.	Date of trip/ Collection	Collection nos.	Locality	Districts
1.	15.04.1988	5	Khilgaon area	Dhaka
2.	16.04.1988	2	Khilgaon area	"
3.	18.04.1988	1	Dhanmondi area	"
4.	19.04.1988	1	Dhanmondi area	"
5.	11.05.1988	1	Dhanmondi area	"
6.	19.06.1995	3	Mohakhali	"
7.	20.06.1995	3	BARC complex, Farmgate	"

Sl.	Date of trip/ Collection	Collection nos.	Locality	Districts
8.	12.08.1995	6	On the way of Natore and Rajshahi town area	Rajshahi & Natore
9.	22.04.1997	2	BARC complex, Farmgate	Dhaka
10.	30.05.1998	2	Sunamganj	Sunamganj
11.	04.06.1998	2	Tamabil, Jafflong	Sylhet
12.	05.06.1998	11	Madhabkundo	Moulvibazar
13.	06.06.1998	5	Sunamganj town area	Sunamganj
14.	25.05.2000	1	Madhupur forest	Mymensingh
15.	28.04.2002	1	Dhaka University Botanical Garden	Dhaka
16.	05.07.2002	41	Madhabkundo	Moulvibazar
17.	06.07.2002	26	Harargonj reserve forest, Kulaura	"
18.	07.07.2002	15	Madhabkundo	"
19.	10.09.2002	1	Mymensingh town	Mymensingh
20.	04.02.2003	1	Fakir para	Bogra
21.	05.02.2003	2	Mohastangarh	"
22.	06.02.2003	23	Beltola	"
23.	17.02.2003	1	Ishwarganj	Mymensingh
24.	20.02.2003	1	Mymensingh town	"
25.	02.05.2003	45	Lowachara reserve forest	Moulvibazar
26.	03.05.2003	30	Kawargola forest, Adampur beat	Moulvibazar
27.	04.05.2003	26	Madhabkundo	"
28.	05.05.2003	15	Kalenga beat, Kalenga	Habigonj
29.	06.05.2003	27	"	"

Sl.	Date of trip/ Collection	Collection nos.	Locality	Districts
30.	06.07.2003	33	Kaptai, Bangchori beat, Bangchori	Rangamati
31.	07.07.2003	22	Kaptai, Rampahar	"
32.	08.07.2003	57	Kaptai, Sitapahar, Shilsori village, Velbapara	"
33.	09.07.2003	12	Kaptai, Shilsori village	"
34.	11.07.2003	16	Matiranga, Alutilla	Khagrachari
35.	12.07.2003	30	Jamtoli	"
36.	06.10.2003	32	Modhupur forest, Dokhola	Tangail
37.	06.10.2003	11	Modhupur forest, Rasulpur	Mymensingh
38.	08.10.2003	47	Bakshigonj, Dumurtola, Lawchapra	Sherpur
39.	09.10.2003	28	Rangtia Range, Gazni beat	"
40.	10.10.2003	81	Rangtia Range, Samaschura beat	"
41.	14.10.2003	4	Kaptai, Sitapahar	Rangamati
42.	15.04.2004	1	Savar	Dhaka
43.	15.04.2004	1	Mandapasha village, Uzirpur thana	Barisal
44.	16.04.2004	4	Kawargola forest, Adampur beat	Moulvibazar
45.	16.06.2004	50	Bijoypur, Durgapur thana	Netrokona
46.	17.06.2004	16	Durgapur thana, Fantha, Khalikpur, Attrakhali, Naluapara	"
47.	18.06.2004	72	Durgapur thana, Utrail bazar, Vabanipur, Khonafanda, Dhahapara Bharatpur, Farangpara	Netrokona
48.	20.06.2004	3	Gopalpur beat, Mayaghashi, Monshapara	Sherpur

Sl.	Date of trip/ Collection	Collection nos.	Locality	Districts
49.	20.06.2004	37	Haluaghat thana, Koroitoli	Mymensingh
50.	21.06.2004	50	Rangtia range, Gazni beat	Sherpur
51.	22.06.2004	65	Sherpur thana, Koshba village	"
52.	22.06.2004	10	Zinaigathi thana, Rangtia hill	"
53.	23.06.2004	35	Samaschura beat, Madhutila Eco park	"
54.	26.06.2004	1	Madhabkundo forest	Moulvibazar
55.	25.07.2004	11	Tetupara road, Baropaikha, Burulia Village	Gazipur
56.	07.09.2004	1	Madhabkundo	Moulvibazar
57.	18.09.2004	32	Tourist spot, Hanging bridge area, Rajbari, Buddhist spot	Rangamati
58.	19.09.2004	10	Subalang forest area	"
59.	20.09.2004	35	Rangamati DC. Bangloo area, Banarupa area	"
60.	22.09.2004	98	Kulpara, Balaghat Prantic lake, Meghla tourist zone	Bandarban
61.	23.09.2004	29	Thanchi, Betchari, Bolipara	"
62.	24.09.2004	19	Thanchi	"
63.	25.09.2004	31	Bandarban Town area	"
64.	26.09.2004	65	Rajespur Sal forest, Amandanga, Jashpur, Jambari, Kotbari, Dargatilla	Comilla
65.	16.12.2004	1	Fullkaisha village, Varanadhi thana	Bhola
66.	09.01.2005	3	Kaptai, Chitmaram	Rangamati
67.	15.05.2005	55	Lawachara reserve forest	Moulvibazar
68.	16.05.2005	48	Kalenga beat, Kalenga forest	Habigonj

Sl.	Date of trip/ Collection	Collection nos.	Locality	Districts
69.	17.05.2005	44	Satchari forest	"
70.	18.05.2005	52	Kawargola forest, Adampur beat	Moulvibazar
71.	19.05.2005	32	Muraichara forest	"
72.	20.05.2005	31	Madhabkundo reserve forest	"
73.	21.05.2005	12	Harargonj forest, Kulaura	"
74.	03.07.2005	29	Kawargola forest, Adampur beat	"
75.	04.07.2005	25	Lawachara reserve forest	"
76.	05.07.2005	24	Harargonj forest, Kulaura	"
77.	06.07.2005	41	Madhabkundo reserve forest	"
78.	07.07.2005	17	Satchori forest	Habigonj
79.	07.07.2005	29	Narshingdi Sadar	Narshingdi
80.	07.07.2005	53	Sonargaon area	Dhaka
81.	16.08.2005	5	On the way of Gaibandha district	Gaibandha
82.	16.08.2005	4	Rangpur town area	Rangpur
83.	16.08.2005	5	Nilphamari town area	Nilphamari
84.	17.08.2005	30	Banglabanda, Tetulia upazilla, Garina bari	Panchagarh
85.	17.08.2005	20	Dharmagar, Baliadangi	Thakurgaon
86.	17.08.2005	40	Town area, Ramsagar area	Dinajpur
87.	18.08.2005	78	Singra forest, Kantazir Mandir area, Birgonj Sal forest, Nawabgonj Sal forest	Dinajpur
88.	19.08.2005	10	Ranigonj	"
89.	19.08.2005	10	Fultala	Joypurhat
90.	19.08.2005	10	Shibgonj area	Bogra

Sl.	Date of trip/ Collection	Collection nos.	Locality	Districts
91.	19.08.2005	10	Mirzapur	Tangail
92.	19.08.2005	11	Kaliakair	Gazipur
93.	07.09.2005	5	Kawargola forest, Adampur beat	Moulvibazar
94.	26.09.2005	55	Chunati, Herbang	Chittagong
95.	26.09.2005	11	Ramu, Punnagram	Cox's bazar
96.	27.09.2005	13	Hazarikhil forest	Chittagong
97.	27.09.2005	10	Fatiq chari	"
98.	27.09.2005	18	Hathazari, Nandirkir	"
99.	28.09.2005	8	Chittagong University area	"
100.	28.09.2005	9	Chittagong BCSIR Campus area	"
101.	29.09.2005	49	Teknaf Game Reserve, Whykeon Range, Rhykong beat.	Cox's bazar
102.	29.09.2005	16	Upper Rezu range	"
103.	29.09.2005	8	Taknafe forest area	"
104.	29.09.2005	8	Ukia forest, Dechori and Techori area	"
105.	30.09.2005	126	Chota Inani, Bara Inani, Swankhali, Himchari, Cox's bazar town area	"
106.	01.10.2005	6	Edgah	Cox's bazar
107.	01.10.2005	48	Bariadhala, Bara Kumira, Sitakundo, Mirsarai, Town area, Foiage lake area	Chittagong
108.	06.10.2005	8	Kawargola forest, Adampur beat	Moulvibazar
109.	09.05.2006	4	Harargongj reserve forest, Kulaura	Moulvibazar
110.	28.05.2006	2	Lawachara reserve forest, Kawargola forest	"
111.	04.11.2007	2	Mirpur-1, BNH Campus	Dhaka
112.	06.02.2008	2	Uzirpur thana, East Narayanpur village	Barisal

Sl.	Date of trip/ Collection	Collection nos.	Locality	Districts
113.	22.02.2008	17	Uzirpur thana, East Narayanpur village and Dostani village	"
114.	23.02.2008	49	Kashipur, Lakaotta	"
115.	25.02.2008	4	BNH Garden	Dhaka
116.	23.03.2008	3	Gangpali, Adampur beat	Moulvibazar
117.	16.04.2008	1	Buet Staff Quater	Dhaka
118.	22.04.2008	3	Dhaka University Botanical Garden	Dhaka
119.	18.05.2008	1	Veluachara village, Kulaura	Moulvibazar
120.	25.06.2008	1	Harargonj reserve forest, Kulaura	"
121.	22.04.2009	1	Gangpali, Adampur beat	"
122.	17.05.2009	1	Kamesshore village	Gazipur
123.	07.05.2010	23	Awolachara punji, Muraichara, Moulvibazar town area	Moulvibazar Kamalganj upazilla
124.	08.05.2010	4	Awolachara punji, Muraichara, Kamalganj Upazilla	Moulvibazar Kamalganj upazilla
125.	12.03.2011	1	Awolachara punji, Muraichara, Kamalganj Upazilla	"
126.	18.03.2011	10	Kazipur upazilla to Charkhadah village	Shirajgonj
127.	19.03.2011	10	Dunat Upazilla to Sherpur	Bogra
128.	26.05. 2012	8	Savar	Dhaka
129.	26.05.2012	8	Manikgonj area	Manikgonj
130.	26.05.2012	9	Rajbari area	Rajbari
131.	26.05.2012	9	Magura area	Magura
132.	26.05.2012	10	Jessore town area	Jessore
133.	20.05.2013	8	Singhimari village	Kurigram
134.	24.08.2014	8	Baruitari village	Kurigram

Sl.	Date of trip/ Collection	Collection nos.	Locality	Districts
135.	01.12.2014	6	Juri forest area	Moulvibazar
136.	02.12.2014	6	Juri forest area	"
137.	03.12.2014	11	Madhabkundo	Moulvibazar

3.3 Specimen Examination and Identification

Both living and herbarium specimens have been examined and studied in the Bangladesh National Herbarium (DACB) very carefully by using Long - Arm Stereo Microscope (LSM), Dissecting Microscope and other light instruments (needle, forceps, blade, scale, brush, slides, scissor etc). Expert opinion from home and abroad was also taken for some confused specimens. Collected specimens were critically studied, identified and confirmed with the help of standard literatures and were later matched and confirmed in different herbaria and consulting internet sources. The following works were taken under consideration while conducting the study: Bakshi (1984), Bennet (1979), Blatter & McCann. (1931), Bogner (1978, 1987), Bogner and Jacobsen (1987), Bogner & Hettterscheid (1992), Bogner *et al.* (1985), Boyce (1995, 2000, 2007), Bunting (1964, 1965), Burnett (1984), Calder *et al.* (1926), Cooke (1908), Cowan (1926), Croat (1979, 1988a, 1988b, 2005), Cronquist (1981), Dahlgren *et al.* (1985), Deb (1983), De La Penna (1970), Engler (1905, 1911, 1912, 1915, 1920a), Engler & Krause (1908, 1920), Fischer (1931), Furtado (1935, 1939, 1941), Ghani (1998), Ghani, F.D. (1983), Gosh (1977), Gogoi and Borah (2013), Goncalves and Inhotim (2011), Govaerts and Frodin (2002), Gow (1908, 1913), Graf (1978), Hara (1978), Hassan and Khan (1996), Hay (1988, 1991, 1992, 1993a, 1995, 1996, 1998, 1999a), Hay *et al.* (1995a, 1995b), Heng (1987), Heng & Hay (1992), Heng *et al.* (2010), Hettterschied (1994, 2003, 2006), Hettterscheid and Boyce (2000), Hettterschied & Ittenbach (1996), Hettterscheid and Sarker (1996), Heywood (1978), Hill (1939), Hotta (1985), Hossain (2015), Hu (1968), Ismail and Mia (1972), Ivanic *et al.* (1995), Jackson (1893-1955), Jaleel *et al.* 2011, 2012, 2014), Khan & Halim (1987), Khatun *et al.* (2013), Kirtikar and Basu (1918), Koch (1954), Krause (1908, 1913), Kulkarni *et al.* (1990), Kunkel (1984), Kurniawan *et al.* (2013), Liu, Tang-Shui and Huang Tseng-Chieng (1996), Madison (1978, 1981), Matthew (1991, 1999), Mia and Khan (1995), Mohiuddin *et al.* (2012), Naithani (1990), Nicolson (1960, 1976, 1982), Nasir (1978), Nicolson & Sivadasan (1981), Pullaiah (1997), Purseglove (1972), Radford *et al.*

(1974), Raizada (1941), Rahman (1997), Rahman, M.O. (2004a, 2004b), Rahman and Uddin (1998), Rashid (2014), Razi (1959), Ridley (1925), Rodriguez and Nicolson (2005), Roy, S. *et al.* (2008), Schott (1857), Shaw (1975), Sivadasan (1982), Sivadasan & Jaleel (2002), Sookchaloem (1995), Standley (1944), Standley and Steyermark (1958), Subramanyam (1962), Tillich (2003), Uddin, M.Z. *et al.* (2001a), Walters *et al.* (1984), Wiggins (1971), Wight (1843-1845), Yusuf *et al.* (2006, 2007, 2009) and a no. of internet sources.

About 300 herbarium specimens from BM, K, CAL, DACB, HCU, FRIH, CLH were examined.

Table 3.3.1: Places where Herbarium materials have been examined.

No.	Name of the Herbaria (listed in Index Herbariorum, ed. 8, 1990)	Abbreviation used
1.	Herbarium, The Natural History Museum, London, UK.	BM
2.	Herbarium, Royal Botanic Garden, Kew, Surrey, UK.	K
3.	Central National Herbarium, Kolkata, India.	CAL
4.	Bangladesh National Herbarium, Dhaka, Bangladesh.	DACB
Name of the Herbaria (not listed in Index Herbariorum, ed. 8, 1990)		
5.	Dhaka University Salar Khan Herbarium, Department of Botany, University of Dhaka, Dhaka-1000, Bangladesh.	DUSH
6.	Jahangirnagar University Herbarium, Department of Botany, Jahangirnagar University, Savar, Dhaka, Bangladesh.	JUH
7.	Herbarium, Department of Botany, University of Chittagong, Chittagong-4331, Bangladesh.	HCU
8.	Herbarium, Bangladesh Forest Research Institute, Sholashahar, Chittagong, Bangladesh.	FRIH
9.	Herbarium, BCSIR Laboratories, Natun Para, Chittagong, Bangladesh.	CLH

3.4 Determination of Threatened and Endangered Species

Threatened and endangered species were determined based on field observations, scrutiny of herbarium specimens and literature review. While determining the IUCN status of the plant species (in country context) occurring in the Bangladesh, the following works were consulted: Ara *et al.* (2013), IUCN-The World Conservation Union (2001, 2003), IUCN-Standards and Petitions Subcommittee (2010, 2013), Khan *et al.* (2001) and Rahamn *et al.* (2010). Plant species having local name/s, economic and/ or ethno-botanical uses were recorded whenever possible through interviewing local people during the period of field surveys. "Plant names of Bangladesh (Huq, 1986)" was also consulted for knowing local names of the species. Indigenous, introduced/ cultivated species were determined with the help of field observations, office records of forest department and other relevant literature review.

3.5 Methods of Presentation

The accepted genera and species under this work are enumerated in an alphabetical order. Dichotomous bracketed keys have been prepared for easy identification. Each genus is accompanied by description, mention of type and key to the species. All species are cited with current nomenclature, commonly known synonyms, description, habitat, distribution and specimen citation. Local name, English name, flowering and fruiting time, chromosome number, mention of type, economic uses or harmful aspects and ethnobotanical information have been added where available. Colour photographs and free hand drawings are also given for all the species. Taxonomic and nomenclature notes are provided where necessary.

CHAPTER 4
THE FAMILY ARACEAE

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THE FAMILY ARACEAE

Araceae is a moderately large monocot family consisting of about 3300 species (Mayo *et al.*, 1997). Members of this family have many special morphological characters, occupy different kinds of habitats and geographical areas, well known for their economic importance, also have harmful chemicals etc. Different aspects of Araceae are presented below under separate headings and sub-headings.

4.1 GENERAL CHARACTERISTICS

4.1.1 Habit

Evergreen to seasonally dormant herbs, perennial, sometimes gigantic, creeper, climbing or subshrubby hemiepiphytes, epiphytes, lithophytes, terrestrial, geophytes, halophytes, sometimes rheophyte, true aquatics, rarely free floating (*Pistia*).

4.1.2 Roots

The roots of the aroids bear the normal monocotyledonous feature characterized by the lack of secondary thickening. There is no truly tuberous root in the family. However, the aroids exhibit a range of morphologically variant forms of roots. Typical roots of aroids are produced at nodes of the stem. Most of the epiphytic climbing taxa like *Rhaphidophora* Hassk., *Scindapsus* Schott, *Pothos* L. have nodal roots. In general the root system is fibrous and conspicuously developed and in epiphytic members aerial adventitious roots are present. Some climbers or tall caulescent plants produce aerial roots, e.g. *Monstera deliciosa* Liebm., *Philodendron bipinnatifidum* Schott *ex* Endl., *Scindapsus* Schott sp. etc. These roots are usually thick in diameter having outer layers of cork cells. The contractile root is observed in various members of the monocotyledons (Arber 1925). In the Araceae, many cormous genera have this type of root, viz. *Typhonium* Schott and *Amorphophallus* Blume *ex* Decaisne etc. The hypogeal rhizomatous genera like *Cryptocoryne* Fischer *ex* Weyler has also contractile root which pull down the corms and rhizomes and thus protect the growing buds.

4.1.3 Stem

Aerial and erect to climbing or creeping with very short (plant rosulate) or very long (plant scandent) internodes or subterranean and consisting of a subglobose to depressed-globose tuber (sometimes turnip or carrot like or irregular in shape) or horizontal or erect rhizome; terrestrial plants and helophytes sometimes arborescent with massive stem and terminal rosette of leaves (*Xanthosoma* Schott, *Alocasia* (Schott) G. Don and *Philodendron* Schott) or arborescent with a pseudostem of petiole sheaths; geophytes often with solitary leaf.

The form of stems of different genera exhibits variations and is characteristic of many genera and subfamily.

In the pothoideae the genera such as *Pothos* L., have epigeal climbing stems with usually comparatively long internodes. In the Monsteroideae, the epiphytic genera, like *Rhaphidophora* Hassk., *Scindapsus* Schott etc., are characterized by erect climbing stems. Moreover they possess distinct nodes and internodes. The Lasioideae such as *Lasia* have a horizontal hypogeal rhizome (rough or spiny). The Aroideae are varied: *Philodendron* Schott generally has epigeal erect or climbing stems; *Aglaonema* Schott, *Dieffenbachia* Schott etc. have erect stems; *Amorphophallus* Blume ex Decaisne has a cormous stems. Some species are rhizomatous or underground modified stems. The underground modified corm or tuber may be simple or branched. The only genus *Pistia* L., is characterized by stoloniferous floating stems containing aerenchyma and terminating in short compact erect stems.

4.1.4 Stolons

Stems may be like either stoloniferous or without stolons. Stolons may be short or long and few or numerous. The stolon of *Colocasia heterochroma* H. Li et Z.X. Wei is very narrow. The genus *Remusatia* Schott contains erect viviparous stolons. *Colocasia esculenta* var. *aquatilis* Hassk. has a poorly developed corm, no cormels and many long stolons. It is used for a vegetable and is commercially cultivated in many countries.

4.1.5 Shoot organization

The mature flowering stem is almost always a sympodium composed of a series of articles, rarely the stem is monopodial (*Potheae*, *Heteropsidaeae*); each articles begins with

(Photo : Stem)

a 2-keeled prophyll (except *Orontioideae*) followed by a series of leaves and terminates with an inflorescence; leaf number per article may be determinate or indeterminate, and from one or very few to very many; the leaves of each article normally consist of a mixture of foliage leaves with partially to fully developed blades and cataphylls; the sympodial leaf is that subtending the inflorescence and may be a foliage leaf or a cataphyll; the prophyll is almost always a cataphyll (except *Orontioideae*); subsequent articles (continuation shoots) normally arise at the second node below the spathe node (except *Orontioideae*); juvenile shoots and flagelliform branches are usually monopodial; terminal inflorescences may be solitary or may form a floral sympodium of several inflorescences; the articles of floral sympodia normally consist of a single 2-keeled prophyll and an inflorescence; the subsequent article of a floral sympodium normally arises in the axile of the preceding prophyll, *i.e.* at the first node below the spathe node.

4.1.6 Leaves

Radical or cauline, simple or compound, usually spirally arranged, sometimes distichous, normally differentiated into petiole and expanded blade, usually glabrous, rarely pubescent, tomentose, villous or with small to large and complex trichomes or papillae (e.g. *Philodendron squamiferum* Poepp. & Endl.) on the petiole; ptyxis usually convolute, rarely involute (e.g. *Anthurium* Schott sect. *Pachyneurium*, *Lagenandra* Dalzell); blade and petiole often variegated or mottled with spots, bands, blotches or irregularly shaped patches and zones of various colours, usually shades and mixtures of green, yellow and silver.

4.1.7 Cataphylls

Caducous, marcescent, deciduous or persistent, sometimes beautifully mottled and patterned (e.g. *Arisaema* Martius, *Asterostigma* F.E.L. Fischer & C.A. Meyer), when persistent sometimes a conspicuous feature of plant and either membranous or forming fibrous mass (e.g. many spp. of *Anthurium* Schott, *Philodendron* Schott).

According to Engler (1920 b) the cataphyll of Araceae corresponds to the petiolar sheath of a foliage leaf. The cataphyll serve the same function as the petiolar sheath, protecting the subtending shoot during ontogeny. It occasionally ends in a little tip that looks like the rudiment of a leaf-blade.

(Shoot)

4.1.8 Petiole

Often as long as or longer than blade, usually smooth, sometimes hairy, papillose, warty, prickly or aculeate (e.g. *Lasioideae*), occasionally covered with large multicellular processes (e.g. *Philodendron squamiferum* Poepp. & Endl.), rarely massively succulent and water-storing (e.g. *Zamioculcas* Schott, *Philodendron martianum* Engl.), often geniculate (plicate) apically (e.g. *Anthurium* Schott), basally or rarely centrally (e.g. *Gonatopus boivinii* (Decne.) Engl.; sheath normally well-developed, often at least half as long as entire petiole, sometimes ligulate apically, often very reduced in sympodial leaves (especially in *Anthurium* Schott, most *Philodendron* Schott ssp.).

In the case of *Colocasia* Schott, *Alocasia* (Schott) G. Don, *Typhonium* Schott etc. the basal portion of the petiole is vaginate and sheathing and the upper portion is cylindrical or sub-cylindrical and tapering. In species of *Anthurium* Schott, *Philodendron* Schott, *Rhaphidophora* Hassk., *Lasia* Lour., *Pothos* L. etc. the petiole is terminated in a pulvinus just at the base of the lamina. In *Amorphophallus* Blume ex Decaisne the petiole is cylindrical without conspicuous vagination at the base, but usually encloses the growing apex of the cormous stem.

4.1.9 Leaf Blade

Simple to compound, extremely variable in shape, rarely filiform (e.g. *Cryptocoryne consobrina* Schott), linear (*Jasarum* Bunting), most commonly elliptic, ovate, oblong, sagittate, hastate, less commonly trifid to trisect, pedatifid to pedatisect, radiatisect, dracontoid (*i.e.* trisect with each primary division further much divided), pinnatifid to pinnatisect (*Zamioculcas* Schott), bipinnatifid, tripinnatifid to quadripinnatifid (*Gonatopus* J.D. Hook. ex Engl.).

Size of the leaf blade may range from diminutive (e.g. *Ambrosina* Bassi) to gigantic (e.g. *Alocasia* (Schott) G. Don, *Amorphophallus* Blume ex Decaisne, *Xanthosoma* Schott etc.).

The leaves are sometimes appearing after flowering as in *Remusatia* Schott, *Amorphophallus* Blume ex Decaisne etc., usually spirally arranged as in *Alocasia* (Schott) G. Don, *Colocasia* Schott etc., or distichous as in *Pothos* L., or rostrate as in *Pistia* L.,

(Leaf shapes)

(Leaf division)

(Alocasia leaf)

oblong (*Lagenandra* Dalzell), sagittate or hastate (*Typhonium* Schott), simple peltate (*Colocasia* Schott, *Remusatia* Schott, *Studnera* K. Koch), pinnately lobed [*Lasia spinosa* (L.) Thw., tripartitly compound (*Amorphophallus* Blume ex Decaisne)].

Fenestrate or perforate leaves occur in few genera of Araceae as in *Monstera* Adanson, *Epiremnium* Schott and *Rhaphidophora* Hassk.

Heteromorphy of leaves is found occurring in species of *Pothos* L. and *Monstera* Adanson where juvenile leaves are morphologically quite different from the adult leaves.

Colour of the leaves also show much variation among different taxa. Usually it is green or light green, but sometimes blotched with purplish on the upper surface (*Colocasia heterochroma* H. Li et Z.X. Wei and *Colocasia fallax* Schott var. *purpurea* H. Ara & A. Hassan) and under surface as in *Studnera* K. Koch or mottled with different colours as in *Caladium* Vent., *Aglaonema* Schott, *Dieffenbachia* Schott etc.

Leaf tips among different taxa of the family are usually apiculate.

4.1.10 Leaf Venation

Ertle (1932) investigated ontogeny of leaf venation and recognized three main types in the family, viz. a) parallel venation, b) reticulate venation, and c) an intermediate venation. Hotta (1969) studied the venation pattern in detail and recognized seven types, viz. a) *Lysichiton* and *Symplocarpus* type, b) *Acorus* type, c) *Philodendroideae* and *Calla* type, d) Reticulate venation, e) Reticulate venation type of *Aroideae*, f) Reticulate venation of *Monsteroideae* and g) Reticulate venation of *Pothos* L. Mayo, Bogner and Boyce (1997) recognized three venation pattern, viz. a) reticulate venation, b) parallel-pinnate venation and c) colocasioid venation. They mentioned midrib almost always differentiated, sometimes massive and succulent (e.g. *Philodendron crassinervium* Lindl.); primary veins usually arising pinnately from midrib (and then called primary lateral veins), either running into marginal vein (e.g. *Philodendron* Schott, *Dieffenbachia* Schott) or joining distally to form a submarginal collective vein on each side (e.g. *Caladium* Vent., many *Anthurium* Schott spp.), sometimes primary veins all arising from petiole insertion and running arcuately into leaf apex (e.g. *Orontium* L., *Anthurium* Schott sect, *Digitinervium*),

(Leaf Venation)

rarely strictly parallel (*Gymnostachys* R. Brown) or subparallel (*Pistia* L.), sometimes not differentiated at all (e.g. *Philodendron crassinervium* Lindl.); secondary and tertiary veins either reticulate (e.g. *Areae*), or parallel-pinnate, i.e. running parallel to primaries (e.g. *Philodendron* Schott), or arising from primaries at a wide angle and then arching strongly towards leaf margin (e.g. *Colocasia* Schott), sometimes forming sinuous or zig-zag interprimary veins (e.g. *Caladieae*); higher order venation reticulated or forming cross connections between lower order vein.

4.1.11 Inflorescence

Terminal, solitary or two to many, usually appearing to be axillary to sympodial, consisting of three parts: a peduncle, a spathe and a spadix; usually erect, sometimes pendant, sometimes becoming pendant after anthesis.

4.1.11(i) Peduncle

Very short to very long, comparative to spathe size, usually similar to petiole in appearance, normally longer than spadix stipe, sometimes suppressed and spadix stipe elongated.

In *Pothos scandens* L. the number of cataphylls ranges from 3-4 and are borne at the peduncle base. In *Lagenandra* Dalzell only one cataphyll is present and is free from the peduncle.

4.1.11(ii) Spathe

The presence of a leaf-like spathe inserted at or near the base of the spadix is characteristic of Araceae. Almost always conspicuous, very variable in shape and colour, simpler forms (eg. many *Anthurium* Schott spp.) often green, reflexed or spreading, more complex forms often showy and highly coloured, erect, usually either boat-shaped or constricted centrally to form a basal tube and an apical blade; tube may enclose the female zone of the spadix or both fertile zones or rarely the entire spadix (e.g. *Cryptocoryne* Fischer ex Wydler), very occasionally much longer than blade, tube margins usually convolute, sometimes connate; blade usually erect and gaping, sometimes widely spreading, twisted, reflexed or, rarely margins \pm closed forming a slit-like opening; spathe constriction may lie between

or above male and female zones or occurs in two places; spathe entirely deciduous soon after anthesis, or tube persistent to fruiting and blade marcescent to deciduous after anthesis, or spathe entirely persistent until fruiting or whole spathe gradually withering and rotting.

The spathe often is green (*Pistia* L.) or white (*Spathiphyllum* Schott) or conspicuously coloured (*Anthurium* Schott). Some species of *Anthurium* Schott has a flat ensiform spathe whereas *Pothos* L. has a more or less boat-shaped spathe. The genus *Philodendron* Schott has a persistent spathe. *Epipremnum* Schott, *Rhaphidophora* Hassk., *Scindapsus* Schott etc. have a convolute spathe more or less completely enclosing the spadix and are ultimately completely deciduous. *Alocasia* (Schott) G. Don, *Colocasia* Schott, *Remusatia* Schott, *Schismatoglottis* Zollinger & Moritzi, *Typhonium* Schott etc. have the spathe differentiated into a basal tubular portion with overlapping margins and an upper expanded spreading of slightly rolled limb portion; and in all the above genera the basal tubular portion of the spathe is persistent and the upper portion is deciduous.

In the case of *Lagenandra* Dalzell, the spathe can be delimited into three parts, viz. the basal convolute portion, the middle limb portion and an apical tail portion. A much more specialized type of spathe is seen in the genera *Cryptocoryne* Fischer ex Wydler where the basal portion of the spathe forms a tube by the fusion of the margins. In *Lagenandra* Dalzell and *Cryptocoryne* Fischer ex Wydler the upper limb portion is partially separated from the lower portion by a partition formed of an auricular ligule-like structure formed from within the tube.

4.1.11(iii) Spadix

Usually erect, often fleshy and relatively thick, sessile or shortly stipitate, rarely very long stipitate, usually free, sometimes adnate basally or entirely to spathe, either uniform in appearance or divided into a distinct floral zone, fertile zone contiguous or separated by sterile zones, female zone always basal and male zone either apical or intermediate in position, rarely bisexual flowers occur between male and female zones; sterile zone may be basal, intermediate or apical or any combination of these, apical sterile zone usually known as terminal appendix, rarely a single plant produces inflorescences bearing male flowers only, followed in later years by inflorescences bearing female flowers only and vice versa.

(Spadix)

(Inflorescences)

Linnaeus (1751) was the first to name the inflorescence type of aroids as spadix (Rickett, 1944) and it is considered to be an extension of the peduncle axis. The spadices are stalked (*Pothos scandens* L.), or more usually, sessile. Shapes range from globose (*Symplocarpus* R. A. Salisbury *ex* Nuttall) or elliptic (*Pothos scandens* L.) to cylindrical (*Lasia* Lour. sp.).

The sexuality of the spadix also exhibits much variations from bisexual to unisexual. Genera with bisexual flowers have homomorphic spadices. The spadices of many genera of Pothoideae, Monsteroideae etc. are homomorphic and are usually completely covered with bisexual flowers.

Genera with unisexual flowers have heteromorphic spadices, where it is differentiated into at least three parts viz. a basal pistillate portion, a middle male portion and an apical naked sterile portion (*Amorphophallus* Blume *ex* Decaisne); or sometimes into more parts with the occurrence of a neuteriflorous or naked portions usually in between the pistillate and staminate portions as in the case of *Typhonium* Schott, *Therophonum* Blume etc.

4.1.11(iv) Flowers

The genera *Pothos* L., *Anaphyllum* Schott, *Lasia* Lour. etc. have bisexual flowers. Unisexual flowers are found in *Amorphophallus* Blume *ex* Decaisne, *Arisaema* Martius, *Sauromatum* Schott, *Therophonum* Blume, *Typhonium* Schott etc.

Usually the bisexual flowers are with or without a perigone (perianth) and unisexual flowers are without perigone (perianth). The primitive floral structure is considered to be trimerous as represented in *Acorus* L., *Pothos* L. etc. In other taxa the floral whorls are di- or tetramerous or rather inconstant. The genera *Lasia* Lour, *Anaphyllum* Schott etc. have di- or tetra or rarely pentamerous perianth. The perianth shape also exhibit variation from lanceolate to ovate-rounded with vaulted apices. The perianth lobes usually have a single trace vascular supply. In *Zamioculcas* Schott the perianth is three-traced. In species of *Spathiphyllum* Schott, and *Anadendrum montanum* Schott no vascular supply in the perianth was reported, suggested to be due to degeneration. In some cases perianth is partially connate as in some species of *Pothos* L. and most notably in *Spathiphyllum* Schott sect. *Massowia*.

4.1.11(v) Perigone

Composed of free or partially connate tepals, or consisting of a single cup like structure, when free, tepals 4-6 (-8) and imbricate in 2 whorls, membranous or more commonly thickened at least apically, truncate to cucullate.

4.1.11(vi) Female flowers

Gynoceium sometimes surrounded by a whorl of variously shaped staminodes, or sometimes \pm regularly associated with a single clavate staminodes.

4.1.11(vii) Gynoecium

Ovary usually 1-3 locular, rarely more, ovules 1-many per locule, orthotropous or hemiorthotropous, amphitropous, hemianatropous or anatropous; placenta 1- several, axile, parietal, apical, basal, or basal and apical; stylar region usually well developed, usually as least as broad as ovary, sometimes attenuate and elongate or massive and truncate, rarely dilated and connate with neighbouring gynoecia; stigma hemispheric, capitate, discoid, more or less strongly lobed, sometimes brightly coloured, sometimes producing conspicuous nectar droplet.

In bisexual flowers the pistil is surrounded by stamens and in unisexual flowers the pistillate flowers are usually naked and attached to the lower portion of the spadix usually in more than one spiral whorl forming a more or less cylindrical mass as in *Amorphophallus* Blume ex Decaisne or a globose mass as in *Typhonium* Schott, *Lagenandra* Dalzell etc. In *Cryptocoryne* Fischer ex Wydler the pistillate flowers are few and in a single whorl but united into a syncarp. In *Pistia* L. there is only one pistillate flower attached to the spathe at the base.

There is wide range of variations in the shape and structure of pistils in the family. The pistils usually have an ovary, a terminal style and an apical stigma. The ovary is usually 3-locular in primitive genera such as *Pothos* L.; 1-locular as in *Typhonium* Schott; 2-many-locular as in species of *Amorphophallus* Blume ex Decaisne etc. It is plurilocular in *Philodendron* Schott. The number of ovules per locule also vary from 1 as in *Lasia* Lour.,

Typhonium Schott etc., as in *Rhaphidophora* Hassk. and others. The placentation ranges from basal as in the case of *Typhonium* Schott, *Lagenandra* Dalzell etc., parietal as in *Remusatia* Schott, axile as in *Rhaphidophora* Hassk. Many members of Monsteroideae have pistil with undifferentiated style between the ovary and stigma which seem like an ovary with sessile stigma. In the tribe Monstereae this stylar region is especially well developed and densely filled with trichosclereids. Here the style seems to substitute functionally for a perianth in protecting the sexual organs of the flowers. Majority of the species of Pothoideae are devoid of styles. Many species of Aroideae are provided with distinct styles as in *Amorphophallus paeoniifolius* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan, *Amorphophallus nepalensis* (Wall.) Bogner & Mayo etc. The stigma also are of varied shapes from discoid, globose, lobated to linear. In one and the same genus different shaped stigma are observed, e.g., discoid (unlobed) in *Typhonium trilobatum* (L.) Schott, kidney-shaped (2-lobed) or three-lobed in *Amorphophallus paeoniifolius* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan, linear as in *Epipremnum pinnatum* (L.) Engl.

4.1.11(viii) Male Flowers

1-8 androus, floral grouping of stamens sometimes obvious in mature inflorescence; stamens free or partially to completely connate to form a synandrium.

4.1.11(ix) Stamens

Usually free, equal in number and opposite to tepals (when present), rarely more; filaments distinct, often \pm oblong and flattened, rarely filiform; anthers usually terminal, basifixed, always composed of two thecae each with two microsporangia; connective usually slender, inconspicuous, thecae dehiscent by single longitudinal slit or apical stomial pore.

A single stamen is usually represented by a filament with 2-anthers attached to it as in the bisexually flowered genera like *Pothos* L., *Lasia* Lour. etc. The filaments are usually flat, and usually elongate to protrude out of perianth or above the pistils at the time of anthesis or afterwards. In the unisexual flowers the stamens are free, or united to form synandria. In *Lagenandra* Dalzell, *Typhonium* Schott, *Amorphophallus paeoniifolius* (Dennst.)

Nicolson var. *campanulatus* (Decne.) Sivadasan etc. the stamens are free and 2-anthered and sessile. In *Cryptocoryne* Fischer ex Wylder and *Lagenandra* Dalzell, there are small tubular structure at the top of the anthers through which pollen grains are extruded. The dehiscence of anthers are by lateral slits towards the apex which can become ultimately seem to be apical as in *Lasia*, or by apical pores as in *Amorphophallus* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan, *Typhonium* Schott etc.

In *Pistia* L. all the stamens (4 or 5) are borne on a single stalk surrounded by a cupular structure at the base. In *Ariopsis* Nimmo stamens are sunken in the tissue of the spadix and the anthers dehisce into the central cavity and the pollen are released through the pore at the top.

4.1.11(x) Synandrium

Usually \pm sessile, sometimes formed by fusion of filaments only, more commonly composed of completely connate stamens and then usually apically truncate and \pm prismatic in apical cross section, sometimes mushroom shaped or cylindrical, very rarely the synandria themselves connate; common connectives usually broad, fleshy; thecae either lateral, apical or marginal depending on the degree of elongation of the thecae and the extent to which they are overtopped by the common connective, dehiscing by single longitudinal slit or apical stomatal pore.

In the unisexual members like *Remusatia* Schott, *Colocasia* Schott, *Alocasia* (Schott) G. Don etc., the anthers are united to form synandria which may be sessile and the dehiscence is by apical pore.

4.1.11(xi) Terminal Appendix

Present only in some genera, partly or completely covered with staminodes, rugose or corrugated, or entirely smooth, intermediate condition also occur.

The appendix shape varies from filiform, subulate, conical, ovoid, to hemispherical.

4.1.11(xii) Neuter Flowers

In many species with unisexual flowers, neuter (sterile) flowers are found between the male and female flowers (*Amorphophallus margaritiferum* (Roxb.) Kunth, *Typhonium trilobatum* (L.) Schott, *T. roxburghii* Schott etc.). The shape of the neuters also vary from subulate, erect, or slightly incurved as in *Typhonium blumei* Nicolson & Sivadasan, pearl-shaped as in *Amorphophallus margaritiferum* (Roxb.) Kunth, sub-rhomboidal, as in *Alocasia* (Schott) G. Don and *Colocasia* Schott. The shape of the neuters is not specific to genera. In some species it is heteromorphic, i.e. with different shapes as in *Typhonium flagelliforme* (Lodd.) Blume. In species of *Cryptocoryne* Fischer ex Wydler specialized structure called “olfactory bodies” represent the neuters which are just above the pistillate flowers.

4.1.11(xiii) Fruit

Normally a juicy berry, rarely mesocarp leathery or dry; berries normally free, rarely connate or connate and dehiscent as a syncarp, usually red, orange or purplish red, sometimes white, yellow, green, very rarely blue or brownish infructescence densely packed, cylindric to globose, exposed by withering, basal abscission or splitting of spathe, rarely berries dehiscent, either basally or apically when seeds exposed by \pm simultaneous sloughing of styler regions of all berries.

In *Cryptocoryne* Fischer ex Wydler the fruit is a syncarp formed of 4-7 pistills which dehisces septicidally. *Lagenandra* Dalzell is characterized by fruits which are fleshy capsules which detach from the “columella” (the basal axis of the spadix) and rupture vertically from base to top at different points with the fruit walls bending outwards to liberate the seeds, but aroid berries are otherwise inehiscent.

Various mechanisms are observed for protection of the developing fruits and seeds (Madison 1979). In the *Monstereae*, which have bisexual but nacket flowers, the thick styler region is filled with trichosclereids which protect the developing seeds. At maturity the styler region is shed to reveal the seeds. In perigoniate genera like *Anthurum* Schott the perigone clearly plays a protective role and keeps pace with the growth of the developing

berry, until berry maturity at which point the ripe fruit is squeezed out of the perigone and hangs by slender threads from the tepals.

In many unisexual flowered genera the protective function is assumed by the persistent spathe or spathe tube. Spathe growth continues around the developing fruits until maturity when the spathe may split open (*Alocasia* (Schott) G. Don, *Dieffenbachia* Schott) or absciss at the base (*Philodendron* Schott), exposing the infructescence of white or coloured berries. In other monoecious genera, however, the spathe is marcescent and plays no role in seed protection. In such cases (e.g. *Arum* L.) protection may possibly through the presence of toxic chemical compounds in the berries (Mayo, Bogner & Boyce 1997)

4.1.11(xiv) Seed

1-many per berry; testa thick to thin, smooth, roughened, papery in seeds with highly developed embryo; embryo usually straight, sometimes curved, usually undifferentiated, rarely with highly developed plumule (*Cryptocoryne ciliata* (Roxb.) Fischer *ex* Wydler); endosperm copious or absent, with all intermediate states occurring.

Seeds are of various shapes: Ovoid and elliptic as in *Amorphophallus* Blume *ex* Decaisne, *Pothos* L.etc; straight as in *Lagenandra* Dalzell and *Cryptocoryne* Fischer *ex* Wydler, curved as in *Epipremnum* Schott. The seed coat (testa) is smooth as in the species of *Amorphophallus* Blume *ex* Decaisne and *Pothos* L., or reticulately ridged as in *Typhonium* Schott, *Theriophonum* Blume etc. or longitudinally ribbed as in *Lagenandra* Dalzell and *Cryptocoryne* Fischer *ex* Wydler.

The seeds are often embedded in mucilaginous pulp. In *Anthurium* Schott the inner layer of the pericarp may also be mucilaginous and in other genera the outer integument becomes mucilaginous. This makes the seeds sticky and aids the dispersal of epiphytic and hemiepiphytic species to new sites by birds or mammals.

The amount of endosperm in the seed varies considerably within the family and has long been regarded as a useful taxonomic character at tribal level (Mayo, Bogner & Boyce 1997).

4.2 CLASSIFICATION

4.2.1 The Nomenclatural History

A.L. de Jussieu in 1759 used the name 'Aroideae' for the group with its constituent taxa having spadix on *spadix*-like inflorescence which included some non-aroid genera such as *Lemna* L., *Saururus* Plum ex L., *Zannichellia* L., *Ruppia* L., *Potamogeton* L. and *Menyanthes* (Tourn.) L. The name 'Ara' (the nominative plural of *Arum*) was assigned to the 'Arum' family by Adanson in 1763, he also included many non-aroid genera. The familial name 'Araceae' was first used by Necker in 1770, his Araceae also included many non-aroid genera. However Bentham and Hooker (1883) have retained the name 'Aroideae' for their natural order (equivalent to present day family).

A.L. de Jussieu's *Genera Plantarum* (1789) has been accepted as the starting point for family nomenclature and at the ninth International Botanical Congress held in 1959 at Montreal : **Araceae** was conserved as the familial name. de Jussieu did not follow the modern convention of using stem of the type genus and adding '-aceae' for naming the families in his treatment.

He usually used the nominative plural of generic name (hence *Amaranthi*, *Araliae*, *Capparides*) except for neuter names in which the plural ends in - 'a' and might be confused with feminine generic name. Therefore he shifted from *Ara* (based on *Arum*) to Aroideae (adding '-oideae' to the stem *Arum*).

Thus, the Committee on family nomenclature decided to conserve the family name from de Jussieu with standardized spelling (adding - 'aceae' to the stem of the type genus) and hence de Jussieu's familial name 'Aroideae' became **Araceae**.

4.2.2 Classification Systems

Araceae (earlier Aroideae) is a moderately large family consisting various taxa of taxonomical importance. Therefore many workers came forward to present a suitable and acceptable classification of the family. Only a few (seven) of them are presented below :

- 4.2.2(i) Schott's (1860) classification.
- 4.2.2(ii) Hooker's (1883) classification.
- 4.2.2(iii) Engler's (1876) classification.
- 4.2.2(iv) Engler's (1920) classification.
- 4.2.2(v) Grayum's (1990) classification.
- 4.2.2(vi) Bogner & Nicolson's (1991) classification.
- 4.2.2(vii) Mayo, Bogner and Boyce (1997) classification.

4.2.2(i) Schott's (1860) Classification

The first important classification of the Araceae in the post-Linnaean period was that by Heinrich Wilhelm Schott. He had a very good knowledge of the family and his first major publication on the family appeared in 1832, when Schott and Endlicher published **Meletemata Botanica**. In this work thirty-seven genera were recognized, including most of the well known genera of present day under two orders "Araceae" and "Acoroideae". This work is a precursor of his later works on the system of classification.

In 1856 Schott published **Synopsis Aroidearum** which was a partial treatment of the classification. Here he used the name "Aroideae" for the whole group and divided it into (i) Diclines and (ii) Monoclines. The Diclines was further divided into (A) Efilamentatas and (B) Filamentatas. Again they were subdivided and altogether 9 tribes were recognized which were in some cases again divided into sub-tribes and a total of 49 genera. Nothing was mentioned about the taxa of the "Monoclines".

Schott's **Genera Aroidearum** was published in 1858 which contains illustrations of 104 genera belonging to 14 tribes and 27 sub-tribes. A few are synonyms of other genera by current standards. In 1860 he published his final monograph of the family, the **Prodromus Systematis Aroidearum** where he recognized 110 genera, almost all of which are still recognized today as genera or as subgenera. An outline of Schott's scheme of aroid classification is given below (names and taxon numbers are as in the original publication) :

Aroideae

I. Diclines

A. Efilamentatae

a. Stenozeugmaticae

α. Orthotropoae

Tribus Alleluchieae

Subtr. Cryptocoryninae

1. *Cryptocoryne*

2. *Lagenandra*

Subtr. Pinellinae

3. *Pinellia*

Tribus Arisareae

4. *Arisarum*

5. *Arisaema*

Tribus Dracunculeae

Subtr. Biarinae

6. *Biarum*

7. *Leptopetion*

8. *Cyllenium*

9. *Ischarum*

10. *Sauromatum*

Subtr. Arinae

11. *Gymnomesium*

12. *Arum*

Subtr. Helicophyllinae

13. *Theriophonum*

14. *Tapinocarpus*

15. *Calyptrocoryne*

16. *Typhonium*

17. *Heterostalis*

18. *Eminium*

19. *Helicophyllum*

20. *Helicodiceros*

Subtr. Dracunculinae

21. *Dracunculus*
- B. Anatropeae
- Tribus Zomicarpeae
22. *Zomicarpa*
- Tribus Pythonieae
- Subtr. Amorphophallinae
23. *Allophythion*
24. *Pythonium*
25. *Plesmonium*
26. *Rhaphiophallus*
27. *Synantherias*
28. *Brachyspatha*
29. *Conophallus*
30. *Amorphophallus*
- Subtr. Hydrosmineae
31. *Corynophallus*
32. *Hydrosme*
33. *Hansalia*
34. *Anchomanes*
- b. Pachyzeugmaticae
- α. Gymnogoneae
- Tribus Caladieae
- Subtr. Colocasinae
35. *Ariopsis*
36. *Remusatia*
37. *Colocasia*
38. *Leucocasia*
- Subtr. Alocasinae
39. *Gonatanthus*
40. *Alocasia*
41. *Peltandra*
- Subtr. Anubiadinae
42. *Anubias*
- Subtr. Syngoninae
43. *Typhonodorum*
44. *Hapaline*
45. *Caladium*
46. *Xanthosoma*
47. *Acontias*
48. *Syngonium*
- Subtr. Problematicae
49. *Zamioculcas*
- Tribus Philodendreae
- Subtr. Aninginae
50. *Montrichardia*
- Subtr. Culcasinae
51. *Culcasia*
52. *Nephtythis*
53. *Cercestis*
- Subtr. Philodendrinae
54. *Philodendron*
- Subtr. Anaporinae
55. *Aglaonema*
56. *Aglaodorum*
- Subtr. Homalomeninae
57. *Zantedeschia*
58. *Homalomena*
59. *Chamaecladon*
- Subtr. Adeloneminae
60. *Adelonema*
61. *Philonotium*
- Subtr. Schismatoglottidinae
62. *Apatemone*
63. *Bucephalandra*
64. *Apoballis*
- β. Peristatogoneae
- Tribus Richardieae
65. *Richardia*
- Tribus Asterostigmeae
- Subtr. Dieffenbachininae
66. *Dieffenbachia*
- Subtr. Asterostigmatinae
67. *Mangonia*
68. *Taccarum*
69. *Asterostigma*
70. *Rhopalostigmium*
71. *Andromycia*
- Subtr. Spathicarpinae
72. *Spathicarpa*
73. *Spathantheum*
- B. Filamentatae
- Tribus Stylochitoneae
74. *Stylochiton*
- II. Monoclines
- Tribus Calleae

Subtr. Callinae	92. <i>Lasiomorpha</i>
75. <i>Calla</i>	93. <i>Urospatha</i>
Subtr. Monsterinae	94. <i>Arisacontis</i>
76. <i>Stenospermatum</i>	Subtr. Dracontioninae
77. <i>Atimeta</i>	95. <i>Dracontium</i>
78. <i>Rhodospatha</i>	96. <i>Echidnium</i>
79. <i>Anepsias</i>	97. <i>Ophione</i>
80. <i>Tornelia</i>	98. <i>Symplocarpus</i>
81. <i>Alloschemone</i>	Subtr. Orontioninae
82. <i>Monstera</i>	99. <i>Lysichiton</i>
83. <i>Heteropsis</i>	100. <i>Orontium</i>
84. <i>Rhaphidophora</i>	Subtr. Spathiphyllinae
85. <i>Epipremnum</i>	101. <i>Spathiphyllum</i>
86. <i>Anadendron</i>	Subtr. Anthurinae
87. <i>Scindapsus</i>	102. <i>Anthurium</i>
88. <i>Cuscuaria</i>	Subtr. Pothoinae
	103. <i>Pothos</i>
Tribus Orontieae	104. <i>Pothoidium</i>
Subtr. Lasinae	Subtr. Acorinae
89. <i>Lasia</i>	105. <i>Gymnostachys</i>
90. <i>Cyrtosperma</i>	106. <i>Acorus</i>
91. <i>Anaphyllum</i>	

4.2.2(ii) Hooker's (1883) Classification

Hooker in Bentham & Hooker's **Genera Plantarum** (1883) listed and described 98 genera and mentioned 900 species in his treatment of the family. His classification, like Schott's, was based primarily on floral characters, and divided the family into 11 tribes included in three series as follows:

Series A. Flowers monoecious (Sometimes dioecious – in *Arisaema*), perianth 0.

Tribe I. Arineae	<i>Theriophonum</i>
	<i>Helicophyllum</i>
Subtribe 1. Alleluchieae	<i>Helicodicros</i>
<i>Cryptocoryne</i>	<i>Dracunculus</i>
<i>Lagenandra</i>	
<i>Pinellia</i>	Tribe II. Stylochitoneae
<i>Ambrosinia</i>	<i>Stylochiton</i>
Subtribe 2. Pistieae	
<i>Pistia</i>	Tribe III. Zomicarpeae
Subtribe 3. Arisareae	<i>Zomicarpa</i>
<i>Arisarum</i>	<i>Zomicarpella</i>
<i>Arisaema</i>	
Subtribe 4. Euarineae	Tribe IV. Phythonieae
<i>Biarum</i>	<i>Amorphophallus</i>
<i>Sauromatum</i>	<i>Thomsonia</i>
<i>Arum</i>	<i>Pseudodracontium</i>
<i>Typhonium</i>	<i>Synantherias</i>

- Raphiophallus*
Xenophya
Plesmonium
Anchomanes
- Tribe V. Colocasieae
- Ariopsis*
Remusatia
Gonatanthus
Colocasia
Alocasia
Anubias
Peltandra
Caladium
Xanthosoma
Typhonodorum
Chlorospatha
Hepaline
Scaphispatha
Schizocasia
- Tribe VI. Philodendreae
- Philodendron*
Thaumatophyllum
Syngonium
Porphyrospatha
Culcasia
Cercestis
Rhektophyllum
- Aglaonema*
Philonotion
Montrichardia
Nephtytis
Richardia
Homalonema
Chamaecladon
Schismatoglottis
Apatemone
Bucephalandra
Rhynchopyle
Piptospatha
Gamogyne
Microcasia
- Tribe VII. Dieffenbachieae
- Dieffenbachia*
Taccarum
Andromycia
Staurostigma
Gearum
Mangonia
Steundnera
Gorgonidium
- Tribe VIII. Spathicarpeae
- Spathicarpa*
Spathantheum

Series B. Flowers hermaphroditic, perianth 0.

- Tribe IX. Calleae
- Calla*
Stenospermation
Rhodospatha
Heteropsis
Anadendrum
Monstera
Scindapsus
Rhaphidophora
Epipremnum

Series C. Flowers all hermaphroditic (except *Zamioculcas*), perianth with 4-8 distinct segments.

Tribe X. *Zamioculcaseae*

Zamioculcas

Tribe XI. *Orontieae*

Subtribe 1. *Euorontieae*

Orontium

Lysichiton

Subtribe 2. *Dracontieae*

Symplocarpus

Dracontium

Subtribe 3. *Lasieae*

Lasia

Podolasia

Urospatha

Anaphyllum

Ophione

Cyrtosperma

Subtribe 4. *Spathiphyllaeae*

Spathiphyllum

Subtribe 5. *Anthurieae*

Anthurium

Subtribe 6. *Pothonieae*

Pothos

Pothodium

Subtribe 7. *Acoreae*

Acorus

Gymnostachys

4.2.2(iii) Engler's (1876b) Classification

Engler (1876) classified the whole aroids under 9 subfamilies. It was based chiefly on vegetative characters in addition to floral characters. The system contains 29 tribes and 18 subtribes. Names in brackets indicate genera accepted by Schott which Engler considered better reduced to synonymy. An outline of the system of classification is given below (names and taxon numbers are as in the original publication):

Araceae	<i>Scindapsus</i>
1. Subfam. Pothoideae	<i>Cuscuaria</i>
Trib. Pothoeae	<i>Monstera</i>
Subtrib. Pothoinae	(<i>Tornelia</i>)
<i>Pothos</i>	<i>Alloschemone</i>
<i>Pothodium</i>	
<i>Anadendron</i>	
Subtrib. Heteropsinae	
<i>Heteropsis</i>	
? <i>Amydrium</i>	
Subtrib. Culcasinae	
<i>Culcasia</i>	
Trib. Anthurieae	
<i>Anthurium</i>	
Trib. Zamioculcaseae	
<i>Zamioculcas</i>	
(<i>Gonatopus</i>)	
Trib. Symplocarpeae	
<i>Lysichitum</i>	
<i>Symplocarpus</i>	
<i>Orontium</i>	
Trib. Calleae	
<i>Calla</i>	
Trib. Acoreae	
<i>Acorus</i>	
<i>Gymnostachys</i>	
2. Subfam. Monsteroideae	
Trib. Anepsiadeae	
Subtrib. Spathiphyllinae	
<i>Spathiphyllum</i>	
<i>Amomophyllum</i>	
(<i>Spathiphylopsis</i>)	
Subtrib. Anepsidinae	
<i>Anepsias</i>	
<i>Rhodopatha</i>	
(<i>Atimeta</i>)	
<i>Stenospermatum</i>	
Trib. Raphidophoreae	
<i>Raphidophora</i>	
<i>Epipremnum</i>	
Trib. Monstereae	
	3. Subfam. Lasioideae
	Trib. Lasieae
	Subtrib. Lasinae
	<i>Cyrtosperma</i>
	(<i>Lasimorpha</i>)
	<i>Lasia</i>
	<i>Anaphyllum</i>
	Subtrib. Dracontioninae
	<i>Urospatha</i>
	<i>Echidnium</i>
	<i>Ophione</i>
	<i>Dracontium</i>
	(<i>Godwinia</i>)
	(<i>Chersydrium</i>)
	Trib. Montrichardieae
	<i>Cercestis</i>
	<i>Nephtyitis</i>
	<i>Montrichardia</i>
	<i>Syngonium</i>
	Trib. Amorphophalleae
	Subtrib. Pythoninae
	<i>Anchomanes</i>
	<i>Plesmonium</i>
	<i>Allophythion</i>
	<i>Pythonium</i>
	Subtrib. Amorphophallinae
	<i>Amorphophallus</i>
	(<i>Conophallus</i>)
	(<i>Proteinophallus</i>)
	(<i>Brachyspatha</i>)
	<i>Synantherias</i>
	<i>Corynophallus</i>
	<i>Hydrosme</i>
	(<i>Hansalia</i>)
	<i>Raphiophallus</i>

4. Subfam. Philodendroideae
 Trib. Richardieae
Richardia
 Trib. Peltandreae
Peltandra
 ?Trib. Typhonodoreae
Typhonodorum
 Trib. Philodendreae
 Subtrib. Homalomeninae
Homalomena
 (*Curmeria*)
Chamaecladon
 ?*Adelonema*
 Subtrib. Schismatoglottidinae
Bucephalandra
Schismatoglottis
 (*Apoballis*)
 (*Colobogynium*)
Apatemone
 Subtrib. Philodendrinae
Philodendron
Philonotion
 Trib. Anubiadeae
Anubias
5. Subfam. Aglaonemoideae
 Trib. Aglaonemeae
Aglaonema
 ??*Aglaodorum*
 Trib. Dieffenbachieae
Dieffenbachia
6. Subfam. Colocasioideae
 Trib. Steudnerae
Staudnera
 Trib. Caladieae
Caladium
 ?*Xanthosoma*
 (*Acontias*)
 (*Phyllotaenium*)
 (*Andromycia*)
 Trib. Colocasieae
 Subtrib. Colocasinae
Colocasia
 (*Leucocasia*)
Schizocasia
Remusatia
 Subtrib. Alocasinae
Alocasia
Gonatanthus
7. Subfam. Staurostigmaoideae
Mangonia
Staurostigma
 ?*Gamochlamys*
8. Subfam. Aroideae
 Trib. Stylochitoneae
Stylochiton
 Trib. Zomicarpeae
Zomicarpa
Xenophya
 Trib. Ariopsidae
Ariopsis
 Trib. Spathicarpeae
Spathanthemum
Spathicarpa
 ?*Gorgonidium*
 Trib. Areae
 Subtrib. Arisarinae
Arisarum
Arisaema
Pinellia
 Subtrib. Sauromatinae
Sauromatum
 Subtrib. Biarinae
Biarum
Leptopetion
 (*Ischarum*)
 (*Cyllenium*)
 Subtrib. Arinae
Arum
 (*Gymnomesium*)
Helicodiceros
Helicophyllum
 (*Eminium*)
Dracunculus
Theriophonum
 (*Tapinocarpus*)
 (*Calyptrocoryne*)
Typhonium
 (*Heterostalis*)
 Trib. Ambrosinieae
Ambrosinia
 Trib. Cryptocoryneae
Lagenandra
Cryptocoryne
9. Subfam. Pistioideae
Pistia
10. Subfam. Lemnoideae
 Trib. Lemneae
Spirodela
Lemna
 Trib. Wolffieae
Wolffia

4.2.2(iv) Engler's (1920b) Classification

Engler completed his final monograph of the family incorporating all genera and species recognized till then which come to a total of 30 tribes and 107 genera. This classification was based primarily on vegetative anatomy and morphology and it represented a radically new classification of the family, compared with those of Schott and Hooker. A brief scheme of Engler's (1920b) classification system of Araceae is given below (names and taxon numbers are as in the original publication):

Araceae

- | | |
|--------------------------------|------------------------------------|
| Subfam. I. Pothoideae | |
| Trib. Pothoeae | Trib. Calleae |
| 1. <i>Pothos</i> | 26. <i>Calla</i> |
| 2. <i>Pothoidium</i> | |
| 3. <i>Anadendron</i> | Subfam. IV. <i>Lasioideae</i> |
| 3a. <i>Epipremnopsis</i> | Trib. Lasieae |
| Trib. Heteropsidae | 27. <i>Cyrtosperma</i> |
| 4. <i>Heteropsis</i> | 28. <i>Lasia</i> |
| Trib. Anthurieae | 29. <i>Anaphyllum</i> |
| 5. <i>Anthurium</i> | 30. <i>Podolasia</i> |
| Trib. Culcasieae | 31. <i>Urospatha</i> |
| 6. <i>Culcasia</i> | 32. <i>Dracontioides</i> |
| Trib. Zamioculcaseae | 33. <i>Echidnium</i> |
| 7. <i>Zamioculcas</i> | 34. <i>Dracontium</i> |
| 8. <i>Gonatopus</i> | |
| Trib. Acoreae | Trib. Amorphophalleae |
| 9. <i>Acorus</i> | 35. <i>Pseudohydrosme</i> |
| 10. <i>Gymnostachys</i> | 36. <i>Plesmonium</i> |
| Subfam. II. Monsteroideae | 37. <i>Anchomanes</i> |
| Trib. Monstereae | 38. <i>Thomsonia</i> |
| 11. <i>Raphidophora</i> | 39. <i>Pseudodracontium</i> |
| 12. <i>Afroraphidophora</i> | 40. <i>Amorphophallus</i> |
| 13. <i>Epipremnum</i> | Trib. Nephthytideae |
| 14. <i>Scindapsus</i> | 41. <i>Nephthytis</i> |
| 15. <i>Stenospermation</i> | 42. <i>Cercestis</i> |
| 16. <i>Rhodospatha</i> | 43. <i>Rhektophyllum</i> |
| 17. <i>Anepsias</i> | Trib. Montrichardieae |
| 18. <i>Monstera</i> | 44. <i>Montrichardia</i> |
| 19. <i>Alloschemone</i> | |
| 20. <i>Amydrium</i> | Subfam. V. <i>Philodendroideae</i> |
| Trib. Spathiphyllaeae | Trib. Philodendreae |
| 21. <i>Spathiphyllum</i> | Subtrib. Homalomeninae |
| 22. <i>Holochlamys</i> | 45. <i>Homalomena</i> |
| | 46. <i>Diandriella</i> |
| Subfam. III. <i>Calloideae</i> | Subtrib. Schismatoglottidinae |
| Trib. Symplocarpeae | 47. <i>Schismatoglottis</i> |
| 23. <i>Lysichitum</i> | 48. <i>Bucephalandra</i> |
| 24. <i>Symplocarpus</i> | 49. <i>Aridarum</i> |
| 25. <i>Orontium</i> | 50. <i>Piptospatha</i> |

51. *Microcasia*

- | | | | |
|----------|---------------------------|----------|---------------------------|
| Subtrib. | Philodendrinae | Trib. | Asterostigmateae |
| | 52. <i>Philodendron</i> | | 77. <i>Mangonia</i> |
| | 53. <i>Philonotion</i> | | 78. <i>Andromycia</i> |
| Trib. | Anubiadeae | | 79. <i>Taccarum</i> |
| | 54a. <i>Amauriella</i> | | 80. <i>Asterostigma</i> |
| | 54b. <i>Anubias</i> | | 81. <i>Synandropsadix</i> |
| Trib. | Aglaonemateae | | 82. <i>Spathantheum</i> |
| | 55. <i>Aglaonema</i> | | 83. <i>Gorgonidium</i> |
| | 56. <i>Aglaodorum</i> | | 84. <i>Gearum</i> |
| Trib. | Dieffenbachieae | Trib. | 85. <i>Spathicarpa</i> |
| | 57. <i>Dieffenbachia</i> | | Protareae |
| Trib. | Zantedeschieae | | 86. <i>Protarum</i> |
| | 58. <i>Zantedeschia</i> | Trib. | Callopsideae |
| Trib. | Typhonodoreae | | 87. <i>Callopsi</i> |
| | 59. <i>Typhonodorum</i> | Trib. | Zomicarpeae |
| Trib. | Peltandreae | | 88. <i>Scaphispatha</i> |
| | 60. <i>Peltandra</i> | | 89. <i>Xenophya</i> |
| | | | 90. <i>Zomicarpa</i> |
| Subfam. | VI. Colocasioideae | | 91. <i>Zomicarpella</i> |
| Trib. | Colocasiaceae | | 92. <i>Ulearum</i> |
| Subtrib. | Steudnerinae | Trib. | Areace |
| | 61. <i>Steudnera</i> | subtrib. | Arinae |
| | 62. <i>Remusatia</i> | | 93. <i>Arum</i> |
| | 63. <i>Gonatanthus</i> | | 94. <i>Dracunculus</i> |
| Subtrib. | <i>Hapalininae</i> | | 95. <i>Helicodiceros</i> |
| | 64. <i>Hapaline</i> | | 96. <i>Therionophnum</i> |
| Subtrib. | <i>Caladiinae</i> | | 97. <i>Typhonium</i> |
| | 65. <i>Caladiopsis</i> | | 98. <i>Sauromatum</i> |
| | 66. <i>Caladium</i> | | 99. <i>Eminium</i> |
| | 67. <i>Aphyllarum</i> | | 100. <i>Biarum</i> |
| | 68. <i>Chlorospatha</i> | Subtrib. | Arisarinae |
| | 69. <i>Xanthosoma</i> | | 101. <i>Arisarum</i> |
| Subtrib. | <i>Colocasiinae</i> | Subtrib. | Arisaematinae |
| | 70. <i>Colocasia</i> | | 102. <i>Arisaema</i> |
| Subtrib. | <i>Alocasiinae</i> | Subtrib. | Pinelliinae |
| | 71. <i>Alocasia</i> | | 103. <i>Pinellia</i> |
| | 72. <i>Schizocasia</i> | Subtrib. | Ambrosiniinae |
| Trib. | Syngonieae | | 104. <i>Ambrosinia</i> |
| | 73. <i>Porphyrospatha</i> | Subtrib. | Cryptocoryninae |
| | 74. <i>Syngonium</i> | | 105. <i>Lagenandra</i> |
| Trib. | Ariopsidaeae | | 106. <i>Cryptocoryne</i> |
| | 76. <i>Ariopsis</i> | | |
| Subfam. | VII. Aroideae | Subfam. | IX. Pistioideae |
| Trib. | Stylochitoneae | | 107. <i>Pistia</i> |
| | 76. <i>Stylochiton</i> | | |

4.2.2(v) Grayum's (1990) Classification

His research, though concentrating on the first rigorous survey of pollen using scanning electron microscopy, also involved the most thorough analysis of all morphological character. The system contains 5 subfamilies, 40 tribes, 13 subtribes and 105 genera. An outline of Grayum's scheme of aroid classification is given below (names and taxon numbers are as in the original publication):

Araceae	<i>Calloopsis</i>
I. Subfam. Pothoideae	<i>Ulearum</i>
Trib. Gymonostachydeae	<i>Filarum</i>
<i>Gymnostachys</i>	<i>Zomicarpella</i>
Trib. Spathiphyllaeae	Trib. Montrichardieae
<i>Spathiphyllum</i>	<i>Montrichardia</i>
<i>Holochlamys</i>	Aglaonema Alliance
Trib. Anthurieae	Trib. Anubiadeae
<i>Anthurium</i>	<i>Anubias</i>
Trib. Potheae	Trib. Zantedeschieae
<i>Pothos</i>	<i>Zantedeschia</i>
<i>Pedicellarum</i>	Trib. Aglaonemateae
<i>Pothodium</i>	<i>Aglaonema</i>
Trib. Anadendreae	<i>Aglaodorum</i>
<i>Anadendrum</i>	Trib. Spathicarpeae
Trib. Monstereae	<i>Mangonia</i>
Subtrib. Heteropsidaeae	<i>Asterostigma</i>
<i>Heteropsis</i>	<i>Synandrospadix</i>
Subtrib. Monsterinae	<i>Taccarum</i>
Rhaphidophora	<i>Gorgonidium</i>
<i>Monstera</i>	<i>Gearum</i>
<i>Amydrium</i>	<i>Spathanthemum</i>
<i>Epipremnum</i>	<i>Spathicarpa</i>
<i>Scindapsus</i>	Trib. Dieffenbachieae
<i>Alloschemone</i>	<i>Dieffenbachia</i>
<i>Stenospermatum</i>	Trib. Bognereae
<i>Rhodspatha</i>	<i>Bognera</i>
Trib. Zamiculcadeae	Peltandra Alliance
<i>Zamioculcas</i>	Trib. Peltandreae
<i>Gonatopus</i>	<i>Peltandra</i>
	<i>Typhonodorum</i>
II. Subfam. Calloideae	Trib. Arophyteae
Calla Alliance	<i>Arophyton</i>
Trib. Calleae	<i>Carlephyton</i>
<i>Calla</i>	<i>Colletogyne</i>
Nephtytis Alliance	Trib. Schismatoglottideae
Trib. Nephtytideae	<i>Schismatoglottis</i>
<i>Nephtytis</i>	<i>Piptospatha</i>
<i>Anchomanes</i>	<i>Bucephalandra</i>
<i>Pseudohydrosme</i>	<i>Phymatarum</i>
Trib. Callopsideae	<i>Aridarum</i>

- Heteroaridarum*
Hottarum
- Philodendron Alliance**
- Trib. Culcasieae
Culcasia
- Trib. Cercestideae
Cercestis
- Trib. Homalomeneae
Furtadoa
Homalomena
- Trib. Philodendreae
Philodendron
- III. Subfam. Colocasioideae
- Trib. Zomicarpeae
Zomicarpa
- Trib. Colocasieae
- Subtrib. Protarinae
Protarum
- Subtrib. Steudnerinae
Steudnera
- Subtrib. Remusatinae
Remusatia
Gonatanthus
- Subtrib. Colocasiinae
Colocasia
Alocasia
- Trib. Caladieae
- Subtrib. Jasarinae
Jasarum
- Subtrib. Scaphispathinae
Scaphispatha
- Subtrib. Caladiinae
Caladium
Xanthosoma
Chlorospatha
Aphyllarum
- Subtrib. Syngoniinae
Syngonium
- Subtrib. Hapalininae
Hapaline
- IV. Subfam. Lasioideae
- Trib. Symplocarpeae
Lysichitum
- Symplocarpus*
- Trib. Orontieae
Orontium
- Trib. Lasieae
- Subtrib. Dracontiinae
Cyrtosperma
Lasia
Anaphyllum
Podolasia
Urospatha
Dracontioides
Dracontium
- Subtrib. Pycnospathinae
Pycnospatha
- Trib. *Stylochaetoneae*
Stylochaeton
- V. Subfam. Aroideae
- Trib. Thomsonieae
Pseudodracontium
Amorphophallus
- Trib. Arisareae
Arisarum
- Trib. Pinellieae
Pinellia
- Trib. Pistieae
Pistia
- Trib. Cryptocoryneae
Cryptocoryne
Lagenandra
- Trib. Ambrosineae
Ambrosina
- Trib. Ariopsidae
Ariopsis
- Trib. Arisaemateae
Arisaema
- Trib. Areae
Arum
Dracunculus
Helicodiceros
Theriophonum
Typhonium
Sauromatum
Eminium
Biarum

4.2.2(vi) Bogner & Nicolson's (1991) Classification

The Bogner and Nicolson classification is a revised Englerian classification, especially when compared to Grayum's. Changes from Engler include : (1) reduction of Pothoideae to three genera, (2) treating *Acorus* and *Gymnostachys* as monotypic tribes in a new subfamily, (3) reduction of Calloideae to *Calla*, (4) expansion of Lasioideae to include several elements previously in Pothoideae and Calloideae. The system contains 9 subfamilies, 31 tribes, 13 subtribes and 105 genera. An outline of the system of classification is given below (names and taxon numbers are as in the original publication):

Araceae		Subtrib. Dracontiinae
Subfam. 1. Gymnostachydoideae		22. <i>Cyrtosperma</i>
1. <i>Gymnostachys</i>		23. <i>Lasimorpha</i>
		24. <i>Lasia</i>
Subfam. 2. Pothoideae		25. <i>Anaphyllum</i>
2. <i>Pothos</i>		26. <i>Anaphyllopsis</i>
3. <i>Pedicellarum</i>		27. <i>Podolasia</i>
4. <i>Pothoidium</i>		28. <i>Urospatha</i>
		29. <i>Dracontioides</i>
		30. <i>Dracontium</i>
Subfam. 3. Monsteroideae		
Trib. Anadendreae		Subtrib. Pycnospathinae
5. <i>Anadendrum</i>		31. <i>Pycnospatha</i>
Trib. Monstereae		Trib. Zamioculcadeae
6. <i>Amydrium</i>		32. <i>Zamioculcas</i>
7. <i>Rhaphidophora</i>		33. <i>Gonatopus</i>
8. <i>Epipremnum</i>		Trib. Callopsideae
9. <i>Scindapsus</i>		34. <i>Callopsis</i>
10. <i>Alloschemone</i>		Trib. Nephthytideae
11. <i>Stenospermation</i>		35. <i>Pseudohydrosme</i>
12. <i>Rhodospatha</i>		36. <i>anchomanes</i>
13. <i>Monstera</i>		37. <i>Nephthytis</i>
Trib. Heteropsideae		38. <i>Cercestis</i>
14. <i>Heteropsis</i>		Trib. Culcasieae
Trib. Spathiphyllaeae		39. <i>Culcasia</i>
15. <i>Spathiphyllum</i>		Trib. Montrichardieae
16. <i>Holochlamys</i>		40. <i>Montrichardia</i>
Subfam. 4. Calloideae		
17. <i>Calla</i>		Subfam. 6. Philodendroideae
Subfam. 5. Lasioideae		Trib. Philodendreae
Trib. Orontieae		Subtrib. Homalomeninae
18. <i>Lysichiton</i>		41. <i>Furtadoa</i>
19. <i>Symplocarpus</i>		42. <i>Homalomena</i>
20. <i>Orontium</i>		Subtrib. Schismatoglottidinae
Trib. Anthurieae		43. <i>Schismatoglottis</i>
21. <i>Anthurium</i>		44. <i>Piptospatha</i>
Trib. Lasieae		45. <i>Hottarum</i>
		46. <i>Bucephalandra</i>

47. *Phymatarum*
 48. *Aridarum*
 49. *Heteroaridarum*
 Subtrib. Philodendrinae
 50. *Philodendron*
 Trib. Anubiadeae
 51. *Anubias*
 52. *Bognera*
 Trib. Aglaonemateae
 53. *Aglaonema*
 54. *Aglaodorum*
 Trib. Dieffenbachieae
 55. *Dieffenbachia*
 Trib. Zantedeschieae
 56. *Zantedeschia*
 Trib. Typhonodoreae
 57. *Typhonodorum*
 Trib. Peltandreae
 58. *Peltandra*
- Subfam. 7. Colocasioideae
 Trib. Caladieae
 59. *Xanthosoma*
 60. *Chlorospatha*
 61. *Caladium*
 62. *Scaphispatha*
 63. *Jasarum*
 Trib. Steudnereae
 Subtrib. Steudnerinae
 64. *Steudnera*
 65. *Remusatia*
 66. *Gonatanthus*
 Subtrib. Hapalininae
 67. *Hapaline*
 Trib. Protareae
 68. *Protarum*
 Trib. Colocasieae
 69. *Colocasia*
 70. *Alocasia*
 Trib. Syngonieae
 71. *Syngonium*
 Trib. Ariopsidaeae
 72. *Ariopsis*
- Subfam. 8. Aroideae
 Trib. Stylochaetoneae
 73. *Stylochaeton*
 Trib. Arophyteae
 74. *Carlephyton*
 75. *Colletogyne*
 76. *Arophyton*
- Trib. Spathicarpeae
 77. *Mangonia*
 78. *Taccarum*
 79. *Asterostigma*
 80. *Gorgonidium*
 81. *Synandropadix*
 82. *Gearum*
 83. *Spathantheum*
 84. *Spathicarpa*
 Trib. Zomicarpeae
 85. *Zomicarpa*
 86. *Filarum*
 87. *Zomicarpella*
 88. *Ulearum*
 Trib. Thomsonieae
 89. *Amorphophallus*
 90. *Pseudodracontium*
 Trib. Areae
 Subtrib. Arinae
 91. *Arum*
 92. *Dracunculus*
 93. *Helicodiceros*
 94. *Theriophonum*
 95. *Typhonium*
 96. *Sauromatum*
 97. *Eminium*
 98. *Biarum*
 Subtrib. Arisarinae
 99. *Arisarum*
 Subtrib. Arisaematinae
 100. *Arisaema*
 Subtrib. Atherurinae
 101. *Pinellia*
 Subtrib. Ambrosininae
 102. *Ambrosina*
 Subtrib. Cryptocoryninae
 103. *Lagenandra*
 104. *Cryptocoryne*
- Subfam. 9. Pistioideae
 105. *Pistia*

4.2.2(vii) Mayo, Bogner and Boyce's (1997) Classification

The most recent system of classification of Araceae by Mayo, Bogner and Boyce (1997) which is based on explicit phylogenetic. They divided the family into 2 major groups : One Proto Araceae and other True Araceae. Proto Araceae contain 2 (two) subfamilies and True Araceae contains 5 (five) subfamilies. The system contains 105 genera under 7 subfamilies and 32 tribes. An outline of the system of classification is given below (names and taxon numbers are as in the original publication):

MAJOR GROUP *PRO ARACEAE*

a. Flowers bisexual

I. Subfamily *Gymnostachyoideae* Bogner & Nicolson

1. *Gymnostachys* R. Brown

II. Subfamily *Orontioideae* Mayo, Bogner & P.C. Boyce

2. *Orontium* L.
3. *Lysichiton* Schott
4. *Symplocarpus* Nuttall

MAJOR GROUP *TRUE ARACEAE*

a. Flowers bisexual

III. Subfamily *Pothoideae* Engler

Tribe *Potheae* Engler

5. *Pothos* L.
6. *Pedicellarum* M. Hotta
7. *Pothodium* Schott

Tribe *Anthurieae* Engler

8. *Anthurium* Schott

IV. Subfamily *Monsteroideae* Engler

Tribe *Spathiphyllae* Engler

9. *Spathiphyllum* Schott
10. *Holochlamys* Engler

Tribe *Anadendreae* Bogner & French

11. *Anadendrum* Schott

Tribe *Heteropsidae* Engler

12. *Heteropsis* Kunth

Tribe *Monstereae* Engler

13. *Amydrium* Schott
14. *Rhaphidophora* Hasskarl
15. *Epipremnum* Schott
16. *Scindapsus* Schott
17. *Monstera* Adanson
18. *Alloschemone* Schott
19. *Rhodospatha* Poeppig
20. *Stenospermation* Schott

V. Subfamily *Lasioideae* Engler

21. *Dracontium* L.
22. *Dracontioides* Engler
23. *Anaphyllopsis* A. Hay
24. *Pycnospatha* Gagnepain
25. *Anaphyllum* Schott
26. *Cyrtosperma* Griffith
27. *Lasimorpha* Schott
28. *Podolasia* N.E. Brown
29. *Lasia* Loureiro
30. *Urospatha* Schott

V1. Subfamily *Calloideae* Endlicher

31. *Calla* L.

b. Flowers unisexual

VII. Subfamily *Aroideae*

PARAPHYLETIC GROUP : PERIGONIATE
AROIDEAE (perigone present)

Tribe *Zamioculcadeae* Engler

- 32. *Zamioculcas* Schott
- 33. *Gonatopus* Engler

Tribe *Stylochaetoneae* Schott

- 34. *Stylochaeton* Leprieur

MONOPHYLETIC GROUP : PERIGONIATE
AROIDEAE (perigone absent)

Dieffenbachia Alliance

Tribe *Dieffenbachieae* Engler

- 35. *Dieffenbachia* Schott
- 36. *Bognera* Mayo & Nicolson

Tribe *Spathicarpeae* Schott

- 37. *Mangonia* Schott
- 38. *Taccarum* Schott
- 39. *Asterostigma* F.E.L. Fischer & C.A. Meyer
- 40. *Gorgonidium* Schott
- 41. *Synandropadix* Engler
- 42. *Gearum* N.E. Brown
- 43. *Spathantheum* Schott
- 44. *Spathicarpa* W.J. Hooker

Philodendron Alliance

Tribe *Philodendreae* Schott

- 45. *philodendron* Schott

Tribe *Homalomeneae* M. Hotta

- 46. *Furtadoa* M. Hotta
- 47. *Homalomena* Schott

Tribe *Anubiadeae* Engler

- 48. *Anubias* Schott

Schismatoglottis Alliance

Tribe *Schismatoglottideae* Nakai

- 49. *Schismatoglottis* Zollinger & Moritzi
- 50. *Piptospatha* N.E. Brown

- 51. *Hottarum* Bogner & Nicolson

- 52. *Bucephalandra* Schott

- 53. *Phymatarum* M. Hotta

- 54. *Aridarum* Ridley

- 55. *Heteroaridarum* M. Hotta

Tribe *Cryptocoryneae* Blume

- 56. *Lagenandra* Dalzell

- 57. *Cryptocoryne* Wydler

Caladium Alliance

Tribe *Zomicarpeae* Schott

- 58. *Zomicarpa* Schott

- 59. *Zomicarpella* N.E. Brown

- 60. *Ulearum* Engler

- 61. *Filarum* Nicolson

Tribe *Caladieae* Schott

- 62. *Scaphispatha* Schott

- 63. *Caladium* Ventenat

- 64. *Jasarum* Bunting

- 65. *Xanthosoma* Schott

- 66. *Chlorospatha* Engler

- 67. *Syngonium* Schott

- 68. *Hapaline* Schott

No Alliance

Tribe *Nephtyhtideae* Engler

- 69. *Nephtyhtis* Schott

- 70. *Anchomanes* Schott

- 71. *Pseudohydrosme* Engler

Tribe *Aglaonemateae* Engler

- 72. *Aglaonema* Schott

- 73. *Aglaodorum* Schott

Tribe *Culcasieae* Engler

- 74. *Culcasia* Palisot de Beauvois

- 75. *Cercestis* Schott

Tribe *Montrichardieae* Engler

- 76. *Montrichardia* H. Crüger

Tribe *Zantedeschieae* Engler

- 77. *Zantedeschia* K. Sprengel

Tribe *Callopsideae* Engler

- 78. *Calloopsis* Engler

Tribe *Thomsonieae* Blume

79. *Amorphophallus* Decaisne
80. *Pseudodracontium* N.E. Brown

Tribe Arophyteae Bogner

81. *Arophyton* Jumelle
82. *Carlephyton* Jumelle
83. *Colletogyne* Buchet

Tribe Peltandreae Engler

84. *Peltandra Rafinesque*
85. *Typhonodorum* Schott

Tribe Arisareae Dumortier

86. *Arisarum* P. Miller

Tribe Ambrosineae Schott

87. *Ambrosina* Bassi

Tribe Areae

88. *Arum* L.
89. *Eminium* (Blume) Schott
90. *Dracunculus* P. Miller
91. *Helicodiceros* K. Koch

92. *Therophonum* Blume
93. *Typhonium* Schott
94. *Sauromatum* Schott
95. *Lazarum* A. Hay
96. *Biarum* Schott

Tribe Arisaemateae Nakai

97. *Pinellia* Tenore
98. *Arisaema* Martius

Tribe colocasiaeae Engler

99. *Ariopsis* Nimmo
100. *Protarum* Engler
101. *Stuednera* K. Koch
102. *Remusatia* Schott
103. *Colocasia* Schott
104. *Alocasia* G. Don

Tribe Pistieae Blume

105. *Pistia* L.

Mayo, Bogner and Boyce (1997) is followed in the present work.

4.2.3 Relationships with other Families

(i) The family **Lamnaceae** S.F. Gray 1821 (non. conserv., the Duckweed Family) is very closely related to Araceae in many characters and hence are grouped together with Araceae in to the order **Arales** Lindley (1833).

However, Lamnaceae reffers from Araceae as indicated below.

Sl. No.	Araceae	Lemnaceae
1.	Plants with roots, stems, and leaves, terrestrial (or epiphytic) or sometimes more or less aquatic, but only rarely free-floating; flowers very numerous in a spadix; vascular system well developed, the plants commonly with vessels in the roots and tracheids in all vegetative organs; ovary usually with more than one carpel, only rarely apparently monomerous.	plants thalloid, free-floating, with or without 1-several short, slender roots; flowers (rarely produced) only 2-3 (4) in an inflorescence; vascular system much reduced, the plants lacking both vessels and tracheids, or sometimes with tracheids in the roots; ovary pseudomonomerous.

(ii) The genus *Acorus* L. has long been considered a member of *Araceae* (Cronquist 1981), but now has been removed from Araceae to form a separate distinct family *Acoraceae* because *Acorus* L. possesses the following characters unlike *Araceae*:

- i. Ethereal oil cells
- ii. Lack of raphides
- iii. Unifacial ensiform leave
- iv. Unique pattern of bud trace insertion
- v. Separate vascular systems in peduncle
- vi. Stellate endotheacial thickenings
- vii. Tapetal cells with 2-4 nuclei
- viii. Secretory anther tapetum
- ix. Exclusively axile vascular supply to placentae
- x. Location and structure of ovular trichomes
- xi. Presence of perisperm
- xii. Dicot-type cellular endosperm development

4.3 GEOGRAPHICAL DISTRIBUTION

4.3.1 Distribution of Bangladesh Aroids

In 1795, Dr. William Roxburgh, father of Indian botany first recorded aroid collections from the area of present Bangladesh. Two aroid taxa appeared from Bangladesh in *Hortus Bengalensis* (Roxburgh 1814) and 14 taxa in *Flora Indica* (Roxburgh 1832). In *Flora Indica* (Roxburgh 1832), he recorded 7 species of aroids from Sylhet and Chittagong area of the present Bangladesh. He also recorded 7 species of aroids from Bengal in the same book. J.O. Voigt (1845) recorded 7 species of aroids from the present Bangladesh area. In the Wallich's Catalogue (1829-1849), he listed 6 species of aroids from the present Bangladesh area. J.D. Hooker (1893) recorded in the "*Flora of British India*, Vol. VI" 27 genera and 223 species out of which only 16 genera and 30 species are included within the area of present Bangladesh. David Prain (1903) in his "*Bengal Plant*, Vol. 2" recorded 14 genera and 30 species out of which 13 genera and 23 species are found within the territory of Bangladesh. Heinig (1925) recorded 20 species only from the Chittagong and Chittagong Hill Tracts area. Sinclair (1956) also recorded 14 aroid species. These two records indicated the richness of aroid flora in this area.

R.M. Datta and J.N. Mitra (1953) in his *Common Plants In and Around Dacca* have previously reported 11 genera and 17 species of the Araceae respectively, from the area now in Bangladesh. Ara (2007), in Siddiqui *et al.* (eds.) in *Encyclopedia of Flora and Fauna of Bangladesh*, Vol. 11, have also reported 29 genus and 89 species of aroids from the territory of present Bangladesh area. Rahman and Toha (2001) and Toha *et al.* (2004) reported some aroids as new distributional records for Bangladesh. Toha (2000) did a thesis entitled *Biodiversity and Taxonomy of Araceae from South East Bangladesh*. His thesis remained unpublished. Beside these, taxonomic researchers have worked on different forest areas of Bangladesh and their research outputs have been published on different journals. In this publications they have mentioned the number of plants of Araceae family found in particular areas. They are as follows: Alam *et al.* (2006), Arefin *et al.* (2011), Huq (1986a), Islam *et al.* (2009), Khan and Afza (1968), Khan and Banu (1969), Khan and Huq (2001a), Khan *et al.* (1977, 1984, 1994, 2001b, 2002), Mia and Huq (1988), Partha (2002), Partha and Hossain (2007), Rahman *et al.* (2001), Rahman, M.O. *et al.* (2013), Rahman, M.S. *et al.* (2015), Rashid *et al.* (2000), Rashid and Mia (2001), Uddin, M.G. (2010), Uddin, M.Z. (2002), Uddin, M.Z. and Hassan (2004, 2010),

Uddin, M.Z. *et al.* (2001b, 2001c, 2002, 2006, 2013, 2015), Uddin, S.B. & Rahman (1999), Uddin, S.N. (2006, 2012), Uddin, S.N. and Hassan (2012), Uddin, S.N. *et al.* (1998, 2004), Tutul *et al.* (2009) and Yousuf *et al.* (1997).

In the last decade or so, extensive field trips throughout the country have been made by the researchers which resulted in several new records of the Araceae for Bangladesh (Ara *et al.* 1998-2012) and published in different journals. They are Ara (2000; 2001a, 2001b, 2002), Ara and Hassan (2003, 2005a, 2005b, 2006, 2012), Ara and Khatun (2002), Ara *et al.* (1998, 2001, 2002a, 2002b, 2003a, 2003b, 2004a, 2004b, 2004c, 2005a, 2005b). However, the present list is moderately long with many new records and new species.

The pattern of distribution of the present taxa recorded from Bangladesh is shown in the following table (Table 4.3.1.1).

Table 4.3.1.1: Distribution of Bangladesh Aroids in home and abroad.

SL. No.	Name of the taxa	Distribution in Bangladesh	Distribution outside Bangladesh
1.	Aglaonema commutatum Schott	Bandarban, Moulvibazar and Sherpur	India, the Philippines and north-eastern Celebes
2.	Aglaonema costatum N.E. Brown	Cultivated as ornamental	Continental Southeast Asia from Langkawi Island to Vietnam
3.	Aglaonema crispum (Pitcher & Manda) Nicolson	Cultivated as ornamental	Native to the Philippines
4.	Aglaonema hookerianum Schott	Bandarban, Chittagong, Chittagong Hill Tracts, Cox's Bazar, East Bengal, Khulna, Moulvibazar, Rangamati and Sylhet	Northeastern India (Khasia Hills and Cachar) and Myanmar (Arakan)
5.	Aglaonema marantifolium Blume	Mymensingh	Moluccas through New Guinea
6.	Aglaonema modestum Schott <i>ex</i> Engler	Moulvibazar and Rangamati	Southern China, northern Laos and northern Thailand
7.	Aglaonema nitidum (Jack) Kunth	Cultivated as ornamental	Southern Myanmar, Malaysia and Indonesia
8.	Alocasia acuminata Schott	Available almost everywhere	Myanmar
9.	Alocasia cucullata (Lour.) G. Don	Available almost everywhere	Southeastern Asia
10.	Alocasia cuprea (C. Koch & Bouche) C. Koch	Cultivated as ornamental	Malaysia and Borneo (Indonesia)

SL. No.	Name of the taxa	Distribution in Bangladesh	Distribution outside Bangladesh
11.	Alocasia decipiens Schott	Netrakona	The Andaman and Nicobar Islands (India)
12.	Alocasia fallax Schott	Habiganj, Netrakona and Tangail	Bhutan and India (Darjeeling, Sikkim Himalaya and Khasia Hills)
13.	Alocasia fornicata (Roxb.) Schott	Throughout the country	Northeast and South India and Sri Lanka
14.	Alocasia hararganjensis H. Ara & M.A. Hassan	Habiganj and Moulvibazar	Endemic to Bangladesh (new endemic)
15.	Alocasia macrorrhizos (L.) G. Don	Cultivated for edible purpose	India through Southeast Asia and the Pacific Islands
16.	Alocasia navicularis K. Koch <i>et</i> Bouche'	Moulvibazar	Northeastern India and eastwards to northern Thailand
17.	Alocasia odora (Roxb.) K. Koch	Bogra, Mymensingh and Sylhet	Assam and Meghalaya of eastern India
18.	Alocasia portei Schott	Cultivated as ornamental	Endemic to the Philippines
19.	Alocasia salarkhanii H. Ara & M.A. Hassan	Moulvibazar	Endemic to Bangladesh (new endemic)
20.	Alocasia sanderiana W. Bull	Cultivated as ornamental	Endemic to the Philippines
21.	Amorphophallus bulbifer (Roxb.) Blume	Chittagong and Chittagong Hill Tracts, Comilla, Cox's Bazar, Dinajpur, Gazipur, Habiganj, Moulvibazar, Mymensingh, Netrakona, Panchagarh, Sherpur, Sylhet, Thakurgaon	India (Sikkim and Khasia Hills) and Myanmar
22.	Amorphophallus excentricus Hettterscheid	Moulvibazar	Peninsular Thailand
23.	Amorphophallus krausei Engler	Moulvibazar	Northern Thailand, northern Myanmar and southern China
24.	Amorphophallus longituberosus (Engl.) Engl. <i>et</i> Gehrm.	Bogra and Kurigram	Thailand and Northwest Malaysia
25.	Amorphophallus margaritiferum (Roxb.) Kunth	Dhaka and Rajshahi	India

SL. No.	Name of the taxa	Distribution in Bangladesh	Distribution outside Bangladesh
26.	Amorphophallus napalensis (Wall.) Bogner & Mayo	Habiganj, Moulvibazar, Mymensingh and Sherpur	Bhutan, Nepal and India
27.	Amorphophallus paeoniifolius (Dennst.) Nicolson var. campanulatus (Decne.) Sivadasan	Cultivated for edible purpose	Sri Lanka, India, Myanmar and Java (Indonesia)
28.	Anthurium andreanum Linden	Cultivated as ornamental	Southwest Colombia and Northwest Ecuador
29.	Anthurium crystallinum Linden & Andre'	Cultivated as ornamental	Colombia
30.	Ariopsis peltata Nimmo	Rangamati	India, Nepal, Bhutan and Myanmar
31.	Ariopsis protanthera N.E. Br.	Rangamati	North India
32.	Caladium bicolor (Ait.) Vent.	Moulvibazar, Mymensingh, Tangail and is also cultivated all over the country	South America, from Panama to Bolivia and eastward to the Atlantic coast of Brazil. Naturalized throughout the tropics
33.	Caladium humboldtii Schott	Cultivated as ornamental	Brazil and Venezuela
34.	Colocasia affinis Schott	Mymensingh, Netrakona and Sherpur	Tropical Himalayas (Sikkim, Assam) and Southwest India
35.	Colocasia esculenta (L.) Schott	Cultivated for edible purpose	Pan-tropical
36.	Colocasia esculenta (L.) Schott var. antiquorum (Schott) Hubb. & Rehder	Cultivated for edible purpose	Pan-tropical
37.	Colocasia esculenta (L.) Schott var. aquatilis Hassk.	Cultivated for edible purpose	Pan-tropical
38.	Colocasia fallax Schott	Bandarban, Cox's Bazar, Moulvibazar, Netrakona, Rangamati and Sherpur	Northern India eastward through Nepal, Sikkim, Khasia to Yunnan (southern China) and northern Thailand
39.	Colocasia fallax Schott var. purpurea H. Ara & M.A. Hassan	Bandarban and Moulvibazar	Endemic to Bangladesh (new endemic)
40.	Colocasia gigantea (Blume) Hook. f.	Bandarban, Khagrachari, Patuakhali and Rangamati	Native of southern China and Indo-China to the Malay Peninsula and Sumatra and Java of Indonesia

SL. No.	Name of the taxa	Distribution in Bangladesh	Distribution outside Bangladesh
41.	Colocasia hassanii H. Ara	Bandarban, Cox's Bazar, Khagrachari, Moulvibazar and Rangamati	Endemic to Bangladesh (new endemic)
42.	Colocasia heterochroma H. Li <i>et</i> Z.X. Wei	Bandarban and Rangamati	Southwest China
43.	Colocasia lihengiae C.L. Long <i>et</i> K.M. Liu	Bandarban	Yunnan (southern China)
44.	Colocasia mannii Hook. f.	Moulvibazar	Assam of India
45.	Colocasia oresbia A. Hay	Chittagong, Cox's Bazar, Khagrachari, Moulvibazar and Rangamati	Indonesia
46.	Colocasia oresbia A. Hay var. obtusifolia H. Ara & M.A. Hassan	Rangamati	Endemic to Bangladesh (new endemic)
47.	Colocasia virosa Kunth	Moulvibazar	South and east India
48.	Cryptocoryne ciliata (Roxb.) Fischer <i>ex</i> Wydler	Southern districts of Bangladesh	Malacca and Malay Islands
49.	Cryptocoryne retrospiralis (Roxb.) Kunth	All over the country	Northern part of the Bay of Bengal (West Bengal in India) to Bangladesh, Myanmar, Thailand and Laos
50.	Cryptocoryne spiralis (Retz.) Fischer <i>ex</i> Wydler	Throughout the country	India (South India and West Bengal)
51.	Dieffenbachia seguine (Jacq.) Schott	Cultivated as ornamental	Throughout the Neotropics
52.	Epipremnum pinnatum (L.) Engl.	Sylhet district and is also cultivated all over the country	Southeastern Asia through Malesia and into Oceania
53.	Gonatopus boivinii (Decne.) Engl.	Netrakona	South Africa, Mozambique, Zimbabwe, Zambia, Malawi, Tanzania, Zaire and Kenya
54.	Homalomena aromatica (Roxb. <i>ex</i> Sim) Schott	Bandarban, Chittagong, Chittagong Hill Tracts, Cox's Bazar, East Bengal, Habiganj, Moulvibazar and Sylhet	India

SL. No.	Name of the taxa	Distribution in Bangladesh	Distribution outside Bangladesh
55.	Homalomena coerulea Jungh.	Moulvibazar and Rangamati	Myanmar, Malaysia and Indonesia
56.	Homalomena gigantea Engler	Moulvibazar and Netrakona	Southwest Malaysian provinces
57.	Homalomena pendula (Blume) Bakh. f.	Chittagong and Sylhet	India (Sikkim Himalayas and Khasia Hills)
58.	Homalomena wallisii Regel	Cultivated as ornamental	Colombia
59.	Lagenandra gomezii (Schott) Bogner & Jacobson	Sylhet	Endemic to Bangladesh
60.	Lasia spinosa (L.) Thwaites	Throughout the country	From India through Papua New Guinea
61.	Lasia viridis H. Ara & M.A. Hassan	Barisal	Endemic to Bangladesh (new endemic)
62.	Monstera deliciosa Liebmann	Cultivated as ornamental	Mexico, Guatemala, Costa Rica and Panama
63.	Monstera obliqua Miq.	Cultivated as ornamental	Panama, Colombia, Peru, Bolivia, Venezuela, Trinidad, Tobago and the Guyanas and Amazonian Brazil
64.	Philodendron bipinnatifidum Schott <i>ex</i> Endl.	Cultivated as ornamental	Northeast Brazil
65.	Philodendron lacerum (Jacquin) Schott	Cultivated as ornamental	Cuba, Haiti and Jamaica
66.	Philodendron mamei Andre'	Cultivated as ornamental	Ecuador
67.	Philodendron scandens C. Koch & Sello <i>ex</i> Koch	Cultivated as ornamental	Northern Neotropics
68.	Pistia stratiotes L.	Everywhere in Bangladesh	Tropics and subtropics but rare in Oceania
69.	Pothos chinensis (Raf.) Merr.	Chittagong, East Bengal and Rangamati	Northeastern India, Nepal, Bhutan, China, Myanmar, Thailand, Cambodia, Vietnam and Taiwan
70.	Pothos junghuhnii de Vriese	Silhet	Malesia
71.	Pothos scandens L.	Available almost everywhere	Madagascar to New Guinea
72.	Remusatia pumila (D. Don) Li & Hay	Cox's Bazar	India, northern Thailand and western China
73.	Remusatia vivipara (Roxb.) Schott	Moulvibazar	Africa, Madagascar, Indo-Malesia and Australia

SL. No.	Name of the taxa	Distribution in Bangladesh	Distribution outside Bangladesh
74.	Rhaphidophora affinis Schott	East Bengal	India
75.	Rhaphidophora aurea (Linden & Andre') Birdsey	Planted in gardens and homesteads all over the country	Solomon Islands
76.	Rhaphidophora calophyllum Schott	East Bengal and Sherpur	India and Myanmar
77.	Rhaphidophora calophyllum Schott var. violaceus H. Ara & M.A. Hassan	Moulvibazar	Endemic to Bangladesh (new endemic)
78.	Rhaphidophora decursiva (Roxb.) Schott	Bandarban, Cox's Bazar, Khagrachari, Rangamati and Sylhet	Eastern Himalayas and Sri Lanka
79.	Rhaphidophora glauca (Wall.) Schott	East Bengal, Moulvibazar and Rangamati	Tropical and subtropical Himalayas, Nepal
80.	Rhaphidophora grandis Schott	Khagrachari and Moulvibazar	Bhutan and India
81.	Rhaphidophora hookeri Schott	Bandarban, Chittagong, Chittagong Hill Tracts, East Bengal, Moulvibazar and Sylhet	India (Sikkim Himalayas, Upper Assam and Khasia Hills), central China, northern Thailand and Vietnam
82.	Rhaphidophora peepla Schott	Chittagong and Rangamati	Bhutan, North India, Myanmar, Nepal, north Thailand, north Laos, north Vietnam and south China
83.	Rhaphidophora pertusa (Roxb.) Schott	Moulvibazar and is also cultivated all over the country	Southern India, Sri Lanka, southern Mexico to the West Indies and southern Brazil
84.	Rhaphidophora schottii Hook. f.	Habiganj and Rangamati	North India
85.	Schismatoglottis picta Schott	Cultivated as ornamental	Singapore, Malaysia, Indonesia (Sumatra, Java, Borneo and Celebes) and China
86.	Scindapsus officinalis (Roxb.) Schott	All over the country	India (Sikkim and the Himalayas) and Myanmar
87.	Scindapsus perakensis Hook. f.	Moulvibazar, Netrakona and Sherpur	Malaysia
88.	Scindapsus pictus Hassk.	Chittagong Hill Tracts and Rangamati	Tropical Asia, extending up to Indonesia

SL. No.	Name of the taxa	Distribution in Bangladesh	Distribution outside Bangladesh
89.	Scindapsus scortechinii Hook. f.	Sherpur	Malaysia
90.	Spathiphyllum floribundum (Linden & Andre) N.E. Brown	Cultivated as ornamental	Colombia
91.	Spathiphyllum wallisii Regel	Cultivated as ornamental	Colombia
92.	Stuednera colocasiifolia K. Koch	Bandarban, Chittagong, Cox's Bazar, Moulvibazar and Rangamati	Myanmar
93.	Stuednera colocasioides Hook. f.	Bandarban, Chittagong, Chittagong Hill Tracts, Cox's Bazar, Habiganj, Kushtia, Moulvibazar and Sylhet	India
94.	Stuednera discolor N.E. Br.	Chittagong, Chittagong Hill Tracts, Moulvibazar and Sylhet	Northeast India and Myanmar
95.	Stuednera gagei Krause	Moulvibazar	India
96.	Syngonium macrophyllum Engler	Cultivated as ornamental	Mexico to Ecuador
97.	Syngonium podophyllum Schott	Cultivated as ornamental	Mexico to the Guyanas, Brazil and Bolivia
98.	Typhonium blumei Nicolson & Sivadasan	Sherpur	East and Southeast Asia
99.	Typhonium cochleare A. Hay	Sherpur	Northern territories of Australia
100.	Typhonium elatum H. Ara & M.A. Hassan	Sherpur	Endemic to Bangladesh (new endemic)
101.	Typhonium flagelliforme (Lodd.) Blume	Throughout the country	Indo-China, Tropical Asia, East Malesia to Australia (Queensland)
102.	Typhonium geniculatum H. Ara & M.A. Hassan	Moulvibazar	Endemic to Bangladesh (new endemic)
103.	Typhonium gracile (Roxb.) Schott	East Bengal, Sherpur and Sylhet	India
104.	Typhonium listeri Prain	Chittagong Hill Tracts	Myanmar and India

SL. No.	Name of the taxa	Distribution in Bangladesh	Distribution outside Bangladesh
105.	Typhonium roxburghii Schott	Bandarban and Chittagong	South India, Sri Lanka, south and central Malaysia. Introduced into northeast India, Luzon, East Africa (Zanzibar) and Neotropics (Brazil)
106.	Typhonium trilobatum (L.) Schott	All over the country	From Nepal to southeast China, north Malaysia and Sri Lanka. Introduced in the Philippines, West Borneo, Singapore, West Africa (Ivory Coast) and the Neotropics
107.	Typhonium trilobatum (L.) Schott var. fulvum H. Ara & M.A. Hassan	Netrakona	Endemic to Bangladesh (new endemic)
108.	Xanthosoma lindenii (Andre') Engler	Cultivated as ornamental	Colombia
109.	Xanthosoma sagittifolium (L.) Schott	Cultivated for edible purpose	West Indies and South America
110.	Xanthosoma undipes (K. Koch) K. Koch	Gazipur	Native to tropical America
111.	Xanthosoma violaceum Schott	Cultivated for edible purpose	West Indies and South America

4.3.2 Endemism

There are three centres of aroid species diversity, two major and one minor. The two major centers are (i) tropical Asia with 43 genera having 32 endemic, (ii) tropical America with 36 genera having 33 endemic and the minor centre is (iii) Africa with 19 indigenous having 12 endemic. In terms of endemism tropical America top the list and also studied thoroughly.

To the east of the Amazon basin, especially in the Guiana Highlands and in eastern Brazil, from the state of Bahia south almost to Uruguay, the rate of endemism is much higher. Nearly all the species occurring in this region are endemic to eastern Brazil, and a few range into the Amazon basin. Amazon lowlands have wide-ranging common species although some endemic species recorded from the mouth of the Amazon. Species diversity

increases dramatically as one approaches the foothills of the Andes in the west. The degree of endemism increases as elevation increases on the slopes of the Andes (Croat 1994). Species diversity is high throughout the extent of the South American Andes but especially along the north western slope. In all cases high species diversity is correlated with high precipitation and with the absence of prolonged dry seasons.

Endemism is especially high in the Andes of western South America, including the eastern range of the Andes which extends into Venezuela. Endemism is also high in the Guiana Highlands and in parts of North America, especially in Mexico, in Costa Rica and Panama. Mexico, with 41 taxa of *Anthurium* Schott has 26 endemic taxa. Costa Rica has 68 taxa with 22 endemic species, and Panama has 150 species of which 82 are endemic. However, for endemism, other two centers (tropical Asia and Africa) are not critically analyzed.

Bangladesh is a part of tropical Asia, and hence a part of a major centre of diversity, very rich in aroid flora. Out of 43 genera available in this centre, 32 are endemic, the percentage of endemism is also very high. From the present study we have reported 111 taxa from Bangladesh (including cultivated taxa, Table-4.3.1.1). Out of 111 taxa, 11 species (viz. *Alocasia hararganjensis* H. Ara & M.A. Hassan, sp. nov., *Alocasia salarkhanii* H. Ara & M.A. Hassan, sp. nov., *Colocasia hassanii* H. Ara, sp. nov., *Lagenandra gomezii* (Schott) Bogner & Jacobson, *Lasia viridis* H. Ara & M.A. Hassan, sp. nov., *Typhonium elatum* H. Ara & M.A. Hassan, sp. nov., *Typhonium geniculatum* H. Ara & M.A. Hassan, sp. nov., *Colocasia fallax* Schott var. *purpurea* H. Ara & M.A. Hassan, var. nov., *Colocasia oresbia* A. Hay var. *obtusifolia* H. Ara & M.A. Hassan, var. nov., *Rhaphidophora calophyllum* Schott var. *violaceus* H. Ara & M.A. Hassan, var. nov. and *Typhonium trilobatum* (L.) Schott var. *fulvus* H. Ara & M.A. Hassan, var. nov., are endemic to Bangladesh; 15 species are endemic to Bangladesh-India; 2 species are endemic to Bangladesh-Myanmar, 6 species are endemic to Bangladesh-India-Myanmar, 10 species are endemic to Bangladesh-India-Nepal-Bhutan-Sri Lanka and 36 species are endemic to Southeast Asia.

21 species are common to tropical America centre and at least one species, *Gonatopus boivinii* (L.) Engl. is common to Africa centre. In fact *G. boivinii* (L.) Engl. is regarded as endemic to Africa, but we have collected it from Netrakona growing wild indicating its disjunct distribution.

4.4 ECONOMIC IMPORTANCE

Members of the aroid family are important food sources in all parts of the tropics and subtropics. Aroids are a rich and cheap source of energy, minerals and vitamins. Species of this family those are available in Bangladesh of used for food, medicine, ornamental, fencing, fodder, fibers, magical and religious purposes, and their weedy and ecological importance are stated below:

4.4.1 Food Plants

The edible aroids that are cultivated and used as food in various parts of the tropics, are : *Colocasia esculenta* (L.) Schott, commonly referred as taro, old cocoyam (in Africa), eddoe, dasheen; *Xanthosoma* Schott spp., commoly referred as tannia, new cocoyam (in Africa) or cocoyam; *Alocasia* (Schott) G. Don. spp., commonly referred as giant taro, *Alocasia macrorrhizos* (L.) G. Don is the most prevalent species but *A. fornicata* (Roxb.) Schott and *A. cucullata* (Lour.) G. Don are also cultivated to a limited extent; *Amorphophallus paeoniifolius* (Dennst.) Nicolson, var. *campanulatus* (Decne.) Sivadasan, commonly referred as elephant foot yam or elephant yam, is the most popular cultivatd species for food purpose; *Cyrtosperma merkusii* Schott, commonly referred as swamp taro, is also cultivated to a limited extent.

In Bangladesh, the genera *Cyrtosperma* Griffith is not available but the other four genera namely *Alocasia* (Schott) G. Don., *Amorphophallus* Blume ex Decaisne, *Colocasia* Schott and *Xanthosoma* Schott are not uncommon and cultivated for human consumption. *Colocasia esculenta* (L.) Schott is widely cultivated and consumed by the people in Bangladesh. *Colocasia esculenta* (L.) Schott is the major cultivated form of taro.

The origin of taro is from south central Asia, probably in India or Malaysia (Watt, 1889; Chang 1958; Keleny 1962). Spier (1951) suggested India as the place of origin of taro, while Kuruvilla & Singh (1981) have traced the orgin of taro to northeastern India and apparently its cultivation also started from this region (Onwueme 1978). During prehistoric times its cultivation spread to the Pacific Islands, Mediterranean area, West Africa, West Indies and to the tropical parts of America (Onwueme 1978). Taro is now widely consumed throughout the world and is of great significance in many places such as the Caribbean, Hawaii, the Solomons, American Samoa, West Samoa, Philippines, Fiji, Mauritius, Sri Lanka, India, Nigeria,

Indonesia, New Hebrides, Tonga, Niue, Papua New Guinea, Egypt and others. Millions in these areas depend on taro as a staple food. Taro has also been introduced by the US Department of Agriculture in the Southern United States as a supplement to potatoes.

The local name of taro is "Kachu" which can be divided into two types viz., *Colocasia esculenta* (L.) Schott var. *antiquorum* (Schott) Hubb. & Rehder (Mukhi Kachu and eddoe type) which is grown in high land and *Colocasia esculenta* (L.) Schott var. *esculenta* (Pani Kachu and dasheen type) which grown in water-logged and swampy areas. In eddoe type, the corm is small with numerous cormels attached to it and depending on the size of its corms and cormels, the names are as follow :

- | | |
|---------------------|--------------------|
| ▪ Poidnal kachu | ▪ Mura mukhi kachu |
| ▪ Urdhamukhi kachu | ▪ Gura mukhi kachu |
| ▪ Panchamukhi kachu | ▪ Atamukhi kachu / |
| ▪ Surja mukhi kachu | Lata mukhi kachu |

Bangladesh Agriculture Research Institute (BARI) and Bangladesh Agricultural University (BAU) have invented a high yielding variety of Mukhi Kachu which is named as "**Bilashi**". The plant produces cormels which is edible and is the means of its propagation.

In the dasheen type, the corm is cylindrical, long and the cormels are very few in number.

In Bangladesh, it is also known as Narkeli Kachu, Bash Kachu, Baksha Kachu, Sola Kachu, Dal Kachu, Khama Kachu, Kalo Kachu and many others names at different places of the country. A high yielding variety of this group named "**Latiraj**" has been introduced in 1988 by BARI & BAU. The plant produces rhizome and stolon, both are edible and means of propagation of the plant. The young inflorescences of taro are fleshy and are used as vegetable in many countries.

The petioles and leaves of *Colocasia gigantea* (Blume) Hook. f. are rich in iron, calcium and vitamin C. In Bangladesh, children and women generally suffer from a deficiency of iron, calcium and vitamin C and, as such, the plant may be consumed as a supplement. The plant can be cultivated in Kitchen gardens for ready availability. It is also cultivated for its edible petioles (Hotta, 1970). The indigenous people of Bangladesh use the petiole of the plant in salads. Leaves and petioles are also used in curries.

Xanthosoma Schott is a native of Central and South America and is grown throughout the humid tropics. It spread from Tropical America to Southeast Asia, the Pacific islands and Africa, probably in the 19th century. Two species of *Xanthosoma* Schott are available in Bangladesh. They are *Xanthosoma sagittifolium* (L.) Schott (Tannia) and *Xanthosoma violaceum* Schott.

Xanthosoma sagittifolium (L.) Schott and *Xanthosoma violaceum* Schott grow well in marshy land, in area under the shade of big trees and in shady or partially shady area in and around homestead. *Xanthosoma sagittifolium* L. (Schott) having dark green leaves and petioles and white-fleshed cormels (economic part) is the most widely cultivated species, but *Xanthosoma violaceum* Schott with darker purplish-green coloured leaves and petioles. As the plant needs minimum care for its growth it is a suitable crop for the kitchen garden in rural area of Bangladesh. It is a common edible aroid in the country. Locally the *Xanthosoma violaceum* Schott is known as *Dudh kachu*, *Kajal Kachu*, *Krishna Kachu*, *Surma Kachu*, *Ari Kachu* and *Xanthosoma sagittifolium* (L.) Schott is known as *Dudh Kachu*, *Mukhi Kachu*. Commercially, the cormels are used for production of starch and the foliage as poultry feed. The corms are used as human food or animal feed after cooking.

Alocasia macrorrhizos (L.) G. Don is said to be a native plant of Sri Lanka from where it spread to adjacent countries. It is a traditional edible vegetable for rural people of the country. It is commercially cultivated in some places of Barisal, Patuakhali, Jessore and Khulna districts of Bangladesh (Mian *et al.* 2001). Locally, the species is known as *Man Kachu*, *Fen Kachu*, *Dudh Kachu*. The stem may grow to as long as 5m and contains abundant latex,

Another species of the starch-rich tubers of the elephant yam, *Amorphophallus paeoniifolius* (Dennst.) Nicolson, var. *campanulatus* (Decne.) Sivadasan are commonly used as food in tropical Asia. It is common in Bangladesh. The species is believed to be a native of South-east Asia. It is locally known as "*Ol Kachu*" or "*Bagh Kachu*". It is a very common type of edible aroid in Bangladesh. The district of Jessore, Satkhira, Hill tracts of Chittagong produce this aroid on commercial basis (Mian *et al.* 2001).

Another species, *Amorphophallus bulbifer* (Roxb.) Blume, is rather uncommon in Bangladesh. Locally it is known as *Amla-bela*. It is grown in forest. The petiole and young leaves are used as a vegetable by the Garo, Khasia and Khasi people of Mymensingh and Sylhet districts in Bangladesh.

The young leaves and petioles of *Amorphophallus longituberosus* (Engl.) Engl. et Gehrm. and *Amorphophallus napalensis* (Wall.) Bogner & Mayo are used as a vegetable in the rural areas and by the indigenous people of the country.

The stem and tender leaves of *Lasia spinosa* (L.) Thwait. are used as vegetables in some parts of Bangladesh. Some indigenous people of Bangladesh use petioles and young leaf of the *Homalomena aromatica* (Roxb. ex Sim) Schott, *Homalomena coerulescens* Jungh. and *Homalomena gigantea* Engl. as vegetables.

Nutritive values of Aroids

From the point of nutrition, aroids are considered to be the best edible vegetable. Fresh leaf blade of aroids contains 20000 IU vitamin - A per 100 gram of edible part. Food value of each 100 gram fresh aroids leaf is presented below:

Food Value of Aroid Leaf

Protein 6800 mg	Calcium 460 mg
Fat 2000 mg	Iron 39 mg
Carbohydrate 8100 mg	Thiamin 0.06 mg
Vitamin C 63 mg	Riboflavin 0.45 mg
Minerals 2500 mg	Fibre 1800 mg
Water 78000 mg	Energy 77 kcal
Source: SAIC Newsletter; Vol. 4, No.2, June 1994.	

The table indicates that aroids are fair source of vitamins, energy, protein and minerals. As such, it is an ideal food for people of all ages specially for rural people who have less access to rich food because of high price.

The thick starch-rich rhizomes of *Cyrtosperma merkusii* (Hassk.) Schott (Swamp taro) are used for food in South East Asia and the Pacific Islands where the plant is grown in nutrient poor sites. The tubers of various species of *Dracontium* L. have been recorded as a food source for Amerindians, after preparation by roasting.

The fruits of *Monstera deliciosa* Liebmann are eaten in many tropical countries (Lawrence 1951) and used to flavour ice cream in Mexico; the taste recalls that of pineapple. The fruits of *Pothos scandens* L. are used in curry preparations in some parts of Kerala (India). Young leaves of *Remusatia* Schott are used as vegetables (Rao 1914; Santapau & Henry 1973). The corms of *Arum maculatum* L. were used as food under the name Portland arrow-root (Prime 1960). The roots of *Arisaema triphyllum* Schott were considered as a delicacy, either roasted or boiled by American Indians (Millsbaugh 1974).

(Cultivated aroid)

(Photo 4.4.1.2)

(Photo 4.4.1.3)

(Photo 4.4.1.4)

The seeds of *Typhonodorum lindleyanum* Schott and *Montrichardia linifera* Schott are recorded as having been eaten by indigenous peoples of Madagascar and tropical South America respectively after cooking or roasting. The seeds of *Orontium aquaticum* L. were eaten drying by North American indigenous people.

4.4.2 Medicinal Uses

The ethnobotany of *Araceae* appears to be diverse and fascinating, judging from the many circumstantial reports which are scattered through the scientific literature. No comprehensive modern review exists. However, I have done my personal discussion with local people and their widely held beliefs, I have coagulate the following information for this section and the following ones on uses of aroids in Bangladesh.

Many *Araceae* members have medicinal importance. The tuber of the *Typhonium roxburghii* Schott is taken along with bananas to serve as a medicine for rheumatism. Pulp of the fruit of *Scindapsus officinalis* (Roxb.) Schott is applied externally on the human body to also cure rheumatism. The Mayna Jivaro tribal people of Peru use the the leaves as a pain reliever, especially to treat rheumatic pain in the legs.

Tuber of *Alocasia macrorrhizos* (L.) G. Don is used in rheumatism, jaundice and diseases of the abdomen and spleen. It also acts as a mild laxative and diuretic.

In India, people of the konda Reddis and Savaras tribes use rhizome paste of *Alocasia fornicata* (Roxb.) Schott to treat wounds and kill worms in domestic animals.

The people of Goa (India) apply crushed seeds of *Amorphophallus margaritifer* (Roxb.) Kunth in tooth cavity to cure toothache.

In Bangladesh, the Garos in Netrokona district use the paste of the rhizome *Gonatopus boivinii* (Decne.) Engl. with honey for the treatment of seminal weakness.

The paste of petiole of the *Colocasia esculenta* (L.) Schott if coated on the wound, prevents bleeding and acts as an antiseptic. The petiole of this plant is also used for curing the itching ear and ear infections (Hassan, 1988).

The juice of tubers of *Colocasia* Schott contain amylases and sapotoxin. Petioles are good source of vitamin A and Vitamin C. The rhizome of *Cryptocoryne spiralis* (Retz.) Fischer *ex* Wydler in combination with other drugs has been used in infantile vomiting and cough, and for fever and abdominal complaints in adults. The leaves and roots of *Lasia spinosa* Lour. have been considered to be a remedy for piles; the petiole was ground and mixed with water and given as a drink to cattle with throat disease. *Pistia stratiotes* L. has been used in dysuria and also to destroy bugs. Leaves have been made into a poultice and applied to haemorrhoids, mixed with rose water and sugar and given for asthma and cough, and with rice and coconut milk for dysentery. The juice of leaves boiled with coconut oil and used externally in chronic skin diseases (Chopra *et al.* 1956). The stem and leaves of *Alocasia odora* (Roxb.) Koch, *Monstera deliciosa* Liebm., *Stuednera colocasiifolia* K. Koch, *Pothos scandens* L., *Rhaphidophora pertusa* (Roxb.) Schott, *Typhonium trilobatum* (L.) Schott are said to be used as an antidote for snake poison. The stem of *Pothos scandens* L. has been cut up with camphor and smoked for asthma. The juice of crushed leaves of *Syngonium podophyllum* Schott is an effective medicine to cure asthma. The roots of *Remusatia vivipara* (Roxb.) Schott have been made into an ointment with turmeric and used as a remedy for itch; and juice with cow's urine is considered as an alexipharmic (Chopra *et al.* 1956).

The corms of the *Remusatia vivipara* (Roxb.) Schott are used externally for the treatment of mastitis, traumatic injury, abscesses and swellings (Heng, 1979). The aerial roots, stems and leaves of the *Rhaphidophora decursiva* (Roxb.) Schott, *Rhaphidophora peepla* Schott and *Rhaphidophora pertusa* (Roxb.) Schott are used against traumatic injury and fractured bones.

Species of *Aglaonema* Schott, *Dieffenbachia* Schott, *Epipremnum* Schott, *Homalomena* Schott, *Monstera* Adanson have the leaves with irritating effect which are also used in folk medicine (Burkill 1935). The skin irritant effects of the roots of some taxa are used in Chinese medicine. The corms of *Amorphophallus paeoniifolius* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan is used as a medicine in piles, dysentery and rheumatism.

4.4.3 Ornamental Uses

Most of the Araceae members possess ornamental characteristics and are best known as ornamental plants. They are commercially among the most important foliage ornamentals cultivated and sold for display. Their beautiful and usually diverse leaf forms and textures form an essential part of any tropical plant display. In tropical countries the *Araceae* have an

important role as ornamental plants. They are cultivated in public parks as well as in private gardens or as house plants. Under these favourable conditions they are easily grown and need little care beyond regular watering in regions with a drier climate. Their varied life forms provide magnificent climbers, bedding and large, sculptural terrestrial plants. Commonly cultivated aroids in tropical countries include species of the following genera *Aglaonema* Schott, *Alocasia* (Schott.) G. Don, *Anthurium* Schott., *Caladium* Vent., *Colocasia* Schott., *Dieffenbachia* Schott., *Epipremnum* Schott., *Homalomena* Schott., *Monstera* Adans., *Philodendron* Schott., *Rhaphidophora* Hassk., *Schismaloglottis* Zollinger & Moritzi, *Scindapsus* Schott., *Spathiphyllum* Schott., *Syngonium* Schott., *Xanthosoma* Schott. Many apartments or houses in Europe and America have at least one aroid as an ornamental plant. A variety of *Araceae* is also grown in hydroculture in large offices and public buildings. Particularly well known house plant aroids belongs to the genera *Monstera* Adans. (*Monstera deliciosa* Liebmann), *Philodendron* Schott (*Philodendron scandens* K. Koch & Sello ex Koch, *Philodendron bipinnatifidum* Schott ex Endl. and many other species and hybrids), *Dieffenbachia* Schott [many cultivars of *Dieffenbachia seguine* (Jacq.) Schott], *Aglaonema* Schott [many cultivars of *Aglaonema commutatum* Schott, *Aglaonema nitidum* (Jack) Kunth and other species], *Syngonium* Schott (cultivars of *Syngonium podophyllum* Schott), *Spathiphyllum* [*Spathiphyllum floribundum* (Linden & Andre') N.E. Brown, *Spathiphyllum wallisii* Regel and other species and hybrids], *Epipremnum* Schott [*Epipremnum pinnatum* (L.) Engl., 'Aureum'], *Anthurium* Schott (particularly *Anthurium andraeanum* Linden and cultivars) and *Caladium* Vent. [*Caladium bicolor* (Aiton) Vent. and cultivars]. Many species of *Cryptocoryne* Fischer ex Wydler are prized by aquarists and species of *Anubias* Schott are also widely grown as aquarium plants.

4.4.4 Fencing

The prickly herb, *Lasia spinosa* (L.) Thw. which can be used as a fencing for protection.

4.4.5 Fodder

The leaves of all varieties of *Colocasia esculenta* (L.) Schott and *Colocasia gigantea* (Blume) Hook. f. are used by the Chinese as pig food. In Thailand, *Colocasia gigantea* (Blume) Hook. f. is cultivated for addiction (petiole) to snaps. In some parts of Bangladesh, slightly dried leaves of *Amorphophallus bulbifer* (Roxb.) Blume, *Amorphophallus paeoniifolius* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan, *Pistia stratiotes* L. are used as food for domestic animals.

(Photo 4.4.3.1)

(Photo 4.4.3.2)

(Photo 4.4.3.3)

(Photo 4.4.3.4)

4.4.6 Fibres

In tropical South America, the roots of *Heteropsis* Kunth and *Philodendron* Schott used for fibres. In Brazilian Amazonia, *Heteropsis spruceana* Schott is still today an important source of twine and basket weaving material. The stem of *Montrichardia linifera* Schott provides a fiber which is suitable for paper making. Bown (1988) reports the uses of fibres from species of *Anthurium* Schott, *Cercestis* Schott and *Gymnostachys anceps* R. Brown (Mayo, Bogner & Boyce 1997).

4.4.7 Magical and Religious Uses

Magical and ritual uses of aroids are known but little studied. The use of *Dieffenbachia* Schott and *Caladium* Vent. to ward off the "evil eye" is widespread in Brazil. In some parts of Bangladesh, mainly among Hindus people, a special kind of smash of available aroids, mixed with fried rice is made which they eat for religious purposes and they call it "cochori".

4.4.8 Weeds

An obnoxious herb, *Pistia stratiotes* L. is a weed of the paddy field, pond and marshy places. Other weeds of the paddy field include *Cryptocoryne retrospiralis* (Roxb.) Fischer. *Pothos scandens* L. hampers the growth and development of some valuable forest plants.

4.4.9 Ecological Importance

The gregarious or growing of *Cryptocoryne ciliata* (Roxb.) Fischer ex Wydler conserves soils, erodes surface runoff of water and tidal action. *Alocasia acuminata* Schott, *Alocasia fornicata* (Roxb.) Schott, *Colocasia gigantea* (Blume) Hook. f. and species of *Stuednera* K. Koch, *Amorphophallus* Blume ex Decaisne etc. all act as soil binders in the hill slopes and edges of ravines, canals and ditches by slowing down the current of runoff and by compacting the soil particles due to their gregarious occurrence.

4.5 BIOLOGY

4.5.1 Pollination

Pollination biology is a field of the utmost interest, specially for those plants which propagate

by seeds. Most of the Aroids propagate by vegetative means, so pollination biology study is not so much important for most of the Aroids.

Aroid inflorescences are always visited by many bees, beetles, flies and also in some cases by thrips. Data on aroid pollinators was first summarized by Grayum (1984) who documented 35 genera and about 90 species. Later on Mayo *et al.* (1997) published a second list including those of Grayum with 38 genera and about 100 species. Finally Gibernau (2003) published a list with 49 genera and 125 species. As Araceae consists of 105 genera and about 3,300 species (Mayo *et al.* 1997), only 47% of the genera are documented for their pollinators.

It is important to note here that all the recorded bees, beetles, flies and thrips may not be real pollinator, many of them may be a simple visitor.

As in all pollination systems, pollinators visit flowers looking for a resource. It can be an alimentary resource (nectar, pollen, floral parts etc) or a "reproductive resource" (mating, laying site). It is interesting to note that not a single species of aroid is known to offer nectar as a reward (Schwerdtfeger *et al.* 2002)

As mentioned by Gibernau (2003), from the flower-pollinator interaction point of view, three situations exist in Araceae. These are

1. The pollinators visit the inflorescence looking for a resource (stigmatic fluid, pollen) achieving thereby the pollination (eg. *Symplocarpus* R.A. Salisbury *ex* Nuttall, *Calla* L., some *Anthurium* Schott)
2. The insects visit Araceae inflorescences not only for food but also to meet sexual congeners, achieve copulations and sometimes lay their eggs (e.g. *Philodendron* Schott, *Dieffenbachia* Schott, *Peltandra* Rafinesque, *Colocasia* Schott).

3. The inflorescence dupes the pollinator by mimicking the laying site of the pollinators (mushroom, dead animals etc), hence the insects visit the inflorescence to complete their reproductive cycle. Through this deceptive attraction, the insects achieve pollination but without actually receiving any reward (eg. *Arum* L., *Helicodieros* Schott ex K. Koch)

However, no observation for pollinator recognition nor any experiment was done to see the mechanism of pollination in Araceae in the present work.

4.5.2 Aroid Reproduction/Propagation

Reproduction is one of the most important biological processes and an important characteristics of living organisms. The process of reproduction/propagation differs in different living groups, even in plant groups there are different mechanisms.

Most aroids propagate vegetatively and a few by reproductive methods, i.e. by seeds.

By tubers/corms/cormels : *Aglaonema modestum* Schott ex Engler, *Alocasia macrorrhizos* (L.) G. Don, *Amorphophallus bulbifer* (Roxb.) Blume, *Amorphophallus longituberosus* (Engl.) Engl. et Gehrm., *Ariopsis peltata* Nimmo, *Ariopsis protanthera* N.E. Br., *Colocasia esculenta* (L.) Schott, *Colocasia esculenta* (L.) Schott var. *antiquorum* (Schott) Hubb. & Rehder, *Typhonium trilobatum* (L.) Schott, *Typhonium roxburghii* Schott.

By stolons : *Colocasia affinis* Schott, *Colocasia esculenta* (L.) Schott, *Colocasia fallax* Schott, *Colocasia heterochroma* H. Li et Z.X. Wei, *Colocasia lihengiae* C.L. Long et K.M. Liu, *Pistia stratiotes* L.

By bulbils : *Remusatia pumila* (D. Don) Li & Hay, *Remusatia vivipara* (Roxb.) Schott.

By seeds : *Alocasia fornicata* (Roxb.) Schott, *Alocasia odora* (Roxb.) K. Koch, *Amorphophallus bulbifer* (Roxb.) Blume, *Colocasia esculenta* (L.) Schott, *Lasia spinosa* (L.) Thw.

4.6 TAXONOMIC EVIDENCES

4.6.1 Anatomy

Anatomical characters for most of the plant groups give dependable data and play an important role in classification and determination of phylogenetic relationships of many taxa. Several workers have studied anatomical as well as morphological aspects of several species of aroids. The publication of van Tieghem (1867) represents the only attempt to study the distribution and construction of stem vascular bundles on a comparative basis within the family. Recently French and Tomlinson (1980, 1981a, 1981b, 1981c, 1981d, 1983, 1984) have published in a series of papers the results of their observations on vascular systems in stems of certain Araceae using cinematographic techniques and pointed out that the aroids exhibit a diversity of vascular patterns greater than is found in the other families of monocotyledons that so far have been examined in details; and also that the plasticity of shoot development is a conspicuous feature of the Araceae.

van Tieghem (1867) was the first to suggest that the taxonomic usefulness of cellular raphids (Trichosclereids) present in aroids. He also described the structure of aroid spadix in detail. Bloch (1946), Rao (1954, 1964), Sinnott & Bloch (1946) and Singh (1968) have studied certain ontogenetic and structural aspects of trichosclereids (raphids) in *Monstera* Adanson and *Scindapsus* Schott. Rao (1977) pointed out that the presence and absence of sclereids in species of *Rhaphidophora* Hasskarl and *Scindapsus* Schott is very useful in indicating the sclereid approach to taxonomic problems within the smaller group of taxa than the family as a whole. A compilation on the studies of the vegetative anatomy (root, stem and leaves) were furnished by French (1987a and 1987b); French and Fischer (1977a and 1977b) and French & Tomlinson (1980, 1981a, 1981b, 1981c, 1981d, 1983, 1984 and 1986) and who concluded like this. "The vegetative anatomy of the *Araceae* is among the most diverse of any family of monocotyledons. Stem vasculature is the most diverse of any monocotyledon group and virtually every known type of secretory structure occurs, including resin canals, laticifers, extrafloral nectaries, mucilage cavities and intravaginal squamules".

There are a considerable number of works on Inflorescence and Floral anatomy. Few important works are that of Eyde *et al.* (1967), French (1985a, 1985b; 1986a, 1986b, 1986c; 1987c), Mayo (1986b, 1989b) and Vogel (1963, 1990).

Keating (2003) presented a detail of Leaf Anatomical characters and their value in understanding morphoclines in the Araceae. He concluded the leaf anatomy and petiole anatomy of the Araceae are discussed in terms of their potential use as character states in a phylogenetic analysis. The characters include leaf venation and structure, leaf epidermis, mesophyll ground tissue, vascular bundles, sclerenchyma, collenchyma, laticifers, secretory ducts, and raphide crystals. Characters that seem to have the greatest potential for use in phylogenetic analysis include those of ground tissue, vascular bundles, fibers, trichosclereids, collenchyma, and laticifers. Other, equally distinguishable, characters have states that are apparently autapomorphies, providing little phylogenetic signal. Therefore, although most leaf and petiole structural variation is useful diagnostically, some characters will probably be less valuable in phylogenetic analysis than originally hoped.

However, in the present work no anatomical studies has been made.

4.6.2 Habitat diversity

The growth of most aroids is dependent on abundant available water and prevailing atmospheric humidity. Structurally and physiologically they are not well adapted for growth in arid or cold conditions and hence almost never occur in the most extreme environments. *Araceae* are most diverse and abundant in the humid tropics and it is there that the richest variety of their life forms is found.

The following is an outline of major habitat diversity in the Araceae:

Aquatic

- a. Submerged aquatics
- b. Free-floating aquatics
- c. Emergent aquatics

Submerged aquatics

Jasarum steyermarkii Bunting has permanently submerged leaves and is the only true example of this life form among neotropical Araceae. Many rheophytes, however, may spend a portion of their lives underwater with no apparent harm, but flowering occurs when the plants are mostly emerged and have only their short stems below water. Species of *Anubias* Schott, *Lagenandra* Dalzell, *Spathiphyllum* Schott and especially

Cryptocoryne Fischer *ex* Wydler are used as aquarium plants and may be submerged completely for indefinite periods of time without apparent injury.

Free-floating aquatics

Free-floating aquatics are represented by only one genus, with one pantropic and variable species. *Pistia stratiotes* L. has a short stem and a rosette of aerenchymatous, buoyant leaves, with a cluster of fine, hair-like roots below.

Emergent aquatics

Emergent aquatics make up a very large group within Araceae. Many genera have at least some species which spend all or part of their lives rooted in standing or moving water. Temperate North America is particularly rich in aquatic or semiaquatic genera. Most, including *Calla* L., *Lysichiton* Schott, *Orontium* L., *Peltandra* Rafinesque and *Symplocarpus* R.A. Salisbury *ex* Nuttall, grow in swampy or marshy areas, lakes, ponds, or along the edges of creeks. *Arisaema triphyllum* (L.) Torr. is also reported as sometimes occurring in swampy areas. Some emergent aquatics, e.g., *Montrichardia arborescens* (L.) Schott, *Peltandra virginica* (L.) Kunth, *Cryptocoryne ciliata* (Roxb.) Fischer *ex* Wydler and *Typhonodorum lindleyanum* Schott, occur in tidal zones.

Terrestrial

The terrestrial habit is predominant for aroids on a world-wide basis. Terrestrial genera are the most diverse ecologically, occurring in humid to very dry habitats, in secluded forest understory and in open, exposed areas. While most genera comprise mainly understory plants in primary forest, some range into savannas, exposed steppes, alpine meadows and even into semidesert areas. Terrestrial aroids range in habit from caulescent plants (*Dieffenbachia* Schott, *Homalonema* Schott and *Aglaonema* Schott) to tuberous plants (*Amorphophallus* Blume *ex* Decaisne, *Arum* L. And *Dracontium* L.), to rhizomatous (rarely also reported as cormose - *Colocasia* Schott, *Theriophonum* Blume or *Typhonium* Schott and to subscandent plants (*Cercestis* Schott and *Culcasia* Palisot de Beauvois).

A large percentage of terrestrial aroids have rhizomes, or short stems with short internodes, which usually creep over the surface of the soil or just beneath the soil surface. Rhizomes may be deeply rooted, as in *Cyrtosperma* Griffith and *Spathiphyllum* Schott, but most are weakly or loosely rooted.

Epilithic

Epilithic plants growing on rocks, sometimes in shallow deposits of soil but not rooted into the ground. These plants do not show a great preference for the surface on which they grow. Many species grow as appressed plants on tree trunks or on boulders. Porous limestone is particularly suitable for epilithic plants because of its ability to catch debris and to provide many interfaces for adequate rooting sites. Rarely is a species found only on lime-stone (e.g., *Anthurium reflexinervium* Croat sp. nov. ined., *Colocasia gigantea* (Blume) Hook. f., *Typhonium albispathum* Bogner and *Amorphophallus putii* Gagnepain).

Epiphytes

- a. Hemiepiphytes
- b. Epiphytes

Hemiepiphytes

Hemiepiphytes growing on trees but rooted into the ground. These are the commonest life form in the more primitive tribes and subfamilies. Most genera of subfamilies *Pothoideae* and *Monstroideae* contain hemi-epiphytes and among the more advanced genera this life form occurs only in the tribe *Culcasieae* and *Philodendreae*, belonging to the subfamily *Aroideae* (Mayo, Bogner & Boyce 1997).

Epiphytes

True epiphytes, which never become connected to the ground by feeder roots, are found in *Anthurium* Schott, *Philodendron* Schott, *Remusatia* Schott, *Scindapsus* Schott and *Stenospermation* Schott. The seeds presumably germinate directly on the host tree after dispersal by birds or other animals. Some species of *Philodendron* Schott, *Anthurium* Schott and *Scindapsus* Schott are litter basket epiphytes. The large leaves form an inverted cone in which leaf litter and other debris accumulate and into which the roots grow and ramify in a dense mass. *Remusatia vivipara* (Roxb.) Schott, which has a tuberous stem, is a widespread epiphyte, due to the dispersal of hooked bulbils which are probably transported by birds and primates high in the forest canopy. Other *Remusatia* Schott species are also epiphytic, though not as widespread as *Remusatia vivipara* (Roxb.) Schott.

Beside this, aroids grow in different habitats, such as lithophytic habit, geophytic habit, helophytic habit and mesophytic habit.

Geophytes

The geophytic habit is strongly represented in the relatively primitive subfamily Lasioideae and particularly common in the most advanced subfamily Aroideae. This category includes all genera with tuberous, rhizomatous, subterranean or partially subterranean stems. Geophytic aroids characteristically have periodic dormant periods when no leaves are present and these correspond to the dry season (or winter) in their habitat. However, rainforest geophytes also exhibit growth periodicity and dormancy even in non seasonal climates. The genera *Amorphophallus* Blume ex Decaisne and *Dracontium* L. are diverse ecologically, with species in rainforests or in seasonal evergreen forests, deciduous forests, savannas or grasslands.

Geophytes are also found as lithophytes in suitable conditions. Certain groups, such as *Anthurium coriaceum* G. Don the complex in eastern Brazil, are characteristically lithophytic. A number of geophytes are characteristically found growing in the eroded, litter or humus filled cavities of limestone outcrops; such as *Amorphophallus albispatus* Hetterscheid, *Colocasia gigantea* (Blume) Hook. f. and *Typhonium albispatum* Bogner in South East Asia.

Helophytes

About 38 genera are helophytic or have at least some helophytic species, i.e. plants which grow in swampy habitats or along river and stream margins.

Mesophytes

The least specialized mesophytic habit is shown by some rain forest terrestrial herbs. In these the stem is aerial and erect or decumbent, with short but distinct green internodes. This habit type has been found predominantly in more advanced genera such as *Aglaonema* Schott (tribe *Aglaonemateae*), *Dieffenbachia* Schott (tribe *Diefenbachieae*), *Homalomena* Schott (tribe *Homalomeneae*) and *Schimatoglottis* Zollinger & Moritzi (tribe *Schimatoglottideae*). Among primitive groups only the tribe *Spathiphyllae* and terrestrial *Anthurium* species have this habit.

4.6.3 Harmful Chemicals

Other than primary metabolites plants also produce some secondary metabolites. Secondary metabolites are important taxonomically as they are sometimes plant specific. Aroids also produce some secondary metabolites, some of the secondary metabolites of aroids are as follows:

Cyanogenic Glucoside

Some species of Araceae may demonstrate cyanogenesis. Triglochinin, a seco-derivative of dhurrin or taxiphyllin, is the cyanogenic glucoside occurring in all Araceae so far investigated for cyanogenesis. It is accompanied by a substrate-specific enzyme (triglochininase) which rapidly splits the glucoside after injury. Triglochinin and the corresponding enzyme were shown to be the cause of cyanogenesis in *Alocasia macrorrhizos* (L.) G. Don, *Arum maculatum* L., *Pinellia tripartita* Schott, *Lasia spinosa* (L.) Thwait. and *Dieffenbachia picta* Schott by Nahrstedt and his group (Mayo *et al.* 1997).

Polyhydroxy Alkaloids or Alkaloidal Glycosidase Inhibitors (AGLS)

Alkaloid glycosidase inhibitors (AGLs) is a group of secondary metabolites, were detected in leaves of several genera e.g. *Anchomanes* Schott, *Nephtytis* Schott, *Pseudohydrosme* Engl., *Aglaonema* Schott and *Aglaodorum* Schott. Trace amounts of AGLs were present in species of *Amorphophallus* Blume *ex* Decaisne (Sharp *et al.* 1993).

Irritants

A comprehensive summary of irritant aroids and their irritating properties is given by Mitchell & Rook (1979). Brazilian scientists have paid much attention to the irritating and toxic properties of Araceae. Lethal intoxication of children from eating the spathe and spadix of cultivated *Zantedeschia aethiopica* (L.) Spreng. (Jesus Neves *et al.* 1988) have been reported (Ladeira *et al.* 1975). The irritant raphides lost their irritating and toxic properties on washing with ether, but not on washing with water.

Contact Dermatitis

Contact dermatitis caused by some species of *Philodendron* Schott. The main allergens have been isolated and identified as alkenylresorcinols with one, two or three double bonds.

Irritation Of Mucous Membrane

Painful irritations of mucous membranes are caused by many aroids. Presence of raphides are the main cause for such irritation. Long ago it was reported by Hegnauer (1963).

The construction and contents of Araceous Raphide Idioblasts (Middendorf 1983; Safford 1905; Tang & Sakai (1983); Wiley 1903 and the structure of the individual needles (Sakai *et al.* 1972; Tang & Sakai 1983) suggest that they are adapted to transport acrid, pain-producing and otherwise irritating substances.

There are a considerable number of works on Raphide Idioblasts Structure. Few important works are that of Cody & Horner (1983), Genua & Hillson (1985), Saha & Hussain (1983), Sakai & Hanson (1974), Sakai & Nagao (1980) and Sunell & Healey (1979).

Biogenic Amines And Alkaloids

Biogenic amines and alkaloids occur in many members of Araceae. The aporphine-type alkaloids liriodenine and lysicamine were isolated from roots of *Lysichiton camtschatcensis* (L.) Schott. Tuber of *Pinellia ternata* (Thumb.) Makino yielded ephedrine. A tertiary base, $C_{20}H_{35}O_2N$, was isolated from tubers of *Eminium spiculatum* (Blume) Kuntze (Ahmed *et al.* 1968).

Essential Oils

Just before and during flowering, spadix and spathe of a number of Araceae produce large amount of volatile amines and indoles, giving them a putrescent odour attractive to their pollinators. A pyrrolidine alkaloid called irinine, $C_{20}H_{35}N$ was isolated from tubers of *Arisarum vulgare* O. Targ.-Tozz., it is one of the toxic principle. *Homalomena* Schott is an aromatic genus, like *Acorus* L., *Homalomena aromatica* (Roxb. *ex* Sim) Schott yielded

1.2% essential oil containing mainly monoterpenoids (Hegnauer 1986). Some other species of the genus also contain monoterpenoids.

Phytosterols And Triterpenes

Some phytosterols and triterpenes are also isolated from Aroids. β -sitosterol palmitate was isolated from tubers of *Amorphophallus paeoniifolius* (Dennst.) Nicolson, var. *campanulatus* (Decne.) Sivadasan together with other phytosterols, triacontane, lupeol and betulinic acid by Chawla and Chibber (1976). New di- and trioxigenated sterols have been isolated from tubers of *Colocasia esculenta* (L.) Schott (Ali 1991). Taraxerol acetate was isolated together with phytosterin, lignoceric acid and others from *Alocasia fornicata* (Roxb.) Schott (Sharma *et al.* 1972).

Conclusion

The data on chemical properties of Araceae, at the present state of occurrence and accuracy, should not be given so much weight to go for a chemotaxonomic treatment of Araceae.

4.6.4 PALYNOLOGY

4.6.4(i) Introduction

Pollen morphology has long been recognized as an important criterion in determining more accurately the natural relationship among some genera and families. Along with other morphological characters, size, shape, class, aperture and surface sculpture of the pollen wall have been considered to be of useful diagnostic value (Erdtman 1952, 1960a, 1961; Erdtman and Straka 1961; Faegri 1956; Fasbender 1959; Punt 1962 and Selling 1947;). Apart from their importance in taxonomy, pollen morphology is of fundamental significance in the wider applications of palynological science. The present study deals with an account of the pollen grains of 16 taxa belonging to the family Araceae during my short visit to the "The Natural History Museum", U.K. on 1.3.1998-10.4.1998.

4.6.4(ii) Materials

The present investigation is based upon pollen grains obtained from 16 species belonging to 12 genera. All the materials for this study were collected from herbarium specimens kept at "The Natural History Museum", U.K.

Table 4.6.4(ii).1: Voucher information for the taxa of Araceae studied here. All collections were deposited in The Natural History Museum (BM), London.

No.	Taxa	Collection data
1.	<i>Aglaonema commutatum</i> Schott	30 June, 1962 Malay, Peninsula
2.	<i>Aglaonema hookerianum</i> Schott	Mont. Khasia Regio. Trop.
3.	<i>Alocasia cucullata</i> (Lour.) G. Don	Sikkim/C.C. Lacaïta April-May, 1913; No. 16199
4.	<i>Alocasia fornicate</i> (Roxb.) Schott	Ritegala (Ceylon) 29/2/1940; No. 810

No.	Taxa	Collection data
5.	<i>Alocasia macrorrhizos</i> (L.) G. Don	AHS. Morton 2/2/1954; No. 13475 and R. Pullen 5981 Asia, 15th Oct, 1964
6.	<i>Colocasia esculenta</i> (L.) Schott	Flora of Bhutan, Punakha, 13/9/1967; No. 5046
7.	<i>Dieffenbachia picta</i> Schott	H.N. Ridley; Bot. Gard. Singapore.
8.	<i>Epipremnum pinnatum</i> (L.) Engler	F.A. MC. clure April 8, 1922; No. 8925
9.	<i>Lasia spinosa</i> (L.) Thwaites	Griffith; No. 5949; East Bengal.
10.	<i>Pothos scandens</i> L.	Bengal, Griffith 505 & No. 18110 & I.V. Thomson, Madagascar.
11.	<i>Rhaphidophora hookeri</i> Schott	Silhet-Wallick; No. 4441
12.	<i>Scindapsus officinalis</i> (Roxb.) Schott	William Stainton 23/8/1967; No. 8220
13.	<i>Syngonium podophyllum</i> Schott	Coll. A.H.G. Alston; No. 15379
14.	<i>Typhonium flagelliforme</i> (Lodd.) Blume	C.B.Clark, Dhaka; No. 17085 & A.H.G. Alston, No. 15576.
15.	<i>Typhonium trilobatum</i> (L.) Schott	F.W. Burbidge, 1877-78 & Ceylon No. 2896 & William & Stainton No. 8166

4.6.4(iii) Methods

Pollen slides have been made according to Erdtman's (1960 b) revised "Acetolysis method" with certain modifications (Nair, 1960). The terminology adopted by Walker and Doyle (1975) and Moore *et al.* (1991) on aperture type, polarity, pollen shape, symmetry, pollen-unit, pollen size and exine sculpturing has also been used.

Preparation of slides for light microscope

The polliniferous materials were collected from preserved herbarium sheets. Before preparation, the dry samples are placed in soapy liquid for 5-10 minutes. Then, the dry

samples were mashed lightly with a glass rod and was then removed to a centrifuge tube via micropipetting and was added one drop of lactic acid. After that the mixture in the tube was centrifuged for about five minutes. This should result in the deposition of a small pellet of material at the base of the tube, though the dark colour of the humic solution may obscure its presence. Then the water of the tube was decanted off with care, so that the pellet is not disturbed and lost. Next 5.c.c. of glacial acetic acid was added to the tube followed by centrifuging and the liquid portion of the mixture of the tube was decanted off. To the sediment is added about acetolysis mixture (1 part conc. sulphuric acid added drop by drop to 9 parts of acetic anhydride). The sulphuric acid should be added drop by drop by a glass rod to the acetic anhydride and kept the mixture for four minutes. In this time the mixture was stirred by long glass rod. This operation was performed in a fume cupboard with gloves and eye protection. The mixture in the tube was centrifuged for about 5 minutes. Then the liquid portion of the mixture of the tube was decanted off carefully into cold running water. Next distilled hot water was added into the tube and shaken well in the fume cupboard and the tube was centrifuged for about 5 minutes. Then all the water of the tube was decanted off. Again distill water was added into the tube and the tube was centrifuged for about 5 minutes. After that half of the tube was filled up with distilled water. Then a pippette was inserted into the half filled tube and the mixture entered into the pippette was transferred into another test tube. After that glycerol (50% in distilled water) was added into the tube half portion and the tube was shaken by giving vigorous jerks with the finger to the bottom of the tube. The pollen grains were thus dispersed well in the liquid. Then it was centrifuged for about 5 minutes and the liquid portion of the tube was decanted off and the tube placed upside down on a filter paper till the glycerol was completely absorbed by the filter paper.

Small pieces of phenol & glycerine jelly were cut by means of a fine scalpel. The tube containing the pollen was then held inverted in the left hand in a slanting position. A block of phenol & glycerine jelly was carried on the hook of a needle and inserted into tube to touch the centre of the pollen sediment. The block of phenol & glycerine jelly was placed on a clean microscope slide. The slide was slightly warmed before placing the jelly. Two small pieces of plastocine was placed on two sides of phenol & glycerine jelly in transverse direction of the slide. It was warmed again and as soon as it was completely melted, the few bubbles that developed were then carefully drawn with a clean mounted needle to the edge and a clean cover glass was placed over the jelly. Then the cover glass was slightly pressed on plastocine

by toothpick. A drop of melted paraffin wax was immediately placed on the edge of the cover slip. The wax spreads inside the cover glass and seals the preparation. After cooling, the excess wax was removed with xylol. Then the slides were labelled and stored horizontally in trays.

The pollen slides were deposited in the Herbarium of the "The Natural History Museum, London."

Scanning electron microscope (SEM)

At first aluminium pin stubs numbering 1 to 18 were placed on a special container. The top of all aluminium pin stubs was covered by glue. Then a film was placed horizontally to cover the top of all the aluminium pin stubs. On next day the film was cutted by scissor to make a circular film on the top of each aluminium pin stubs. Care were taken while cutting and mounting the film so that no scratch mark was made on the film.

A small drop of pollen suspension, which had been prepared earlier, was pipetted onto the film and the entire system was stored in a special container which was kept undisturbed in a warm place for the time needed to evaporate the water of the pollen suspension.

Aluminium pin stubs were then coated with gold in a polaron sputter coating unit and examined under the SEM.

The observations were made under both Light Microscope (LM) (Plate 1) and Scanning Electron Microscope (SEM) (Plate 2-4). For the latter the Digital Scanning Electron Microscope at 5 KV and 15 KV was used and with a working distance of between 9 and 11 mm. Instant pictures were obtained using a video printer, the images were saved on disc, and black and white photographs were taken on an SEM Camera (using Kodak Technical Pan Film). After study, stubs were stored in a dust free environment in constant (low) humidity.

Table 4.6.4(iii).1: Pollen morphology examined with Scanning Electron Microscope

Sl. No.	Taxa	Type of Aperture	Polarity	Shape of pollen	Symmetry	Pollen unit	Size	Surface
1.	<i>Aglaonema commutatum</i> Schott / <i>Aglaonema hookerianum</i> Schott	Inaperturate	Isopolar	Boat-shaped	Bilaterd	Monads	Large	Psilate
2.	<i>Alocasia cucullata</i> (Lour.) G. Don/ <i>Alocasia fornicata</i> (Roxb.) Schott/ <i>Alocasia macrorrhizos</i> (L.) G. Don	Inaperturate	Apolar	Globose	Radiosymmetric	Monads	Medium	Spinose
3.	<i>Colocasia esculenta</i> (L.) Schott	Inaperturate	Isopolar to apolar	Boat-shaped to globose	Bilateral or radiosymmetric	Monads	Small to medium sized.	Striate to spinose
4.	<i>Dieffenbachia picta</i> Schott	Inaperturate	Subisopolar	Boat-shaped to globose	Bilateral	Monads	Large	Foveolate
5.	<i>Epipremnum pinnatum</i> (L.) Engler	Zonate	Subisopolar	hamburger - shaped	Monosymmetric	Monads.	Medium	Foveolate

Sl. No.	Taxa	Type of Aperture	Polarity	Shape of pollen	Symmetry	Pollen unit	Size	Surface
6.	<i>Lasia spinosa</i> (L.) Thwaites	Monosulcate	Heteropolar	Boat-shaped	Bilateral	Monads	Medium	Reticulate
7.	<i>Pothos scandens</i> L.	Monosulcate	Heteropolar	Boat-shaped	Bilateral	Monads	Small	Foveolate to reticulate
8.	<i>Rhaphidophora hookeri</i> Schott	Zonate	Heteropolar or subisopolar	Hamburger or boat-shaped	Bilateral or monosymmetric	Monads	Medium	Scabrate or Granulate
9.	<i>Scindapsus officinalis</i> (Roxb.) Schott	Zonate	Subisopolar	Hamburger-shaped	Isobisymmetric to monosymmetric	Monads	Medium	Foveolate or Punctate
10.	<i>Syngonium podophyllum</i> Schott	Inaperturate	Isopolar to apolar	Boat-shaped to globose	Bilateral to radiosymmetric	Monads	Medium	Spinose
11.	<i>Typhonium flagelliforme</i> (Lodd.) Blume / <i>Typhonium trilobatum</i> (L.) Schott	Inaperturate	Apolar	Globose	Radiosymmetric	Monads	Medium	Spinose to verrucate

4.6.4(iv) Discussion and Conclusion

Pollen structure of about 55 species belonging to 35 genera of Araceae have been studied by Erdtman (1952); 500 species belonging to 98 genera of Araceae have been studied by Thanikaimoni (1969) and 380 species belonging to 99 genera of Araceae have been studied by Grayum (1984, 1986, 1992).

This study showed that aperture type was monosulcate, extended monosulcate or zonate, inaperturate. Inaperturate pollen grains were quite common. The shape of pollen was globose to ellipsoid, boat shaped or hamburger shaped. The polarity was heteropolar to isopolar to apolar. The symmetry was bilateral or isobisymmetric to radiosymmetric. The pollen grains were usually found in monads. The size of pollen was small, medium and large. The ornamentation of the exine was either smooth, rough, reticulate, foveolate, verrucate, spinulate, striate. Pollen characters are not uniform, therefore variation of characters may be used as taxonomic criteria to a certain level of confidence.

However, detailed and in-depth studies are needed with fresh materials of all species of Araceae family to ascertain the pollen structure and taxonomic value of the family.

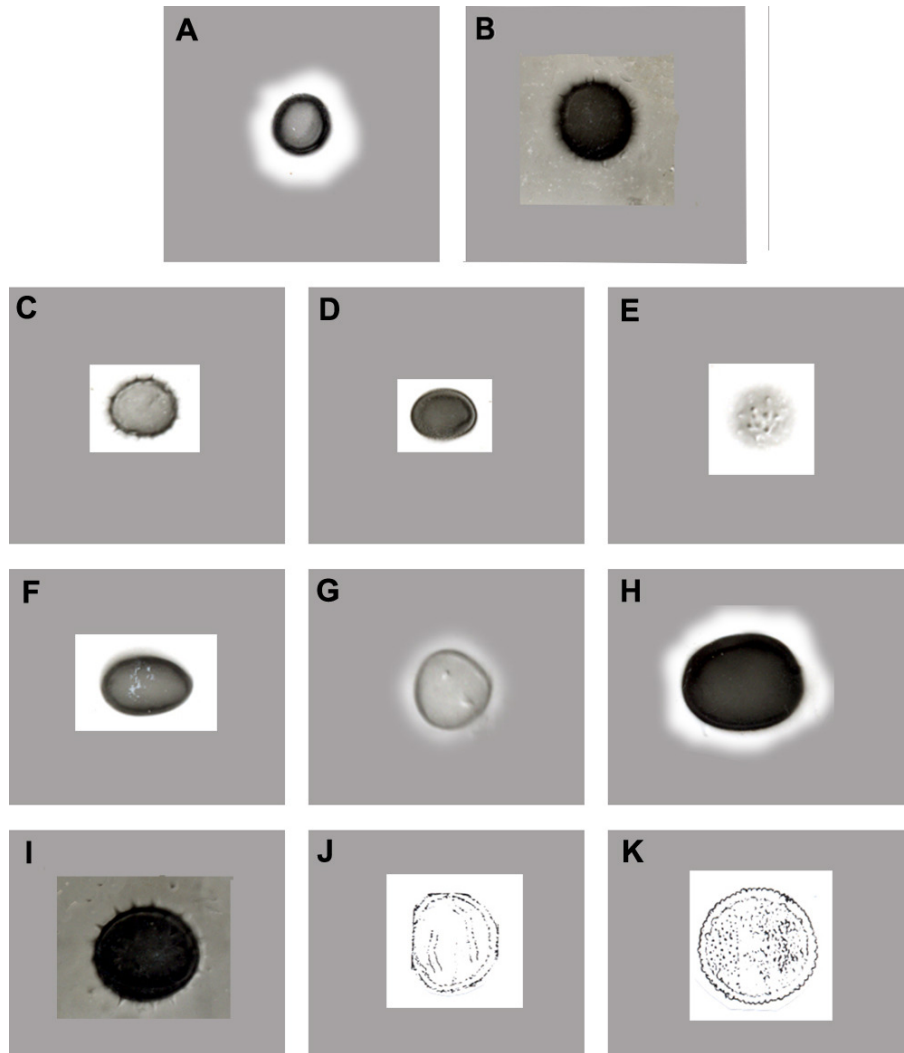


Plate 4.6.4(iii).1: Light micrographs of pollen grain. (A) Pollen of *Aglaonema hookerianum* \times 500. (B) *Alocasia fornicata* \times 1000. (C) *Colocasia esculenta* \times 1000. (D) *Epipremnum pinnatum* \times 500. (E) *Dieffenbachia picta* \times 500. (F) *Lasia spinosa* \times 500. (G) *Rhaphidophora hookeri* \times 1000. (H) *Scindapsus officinalis* \times 500. (I) *Syngonium podophyllum* \times 1000. (J) *Pothos scandens* \times 1000. (K) *Typhonium trilobatum* \times 1000.

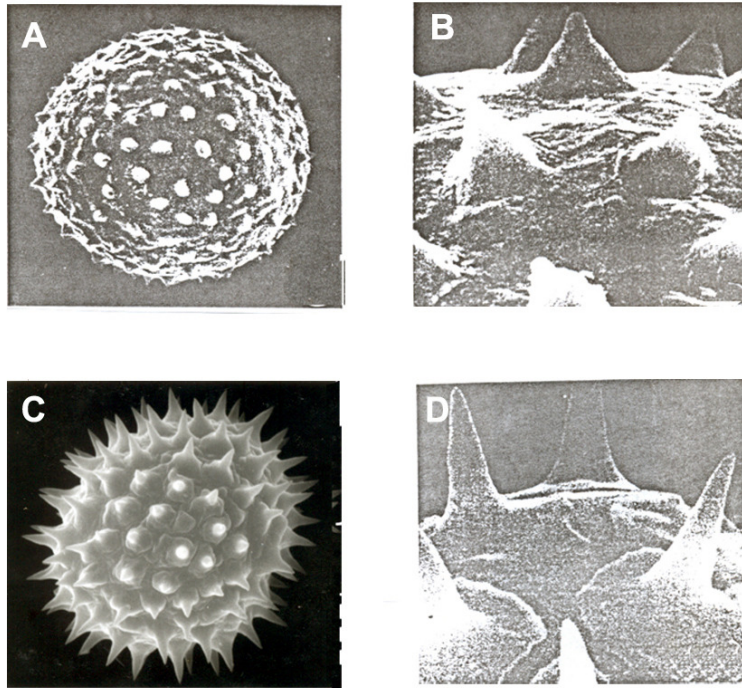


Plate 4.6.4(iii).2: Scanning electron micrographs of pollen grain. (A) Pollen of *Alocasia cucullata* $\times 2000$. (B) *Alocasia cucullata* $\times 12000$. (C) *Colocasia esculenta* $\times 2300$. (D) *Colocasia esculenta* $\times 12000$.

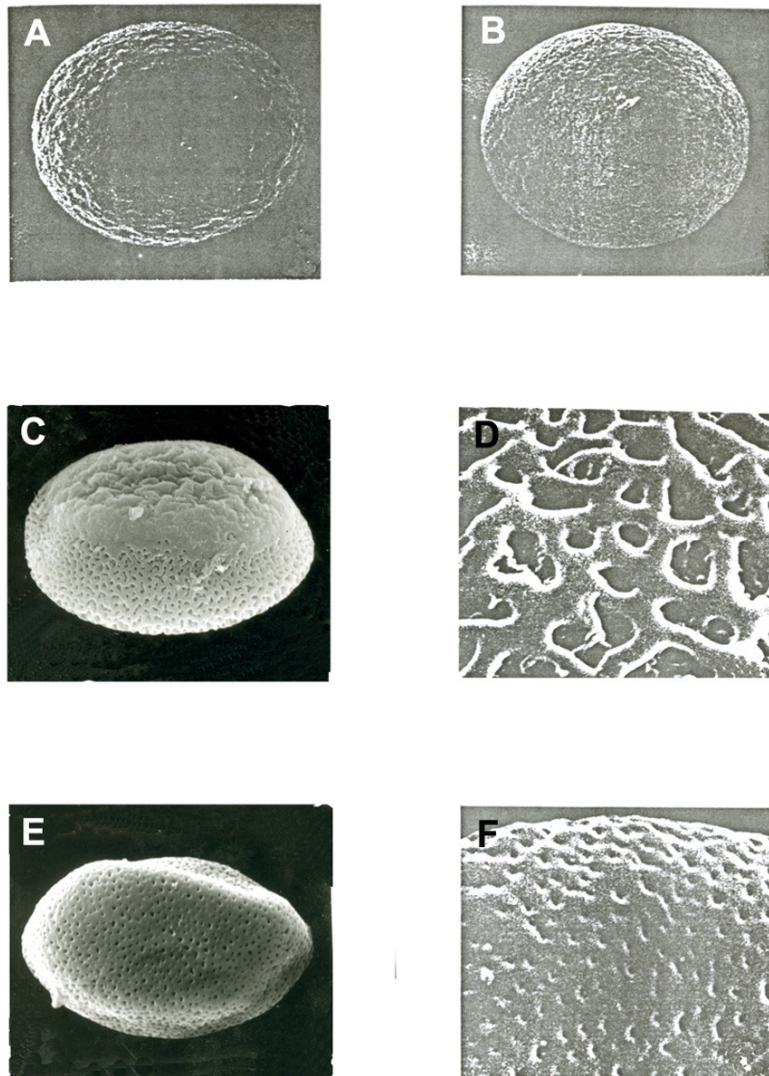


Plate 4.6.4(iii).3: Scanning electron micrographs of pollen grain. (A) Pollen of *Aglaonema commutatum* \times 950. (B) *Dieffenbachia picta* \times 930. (C) *Lasia spinosa* \times 2500. (D) *Lasia spinosa* \times 12000. (E) *Pothos scandens* \times 4500. (F) *Pothos scandens* \times 12000.

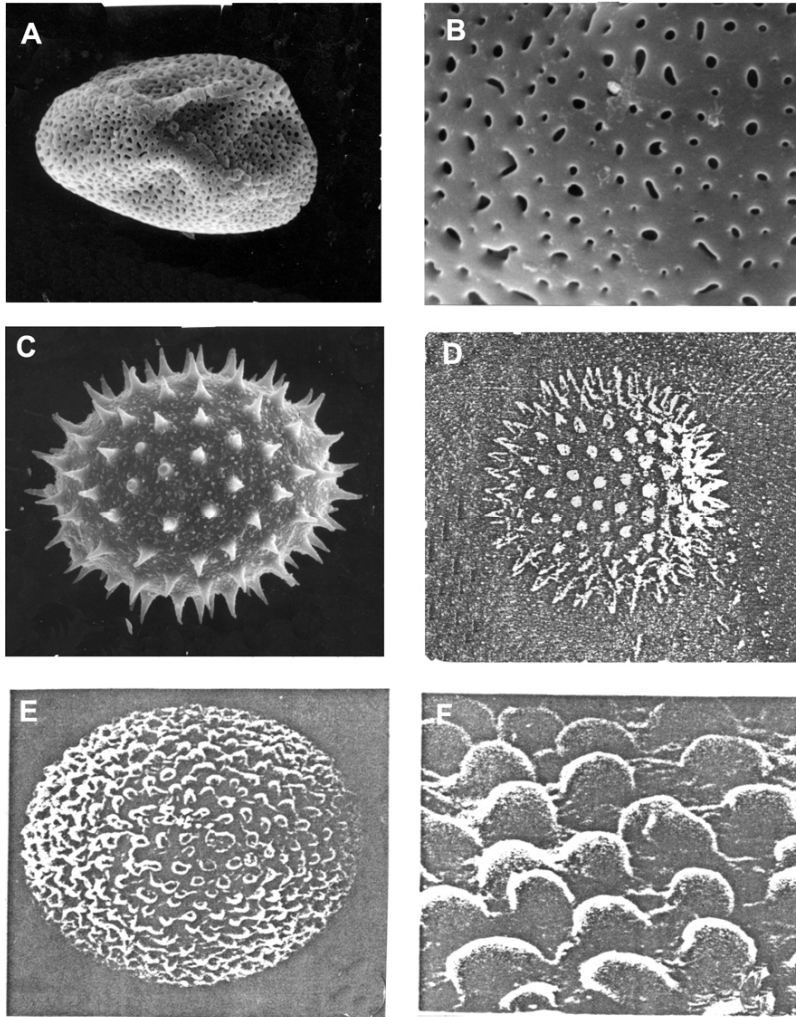


Plate 4.6.4(iii).4: Scanning electron micrographs of pollen grain. (A) Pollen of *Scindapsus officinalis* \times 1450. (B) *Scindapsus officinalis* \times 12000. (C) *Syngonium podophyllum* \times 1400. (D) *Typhonium flagelliforme* \times 1500. (E) *Typhonium trilobatum* \times 1700. (F) *Typhonium trilobatum* \times 12000.

4.6.5 Cytology

4.6.5(i) Introduction

Cytological data, specially chromosome number, chromosome structure and chromosome behaviour during meiotic division, have been successfully utilized in solving taxonomic problems. These data have also been proved to be important in delimitation of taxa and also to establish interrelationships between taxa. Cytological data of Araceae have also proved very useful in all the cases mentioned above.

Since the most thorough taxonomic study of the Araceae of Engler and his collaborator Krause from 1905-1920, who listed 107 genera and the work was mainly based on the flower morphology, half of the genera have been studied Cytotaxonomically.

Since 1950, many workers worked on Aroid Cytology, most important of those are Chaudhury and Sharma (1978-79), Fedorov (1969), Jones (1957), Kumar and Subramaniam (1986), Larsen (1969), Marchant (1970, 1971a, 1971b, 1972 and 1973), Petersen (1989, 1993), Pfitzer (1957), Mookerjea (1955), Sharma and Bhattacharya (1966) and Sharma and Das (1954).

4.6.5(ii) Previous Cytological Works

Chromosomal studies on the Aroids revealed that Chromosome numbers in Araceae vary greatly between genera, from $2n = 14$ (*Ulearum* Engler) to $2n=168$ (*Arisaema* Martius). Within a single genus the number also varies (*Cryptocoryne* Fischer ex Wydler, $2n=20$ to $2n=132$). However, primary basic number of $x=7$ has been proposed by Jones (1957), Larsen (1969) and Marchant (1973). Petersen (1989) suggested that the basic numbers $x=14$ or $x=12$ must have been the starting points for the derivation of all the modern chromosome numbers in the Araceae.

Table 4.6.5(ii).1: List of $2n$ numbers in the genera of Araceae (arranged alphabetically)

Sl. No.	Name of the genera	Chromosome number $2n$
1.	<i>Aglaodorum</i> Schott	40 ($x=20$)
2.	<i>Aglaonema</i> Schott	40, 60, 80, 100, 120 ($x=20$)
3.	<i>Alloschemone</i> Schott	84 ($x=14$)
4.	<i>Alocasia</i> (Schott) G. Don	28, 42, 56, 70, 84 ($x=14$)

Sl. No.	Name of the genera	Chromosome number 2n
5.	<i>Ambrosina</i> Bassi	22 (x=11)
6.	<i>Amorphophallus</i> Blume ex Decaisne	26, 39, 28 (x=13,14)
7.	<i>Amydrium</i> Schott	60 (x=15)
8.	<i>Anadendrum</i> Schott	60 (x=15)
9.	<i>Anaphyllopsis</i> A. Hay	26 (x=13)
10.	<i>Anaphyllum</i> Schott	26 (x=13)
11.	<i>Anchomanes</i> Schott	40 (x=20)
12.	<i>Anthurium</i> Schott	20, 40, 24, 48, 84; 28, 56; 30, 60, 90 (x=10, 12, 14, 15)
13.	<i>Anubias</i> Schott	48, 72 (x=24)
14.	<i>Aridarum</i> Ridley	24 (x=12)
15.	<i>Ariopsis</i> Nimmo	28, 84 (x=14)
16.	<i>Arisaema</i> Martius	20; 22, 24, 48, 72; 26, 39, 52; 28, 42, 56, 70, 112. 140, 168 (x=10, 11, 12, 13, 14)
17.	<i>Arisarum</i> P. Miller	28, 42, 56 (x=14)
18.	<i>Arophyton</i> Jumelle	38, 76; 54 (x=19, 27)
19.	<i>Arum</i> L.	28, 42, 56, 70, 84 (x=14)
20.	<i>Asterostigma</i> F.F.L. Fischer & C.A. Meyer	34 (x=17)
21.	<i>Biarum</i> Schott	16; 20; 22; 24; 26; 32; 36; 74; 96 (x=?)
22.	<i>Bognera</i> Mayo & Nicolson	34 (x=17)
23.	<i>Bucephalandra</i> Schott	c. 26 (x=c. 13)
24.	<i>Caladium</i> Ventenat	22; 26; 28; 30; 32 (x=13, 14, 15, 16)
25.	<i>Calla</i> L.	36, 54, 72 (x=18)
26.	<i>Calloopsis</i> Engler	36 (x=18)
27.	<i>Carlephyton</i> Jumelle	54, 108 (x=27)
28.	<i>Cercestis</i> Schott	42 (x=21)
29.	<i>Chorospatha</i> Engler	26 (x=13)
30.	<i>Colletogyne</i> Buchet	54 (x=27)
31.	<i>Colocasia</i> Schott	28, 42, 56 (x=14)
32.	<i>Cryptocoryne</i> Fischer ex Wydler	20; 22, 33, 66, 88, 132; 28, 42; 30; 34, 68, 85, 102; 36, 54, 72, 90 (x=10, 11, 14, 15, 17, 18)
33.	<i>Culcasia</i> Palisot de Beauvois	42, 84 (x=21)
34.	<i>Cyrtosperma</i> Griffith	26 (x=13)
35.	<i>Dieffenbachia</i> Schott	34, 68 (x=17)
36.	<i>Dracontioides</i> Engler	26 (x=13)
37.	<i>Dracontium</i> L.	26 (x=13)
38.	<i>Dracunculus</i> P. Miller	28 (x=14)
39.	<i>Eminium</i> (Blume) Schott	24; 28 (x=14)
40.	<i>Epipremnum</i> Schott	60 (x=15)
41.	<i>Filarum</i> Nicolson	28 (x=7)
42.	<i>Furtadoa</i> M. Hotta	40 (x=20)
43.	<i>Gearum</i> N.E. Brown	no data
44.	<i>Gonatopus</i> J.D. Hook. ex Engl.	34, 68 (x=17)

Sl. No.	Name of the genera	Chromosome number 2n
45.	<i>Gorgonidium</i> Schott	34 (x=17)
46.	<i>Gymnostachys</i> R. Brown	48 (x=12)
47.	<i>Hapaline</i> Schott	26; 28 (x=13, 14)
48.	<i>Helicodicerus</i> Schott ex K. Koch	56 (x=14)
49.	<i>Heteroaridarum</i> M. Hotta	no data
50.	<i>Heteropsis</i> Kunth	28 (x=14)
51.	<i>Holochlamys</i> Engler	60 (x=15)
52.	<i>Homalomena</i> Schott	38; 40, 80; 42 (x=19, 20, 21)
53.	<i>Hottarum</i> Bogner & Nicolson	26 (x=13)
54.	<i>Jasarum</i> Bunting	22 (x=11)
55.	<i>Lagenandra</i> Dalzell	36, 72 (x=18)
56.	<i>Lasia</i> Lour.	26 (x=13)
57.	<i>Lasimorpha</i> Schott	26 (x=13)
58.	<i>Lazarum</i> A. Hay	c. 78 (x=c. 13)
59.	<i>Lysichiton</i> Schott	28 (x=14)
60.	<i>Mangonia</i> Schott	no data
61.	<i>Monstera</i> Adanson	60 (x=15)
62.	<i>Montrichardia</i> H. Crüger	48 (x=24)
63.	<i>Nephtytis</i> Schott	36; 40, 60 (x=18, 20)
64.	<i>Orontium</i> L.	26 (x=13)
65.	<i>Pedicellarum</i> M. Hotta	no data
66.	<i>Peltandra</i> Rafinesque	56, 112 (x=14)
67.	<i>Philodendron</i> Schott	28; 30; 32; 34; 36; 48 (x=15, 16, 17, 18)
68.	<i>Phymatarum</i> M. Hotta	26 (x=13)
69.	<i>Pinellia</i> Tenore	26, 52 (x=13)
70.	<i>Piptospatha</i> N.E. Brown	26 (x=13)
71.	<i>Pistia</i> L.	28 (x=14)
72.	<i>Podolasia</i> N.E. Brown	26 (x=13)
73.	<i>Pothoidium</i> Schott	24 (x=12)
74.	<i>Pothos</i> L.	24, 36 (x=12)
75.	<i>Protarum</i> Engler	28 (x=14)
76.	<i>Pseudodracontium</i> N.E. Brown	26 (x=13)
77.	<i>Pseudohydrosme</i> Engler	c. 40 (x=c. 20)
78.	<i>Pycnospatha</i> Thorel ex Gagnepain	26 (x=13)
79.	<i>Remusatia</i> Schott	28, 42, 56 (x=14)
80.	<i>Rhaphidophora</i> Hassk.	60, 120 (x=15)
81.	<i>Rhodospatha</i> Poeppig	28, 56 (x=14)
82.	<i>Sauromatum</i> Schott	26, 52, 104 (x=13)
83.	<i>Scaphispatha</i> Brongniart ex Schott	28 (x=14)
84.	<i>Schismatoglottis</i> Zollinger & Moritzi	26, 39, 52 (x=13)
85.	<i>Scindapsus</i> Schott	60 (x=15)
86.	<i>Spathantheum</i> Schott	34 (x=17)
87.	<i>Spathicarpa</i> W.J. Hooker	34 (x=17)
88.	<i>Spathiphyllum</i> Schott	30, 60 (x=15)
89.	<i>Stenospermation</i> Schott	28 (x=14)

Sl. No.	Name of the genera	Chromosome number 2n
90.	<i>Stuednera</i> K. Koch	28, 42, 56 (x=14)
91.	<i>Stylochaeton</i> Leprieur	28, 56 (x=14)
92.	<i>Symplocarpus</i> R.A. Salisbury <i>ex</i> Nuttall	30, 60 (x=15)
93.	<i>Synandropadix</i> Engler	34 (x=17)
94.	<i>Syngonium</i> Schott	28 (x=14)
95.	<i>Taccarum</i> Brongniart <i>ex</i> Schott	34 (x=17)
96.	<i>Theriophonum</i> Blume	16 (x=8)
97.	<i>Typhonium</i> Schott	16; 18, 36, 54; 20; 26, 52, 65 (x=8, 9, 10, 13)
98.	<i>Typhonodorum</i> Schott	112 (x=14)
99.	<i>Ulearum</i> Engler	14 (x=7)
100.	<i>Urospatha</i> Schott	52 (x=13)
101.	<i>Xanthosoma</i> Schott	22; 26, 39, 52 (x=11, 13)
102.	<i>Zamioculcas</i> Schott	34 (x=17)
103.	<i>Zantedeschia</i> K. Sprengel	32 (x=16)
104.	<i>Zomicarpa</i> Schott	20 (x=10)
105.	<i>Zomicarpella</i> N.E. Brown	26 (x=13)

A list of 63 Aroids available in Bangladesh flora with their chromosome numbers is summarized in the table 4.6.5(ii).2.

Table 4.6.5(ii).2: List of 2n numbers of Bangladeshi species of Araceae (arranged alphabetically) (also includes our own works)

Sl. No.	Name of the taxa	Chromosome number 2n
1.	<i>Aglaonema crispum</i> (Pitcher & Manda) Nicolson	60
2.	<i>Aglaonema nitidum</i> (Jack) Kunth	40
3.	<i>Alocasia acuminata</i> Schott	28.
4.	<i>Alocasia cucullata</i> (Lour.) G. Don	28.
5.	<i>Alocasia cuprea</i> (C. Koch & Bouché) C. Koch	28
6.	<i>Alocasia decipiens</i> Schott	24

* = Done at Cytogenetics laboratory, University of Dhaka.

Sl. No.	Name of the taxa	Chromosome number 2n
7.*	<i>Alocasia fallax</i> Schott	28
8.*	<i>Alocasia fornicata</i> (Roxb.) Schott	28, 42, 56
9.*	<i>Alocasia hararganjensis</i> H. Ara & M.A. Hassan	30
10.	<i>Alocasia macrorrhizos</i> (L.) G. Don	28
11.	<i>Alocasia navicularis</i> C. Koch <i>et</i> Bouché	28
12.*	<i>Alocasia odora</i> (Roxb.) Koch	56
13.	<i>Alocasia portei</i> Schott	28
14.*	<i>Alocasia salarkhanii</i> H. Ara & M.A. Hassan	28
15.	<i>Amorphophallus bulbifer</i> (Roxb.) Blume	26, 36, 39
16.	<i>Amorphophallus longituberosus</i> (Engl.) Engl. <i>et</i> Gehrm.	28
17.	<i>Amorphophallus nepalensis</i> (Wall.) Bogner & Mayo	28
18.	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson var. <i>campanulatus</i> (Decne.) Sivadasan	28
19.	<i>Anthurium andreanum</i> Linden	30, 32
20.	<i>Anthurium crystallinum</i> Linden & Andre'	30, 34
21.	<i>Ariopsis peltata</i> Nimmo	28
22.	<i>Caladium bicolor</i> (Ait.) Vent.	28
23.	<i>Caladium humboldtii</i> Schott	19

* = Done at Cytogenetics laboratory, University of Dhaka.

Sl. No.	Name of the taxa	Chromosome number 2n
24.	<i>Colocasia affinis</i> Schott	28
25.*	<i>Colocasia esculenta</i> (L.) Schott	28
26.*	<i>Colocasia esculenta</i> var. <i>antiquorum</i> (Schott) Hubb. & Rehder	42
27.*	<i>Colocasia fallax</i> Schott	42
28.*	<i>Colocasia fallax</i> Schott var. <i>purpurea</i> H. Ara & M.A. Hassan	30
29.	<i>Colocasia gigantea</i> (Blume) Hook. f.	28, 42
30.*	<i>Colocasia hassanii</i> H. Ara	28
31.	<i>Colocasia lihengiae</i> C.L. Long et K.M. Liu	28
32.*	<i>Colocasia oresbia</i> A. Hay	26
33.*	<i>Colocasia oresbia</i> A. Hay var <i>obtusifolia</i> H. Ara & M.A. Hassan	26
34.	<i>Cryptocoryne ciliata</i> (Roxb.) Fischer ex Wydler	22, 33
35.	<i>Cryptocoryne retrospiralis</i> (Roxb.) Kunth	72
36.	<i>Cryptocoryne spiralis</i> (Retz.) Fischer ex Wydler	66, 88
37.	<i>Dieffenbachia seguine</i> (Jacq.) Schott	34
38.	<i>Epipremnum pinnatum</i> (L.) Engl.	60
39.	<i>Homalomena pendula</i> (Blume) Bakh. f.	40
40.	<i>Homalomena wallisii</i> Regel	42
41.*	<i>Lasia spinosa</i> (L.) Thwaites	26
42.*	<i>Lasia viridis</i> H. Ara & M.A. Hassan	28

* = Done at Cytogenetics laboratory, University of Dhaka.

Sl. No.	Name of the taxa	Chromosome number 2n
43.	<i>Monstera deliciosa</i> Liebmann	24, 48, 56, 60, 70
44.	<i>Philodendron bipinnatifidum</i> Schott ex Endl.	36
45.	<i>Philodendron scandens</i> C. Koch & Sello ex Koch	32
46.	<i>Pistia stratiotes</i> L.	28
47.	<i>Pothos scandens</i> L.	24
48.	<i>Remusatia pumila</i> (D. Don) Li & Hay	28
49.	<i>Remusatia vivipara</i> (Roxb.) Schott	28
50.	<i>Rhaphidophora calophyllum</i> Schott	56
51.	<i>Rhaphidophora decursiva</i> (Roxb.) Schott	26, 54, 56
50.	<i>Rhaphidophora glauca</i> Schott	56
51.	<i>Scindapsus officinalis</i> (Roxb.) Schott	56
52.	<i>Scindapsus perakensis</i> Hook. f.	60
53.	<i>Spathiphyllum wallisii</i> Regel	30
54.	<i>Stuednera colocasiifolia</i> K. Koch	28
55.	<i>Stuednera discolor</i> N.E. Br.	56
56.	<i>Syngonium podophyllum</i> Schott	26
57.*	<i>Typhonium elatum</i> H. Ara & M.A. Hassan	18
58.	<i>Typhonium flagelliformae</i> (Lodd.) Blume	14, 16, 50

* = Done at Cytogenetics laboratory, University of Dhaka.

Sl. No.	Name of the taxa	Chromosome number 2n
59.*	<i>Typhonium geniculatum</i> H. Ara & M.A. Hassan	27
60.	<i>Typhonium roxburghii</i> Schott	52
61.*	<i>Typhonium trilobatum</i> (L.) Schott	18
62.*	<i>Typhonium trilobatum</i> (L.) Schott var. <i>fulvus</i> H. Ara & M.A. Hassan	18
63*.	<i>Xanthosoma lindenii</i> (Andre') Engl.	26
64.*	<i>Xanthosoma sagittifolium</i> (L.) Schott	26

* = Done at Cytogenetics laboratory, University of Dhaka.

4.6.5(iii) Cytological Studies of Bangladeshi Aroids

Practically cytological studies with Bangladeshi specimens of Araceae starts with the specimens supplied by the present author. With the increasing number of aroid specimens collected from various parts of Bangladesh during repeated field trips (1988-2014), the author came across with specimens of many species having distinct morphological variations which lead us to go for cytological investigation. The work was mainly done in the Cytogenetic Laboratory of the University of Dhaka under the leadership of Professor Dr. Sheikh Shamimul Alam.

Typhonium trilobatum (L.) Schott (typical form), *T. trilobatum* (L.) Schott (a tall form) and *T. trilobatum* (L.) Schott (a slender form) were investigated cytologically (Huq *et al.* 2007). (i) The typical form has chromosome numbers $2n=18$, total length 43.06 μm , Karyotype formula $16m+2sm$, % of At-rich repeat 9.28; (ii) The tall form has chromosome numbers $2n=18$, total length 42.66, Karyotype formula $12m+6sm$, % of AT-rich repeat 22.23; (iii) Slender form has chromosome numbers $2n=18+1$, total length 47.47, Karyotype formula $17m+2sm$, % of AT-rich repeat 8.68, the extra chromosome is a regular member of pair IX. It is concluded that the tall form should be a distinct species

and the slender form may be considered as a trisomic variety of *T. trilobatum* (L.) Schott. The tall form is named as *Typhonium elatum* H. Ara & M.A. Hassan.

Another specimen of *Typhonium* Schott with geniculate appendix cytologically investigated and was found to have chromosome number 27, may be a triploid ($x=9$) and named as *Typhonium geniculatum* H. Ara & M.A. Hassan.

A green form of *Typhonium trilobatum* (L.) Schott collected from Faranpara of Netrakona investigated cytologically and found that it differs from typical form (variety *trilobatum*) by the presence of two acrocentric chromosomes and absence of CMA-band. Externally it differs from typical form by green petiole colour (not purple), light yellowish cream stigma (not purple) and twisted spathe tip. It has been recognized as a new variety, *Typhonium trilobatum* (L.) Schott var. *fulvus* H. Ara & M.A. Hassan.

In another investigation three forms of *Colocasia fallax* Schott were dealt with (Begum and Alam 2009). The form were (i) green petiole form, (ii) light purple forms and (iii) deep purple petiole form. Green and deep purple forms both possess $2n=28$ chromosome, whereas light purple form possesses $2n=30$ chromosomes, only this form possesses two acrocentric chromosomes. In many other cytological characters this form differs from the typical green petiole form as well as the deep purple form. Considering cytological as well as morphological characters the light purple form has been named as *Colocasia fallax* var. *purpurea* H. Ara & M.A. Hassan.

Later on another interesting specimen of *Colocasia* Schott which differs from all other species of local *Colocasia* Schott by many morphological characters, also investigated cytologically and found to possess $2n=28$ chromosome. This variant is named as *Colocasia hassanii* H. Ara.

Cytological investigation of an interesting material of *Colocasia oresbia* A. Hay collected from Rangamati resulted in $2n$ chromosome number 26, the same number as in *Colocasia oresbia* A. Hay var. *oresbia*. As morphologically it differs from variety proper, it has been recognized here as *Colocasia oresbia* A. Hay var. *obtusifolia* H. Ara & M.A. Hassan.

Karyotype analysis of *Alocasia fallax* Schott and *A. odora* (Roxb.) Koch has also been done successfully confirming their chromosome numbers for the first time (Sultana *et al.*

2011) *Alocasia fallax* Schott has $2n=28$ chromosomes whereas *Alocasia odora* (Roxb.) Koch has $2n=56$. After detail Karyotype analysis it was concluded that *A. odora* (Roxb.) Koch might be an autotetraploid of *Alocasia fallax* Schott.

Another specimen of *Alocasia* (Schott) G. Don was first collected from Hararganj under Moulvibazar district of greater Sylhet with several morphological characters which are different from all other previously recognized species. After cytological investigation it was found to have $2n=30$ chromosomes. With the variation in chromosome number and other morphological characters, this was named as *Alocasia hararganjensis* H. Ara & M.A. Hassan.

Lasia spinosa (L.) Thwaites typical form and its green variant were analyzed Karyotypically (Alam *et al.* 2012). The typical form has $2n=26$ chromosomes with 2 satellites and all chromosomes are metacentric. The green variant has $2n=28$ with no satellite, the additional two chromosomes are submetacentric. The green variant is Karyotypically more advanced because of its heterogenous Karyotype. Three CMA-positive bands were found in green variant, whereas no CMA-positive band were found in typical red form. The green variant has been named as *Lasia viridis* H. Ara & M.A. Hassan.

Three morphological forms of *Alocasia fornicata* (Roxb.) Schott, *viz.* peltate leaf-form, ovate-lanceolate leaf-form and sagittate leaf-form, were Karyotypically analyzed (Afroz *et al.* 2013). All the three leaf-form variants were found to have the same number of chromosomes, $2x=28$ (confirms earlier reports of Peterson 1989). The Karyotypic differences were as follows:

	2n number	Karyotype formula	No. of CMA positive band	No. of DAPI positive band
Peltate form	$2n=28$	12m+16sm	2	4
Ovate-lanceolate form	$2n=28$	22m+6sm	-	-
Sagittate form	$2n=28$	18m+10sm	6	1

From the above table it is clear that ovate-lanceolate form sharply differs from other two forms in Karyotype characters. The ovate lanceolate form thus named as *Alocasia salarkhanii* H. Ara & M.A. Hassan.

CHAPTER 5

CONCEPT OF TAXA

CHAPTER 5**CONCEPT OF TAXA****5.1 Introduction**

To revise a group of plants taxonomically, it is important to have a clear concept of the various taxonomic categories. The recognition of species, genera, subfamilies etc., is more difficult in some groups than in other, and different criteria have to be applied according to circumstances. To revise a family clear concept on lower categories like subfamilies, tribes, genera, species and varieties is important. The concept of taxa that has been followed in this work is given below:

5.2 Subfamilies

Subfamily is a rank below the family but higher than genera. A subfamily is an assemblage of a number of genera which resemble one another more closely than other genera. Characters used for this rank is one, two or three, for example, petiole often winged which is the diagnostic character of the subfamily Pothoideae.

5.3 Tribe

Tribe is a category, usually comprising of one or more genera. In the present work, distinctions between related tribes have been based on at least six correlated characters chosen from plants of various habits (climbing, creeping, tuberous, erect), shape of the leaf-blade, type of the venation, sexuality of flowers, present or absent of perigone, type of the ovule.

5.4 Genera

Genus is an ICBN recognized taxon subordinate in rank to family (often subfamily, tribe etc) and higher than species. A genus is an assemblage of a number of species, which resemble one another more closely than other species. To recognize this rank, depending on the situation, one or more constant characters are used.

5.5 Species

Species is the fundamental taxonomic unit, plays a very vital role in plant taxonomy and systematics. Because, not only of its nature and position in taxonomic hierarchy but also in relation to this some other taxa (genus, sections, subspecies, variety) are defined and described. Although among botanists, definition of a species and its concept has been a great controversy. Linnaeus, in his early life, believed that species were divinely created, discrete and true breeding (Davis & Heywood 1963). In his mature years he believed in hybridization and formation of new taxa (Porter 1959). Du Rietz (1930) employed the principle of discontinuity in natural variation of species as, "The smallest natural populations permanently separated from other such units by a distinct discontinuity in the series of biotypes". Davis and Heywood (1963) define, species as, "morphologically definable units, made up of groups of individuals, which it is assumed are usually interbreeding, the containers and expression of one or more gene pools". Later, Michener (1970) interpreted species as, "a group of organisms not itself divisible by phenetic gaps resulting from concordant difference in character states, but separated by such phenetic gaps from other such groups". Sneath (1958) has proposed at least five correlated character differences when employing techniques of mathematical correlation for the delimitation of species by naturally occurring discontinuities in the variation pattern.

In this revision specific distinctions have been based on at least two clearly discontinuous characters.

5.6 Variety

Linnaeus utilized only one infraspecific taxon, the variety. "A population of one or several biotypes, forming more or less distinct local facies of a species". It is thus a local or ecological race, an ecotype or an ecodeme. One character, which is persistent and heritable is enough to be considered for recognising this rank, which are constant and not overlapping.

CHAPTER 6

TAXONOMIC ENUMERATION

CHAPTER 6**TAXONOMIC ENUMERATION****6.1 Description of the Family****ARACEAE** A. L. de Jussieu,

Gen. Pl. 23 (1789, "Aroideae"), *nom. cons.*

Perennial, slender or robust, usually terrestrial, climbing, sometimes epiphytic or floating aquatic herbs. Underground stem rhizomatous or tuberous or cormous, aerial stems variously produced or not, often evergreen, bulbils often produced for vegetative reproduction. Leaves alternate or apparently basal, usually petiolate with sheathing bases, often subtended by cataphylls, blade very variable, linear, simple, sometimes peltate or variously compound, perforated, lobed. Inflorescence a spadix of sessile, bractless flowers subtended by a large bract (spathe), terminal or axillary. Spathe commonly with tube-like base and withering or deciduous blade, sometimes only persistent below. Spadix bearing bisexual or unisexual flowers, sometimes with a sterile, terminal appendix, when unisexual, the lower flowers pistillate and the upper flowers staminate, sometimes various parts of the spadix naked or covered with sterile flowers, no perianth in unisexual flowers but present in bisexual flowers, tepals 0, 4 or 6, stamens usually 4-6 per flower, filaments free, anthers bilocular, ovary usually 3-loculed. In unisexual flowers, male represented by a single stamen or synandria of 2 fused stamens, anthers often subsessile, usually dehiscent by apical pores or slits, female flowers consisting of single ovary, commonly unilocular (sometimes with 3 or 4 locules), ovules 1-numerous in each locule, axile, parietal or central, placentation basal or apical, style short or absent, stigma discoid, globose or lobed. Neuter flowers derived from male or female flowers sometimes present at the apex of the female and/or male section. Fruit usually a head of 1-many seeded berries, commonly red.

The family Araceae consists of about 105 genera and 3300 species (Mayo *et al.*, 1997), the vast majority of them tropical or subtropical. In Bangladesh, it is represented by 27 genera, 105 species and 6 varieties.

6.2 Key to the Genera

- | | | |
|----|--|----------------------|
| 1. | Plants free-floating aquatics; leaves rosulate, hairy; flowers unisexual, naked; inflorescence with a single female flower and a few male flowers | Pistia |
| - | Plants terrestrial or helophytes, climbing hemiepiphytes, epiphytes or lithophytes or other, but never floating | 2 |
| 2. | Flowers with obvious perigone of free or fused tepals | 3 |
| - | Flowers without perigone of free or fused tepals | 7 |
| 3. | Flowers bisexual, spadix uniform in appearance with flowers of only one type | 4 |
| - | Flowers unisexual, spadix clearly divided into basal female zone and apical male zone; typical Africa | Gonatopus |
| 4. | Higher order leaf venation parallel-pinnate; tissues with abundant trichosclereids | Spathiphyllum |
| - | Higher order leaf venation clearly reticulated; tissues without trichosclereids or trichosclereids very few | 5 |
| 5. | Stem aerial, not tuberous or rhizomatous, never aculate; plant usually a climbing hemiepiphyte or epiphyte, less often lithophyte or terrestrial, only very rarely helophytic (some spp. of <i>Anthurium</i>) | 6 |
| - | Stem typically subterranean, tuberous or rhizomatous, sometimes aerial and creeping or scrambling but then aculeate; plant frequently a helotype | Lasia |
| 6. | Neotropical plants; seeds with copious endosperm; pollen usually forate, never monosulcate | Anthurium |
| - | Palaeotropical plants; seeds without endosperm; pollen monosulcate or inaperturate | Pothos |

- | | | |
|-----|--|----------------------|
| 7. | Flowers bisexual; spadix uniform in appearance with flowers of only one type (sometimes with sterile flowers at spadix base) | 8 |
| - | Flowers unisexual; spadix clearly divided into basal female zone and apical or intermediate male zone, flowers very nearly in longitudinal rows (<i>Spathicarpon</i>) | 11 |
| 8. | Ovary 1-locular or incompletely 2-locular | 9 |
| - | Ovary 2-5 locular. Seeds globose to oblong, 6-22 mm long, the raphe s-shaped; endosperm absent; ovules 2 per locule; leaf blade variously shaped, often perforated or pinnatifid or both | Monstera |
| 9. | Ovules anatropus, more than one | 10 |
| - | Ovules amphitropous to anatropous, solitary; basal, adult leaf blade entire palaeotropics | Scindapsus |
| 10. | Ovules numerous, superposed on 2 (rarely 3) parietal placentas; seeds fusiform, straight, 1.3-3.2 mm long, 0.6-1.0 mm wide | Rhaphidophora |
| - | Ovules 2-4 (-6) at base of a single intrusive placenta; seeds curved, 3-7 mm long, 1.5-4.0 mm wide | Epipremnum |
| 11. | Stamens of each male flower free or only the filaments connate | 12 |
| - | Stamens of each male flower entirely connate into a distinct synandrium, synandrium rarely reduced to single stamen (<i>Colletogyne</i> endemic to Madagascar) or stamens free and basally connate with remote globose thecae (<i>Gorgonidium</i> endemic to Andean South America), or only filaments connate and then stigma stellate and 5-8 lobed (<i>Spathantheum</i>) | 19 |

12. Spadix never entirely enclosed by spathe in a basal “kettle” formed of connate spathe margins (if spathe margins basally connate then plant never aquatic) **13**
- Spadix entirely enclosed by spathe in a basal “kettle” formed of connate spathe margins, plants always helophytic or aquatic **18**
13. Higher order leaf venation parallel-pinnate **14**
- Higher order leaf venation reticulate **17**
14. Upper part of spathe persisting as long as lower part; petiole sheath lacking ligule; ovary 1-many thecae dehiscing by subapical pores or longitudinal slits; connective usually conspicuously thickened **15**
- Spathe constricted; ovules anatropous to hemianatropous petiole sheath usually not ligulate; upper part of spadix usually sterile **Schismatoglottis**
15. Plant always terrestrial, rarely aquatic, never climbing or epiphytic; inflorescences not secreting resin at anthesis; endothecium with cell wall thickenings; ovary 1 locular or incompletely 2-5 locular; most tropical Asian (except *Homalomena* sect. *Curmeria*) **16**
- Plant usually climbing or epiphytic; inflorescences secreting resin from spathe or spadix at anthesis; endothecium nearly always lacking cell wall thickenings; ovary completely 2-many locular, placenta axile to basal; tropical America **Philodendron**
16. Seed without endosperm, embryo large; ovule 1, placenta basal or parietal **Aglaonema**
- Seed with copious endosperm, embryo relatively small; ovules several to many, placenta basal, parietal or axile **Homalomena**

- | | | |
|-----|--|-----------------------|
| 17. | Leaf blade dracontoid, leaf solitary in each growth period | Amorphophallus |
| - | Leaf blade shape of various types but never dracontoid; usually several leaves present | Typhonium |
| 18. | Female flowers spirally arranged (pseudo-whorl in <i>Lagenandra nairii</i> , whorled in <i>L. gomezii</i>) an free; spathe tube “kettle” with connate margins occupying entire spathe tube, spathe blade usually opening only slightly by a straight or twisted slit; berries free, opening from base; leaf ptyxis involute | Lagenandra |
| - | Female flowers in a single whorl, connate; spathe tube kettle occupying only lower part of the spathe tube, remainder also with connate margins (except <i>Cryptocoryne spiralis</i>), blade spreading or twisted; berries connate into a syncarp which opens from the apex; leaf ptyxis convolue | Cryptocoryne |
| 19. | Lacticifers simple | 20 |
| - | Lacticifers anastomosing | 21 |
| 20. | Synandria connate, thecae of adjacent synandria encircling pits in the spadix, each pit with a somewhat prominent upper margin; leaf pelate; Burma to India | Ariopsis |
| - | Synandria free; leaf not peltate; Africa, Madagascar or Americas | Dieffenbachia |
| 21. | Plants climbing hemiepiphytes, sometimes creeping on ground in submature growth; internodes long; berries connate into a syncarp | Syngonium |
| - | Plants terrestrial or geophytic, rarely aquatic, not climbing; internodes very short; berries free from each other | 22 |

22. Spadix without an appendix (present in *Hapaline appendiculata*, included here, occasionally absent in *Colocasia esculenta*, excluded here) **23**
- Spadix with an appendix (occasionally absent in *Colocasia esculenta*); palaeotropical plants **26**
23. Ovary completely to incompletely 2- to several-locular with deeply intrusive parietal placentas (1-locular with basal placenta in *Jasarum*, *Scaphispatha* and a few species of *Caladium* and *Xanthosoma*); neotropical plants **24**
- Ovary clearly 1-locular, placentas not intusive; palaeotropical plants **25**
24. Spathe tube subglobose, inflated; female zone of spadix free; styles normally discoid (laterally swollen) and coherent (except *Xanthosoma plowmanii*); synandrodes (sterile flowers) between male and female flowers well developed, \pm prismatic **Xanthosoma**
- Spathe tube always convolute; stylar region as broad as ovary (*Caladium paradoxum* has discoid, coherent stylar regions); synandrodes (sterile flowers) between male and female flowers well developed, prismatic; placenta 1-2(-3) parietal; seeds several (rarely 1-2) **Caladium**
25. Female flowers with staminodes; spathe not constricted; stem trunk-like or creeping **Steudnera**
- Female flowers without staminodes; spathe with 1 or 2 constrictions; stem tuberous, producing erect or spreading stolons bearing small tubercles covered in hooked scales **Remusatia**
26. Placentas parietal; ovules many; leaf blade always entire **Colocasia**
- Placenta basal; ovules few; leaf blade entire or pinnatifid **Alocasia**

6.3 Taxonomic Description of the Recognized Taxa (Genus, Species and Varieties)

1. Genus: *Aglaonema* Schott in Wiener Z. Kunst 1829 (3): 892 (1829).

Type species: *A. oblongifolium* Schott, *nom. illeg.*

[*Arum integrifolium* Link, *Aglaonema integrifolium* (Link) Schott].

Evergreen herbs, sometimes robust, stem smooth, usually green, epigeal, erect and unbranched or creeping and often branched, internodes green, smooth, often rooting at the nodes. Leaves petiolate, petioles usually equalling or slightly shorter than the leaf blade and petiolar sheaths usually long, forming an apical crown, leaf blades ovate-elliptic, narrowly elliptic, rarely broadly ovate or sublinear, base often unequal, obtuse or cordate or attenuate, apex often apiculate, usually acuminate to acute, sometimes gradually or abruptly acuminate, variegation none or of various patterns, primary lateral veins pinnate, cataphylls usually subtending inflorescence, occasionally subtending petiole. Peduncles shorter or longer than the petioles, erect, solitary to less than 10 together, deflexing in fruit. Spathe ovate, erect, boat-shaped to convolute, not differentiated into tube and blade, often apiculate, green to whitish, slightly to strongly decurrent, marcescent. Spadix cylindrical to clavate, shorter or longer than the spathe, female zone few-flowered, contiguous with and much shorter than the male zone. Flowers unisexual, perigone absent. Pistillate portion below, pistil 1-locular, ovule-1, anatropous, shortly ovoid, funicle very short, placenta basal, style short and thick, stigma broad and disk-like, concave centrally. Staminate portion white to cream coloured, stamen solitary and compact, filaments usually distinct, anthers attached basally, locules dehiscent by an apical pore. Fruit a berry, ellipsoid, outer layer fleshy green but turning yellow and finally red. Seed ellipsoid, solitary, erect, almost as large as the berry, testa thin, smooth.

About 21 species distributed throughout tropical Asia, Malay Archipelago and Papuasias (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 7 species.

Key to the species

- | | | |
|----|--|----------------------|
| 1. | Leaf blade variegated | 2 |
| - | Leaf blade not variegated | 3 |
| 2. | Leaf blade usually ovate, rarely lanceolate, usually variegated with scattered spots on both sides of the leaf | costatum |
| - | Leaf blade elliptic without scattered spots | 4 |
| 3. | Leaf blade ovate to elliptic or lanceolate to narrowly elliptic | 5 |
| - | Leaf blade narrowly oblong or narrowly oblanceolate | marantifolium |
| 4. | Leaf blade with silvery variegation covering most of the upper surface of each half of the leaf blade | crispum |
| - | Leaf blade with silvery variegation along the primary lateral veins | 6 |
| 5. | Leaf-acumen elongate, over 2.5 cm long from point of 1 cm blade width; peduncle shorter | modestum |
| - | Leaf-acumen shorter, less than 2.5 cm long from point of 1 cm blade width; peduncle longer | hookerianum |
| 6. | Spadix shorter than spathe | commutatum |
| - | Spadix equalling or slightly exceeding the spathe | nitidum |

1. *Aglaonema commutatum* Schott, Syn. Aroid.: 123 (1856). Engler, Pflanzenr. 64 (IV. 23 Dc): 27 (1915); Bailey, Manual Cult. Pl.: 182 (1949); Nicolson, Smithsonian Contr. Bot. 1: 49 (1969); Graf, Exotica, edn. 8: 119 (1976); Tropica, edn. 5: 87, 936 (1978-reprint 2003); Jervis, *Aglaonema* Grower's Hand b. 11 (1980); Walters *et al.*, European Gard. Fl. 2 (2): 95 (1984-reprint 2003); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 45 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 5 (1989); Noltie, Fl. Bhutan 3 (1): 131-132 (1994); A. Hay *et al.*, Blumea Supplement 8: 3 (1995); Govaerts & Frodin, World Checkl. Biliog. Araceae: 55 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 21-22 (2007).

Photo 1 (Page no. 152).

Aglaonema oblongifolium sensu Alston in Trimen, Handb. Fl.

Ceylon 6: 296 (1931), *non* Schott (1829).

Neotype: Unpubl. drawing: Schott, Aroideae 38 (W), designated by Nicolson, 1969.

Bengali / Local name: Not available.

English name: Chinese Evergreen,
Philippine Evergreen.

An evergreen herb, stem erect, becoming decumbent in older and larger specimens, 20-150 cm tall, 0.5-6.0 cm thick, internodes 0.4-2.5 cm long. Leaves petiolate, petiole 6-25 cm long, sheathing for more than half its length, margins of sheath membranous but occasionally scarios, leaf blade usually narrowly oblong-elliptic to lanceolate, 10-30 × 2.5-12.0 cm, slightly asymmetric, shortly acuminate, base oblique to rounded, silvery variegation along the primary lateral veins, venation differentiated into 4-7 primary lateral veins, texture coriaceous. Peduncle solitary to 3 together, 4-20 cm long. Spathe 3-7 × 2.8-5.0 cm, light green, shorter than the petiole, decurrent for 0.4-1.2 cm. Spadix shorter than spathe, stipitate for 0.4-1.0 cm, completely free from spathe, 2-6 cm long, usually at least 1 cm short of the spathe apex. Pistillate portion 0.3-1.0 cm long, pistils 10-18. Staminate portion 1.5-6.0 × 0.4-0.6 cm. Ovary ovoid or sub-globose, 1-locular, ovule 1, anatropous, placentation basal, stylar region short, thick, stigma broad, discoid, concave centrally. Fruit turning yellow, then bright red, ellipsoidal to obovoid, 1.5-2.0 × 0.4-1.5 cm.

Flowering and fruiting period: June-September.

Chromosome number: Not known.

Habitat: Shady places in forests, near streams.

Distribution: Bangladesh, India, the Philippines and north-eastern Celebes.

Specimens examined:

Bandarban: Udalbunia, Sapchari hill, 20.09.2004, Hosne Ara HA 1164 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 25.02.2008, Hosne Ara HA 2731 (DACB) [Originally collected from Bandarban district].

Moulvibazar: Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1767 (DACB).

Sherpur: Samaschura beat, Madhutila Eco Park, 23.06.2004, Hosne Ara HA 1068 (DACB).

Economic uses/values/harmful aspects: This species is widely grown as an ornamental plant (Nicolson, 1969).

Ethnobotanical information: No ethnobotanical information is available.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 12 (2): 39-48, 2005).

2. *Aglaonema costatum* N.E. Brown, Gardn. Chron. III: 426 (1892). Hook. f., Fl. Brit. India 6: 531 (1893-reprint 1954); Ridley, Fl. Malay Peninsula: 100 (1925); Bailey, Manual Cult. Pl.: 182 (1949); Birdsey, Cultivat. Aroid.: 15 (1951); Nicolson, Smithsonian Contr. Bot. 1: 23 (1969); Graf, Exotica, edn. 8: 114, 118 (1976); Walters *et al.*, European Gard. Fl. 2 (2): 95 (1984-reprint 2003); A. Hay *et al.*, Blumea Supplement 8: 4 (1995); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 400 (1998); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 55 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 22 (2007). **Photo i (Page no. 98).**

Holotype: England, Hort. Veitch, introduced from Langkawi Island by Curtis n. 2813, 26 March 1892.

Bengali / Local name: *Bahari Kachu*.

English name: Spotted Evergreen.

An evergreen herb, stem creeping and branching, 0.6-1.3 cm thick, internodes 0.1-0.5 cm long. Leaves petiolate, petioles 5-19 cm long, sheaths 1 cm long, leaf blade usually ovate, rarely lanceolate, 9.5-22.0 × 4.7-10.0 cm, base often unequal, sub-

cordate to rounded, apex often apiculate, acute to sub-acuminate, occasionally abruptly acuminate, usually variegated with scattered spots on both sides of the leaf and with a white midrib, rarely not variegated, venation differentiated into 7-15 primary lateral veins diverging from the midrib, cataphylls 5-8 cm long. Peduncle solitary, 3-20 cm long. Spathe often apiculate, 2.5-4.0 cm long, decurrent for 0.5-2.0 cm, stipe 0.2-0.6 cm long. Spadix ellipsoidal to cylindrical, as long as or longer than the spathe. Pistillate portion 0.2-0.5 cm long, pistils 6-13. Staminate portion 1.5-3.3 cm long, 0.5-0.8 cm thick.

Flowering and fruiting period: August-October.

Chromosome number: Not known.

Habitat: Shady places near streams (Nicolson, 1969).

Distribution: Bangladesh, Continental Southeast Asia from Langkawi Island to Vietnam.

Specimen examined:

Dhaka: Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1438 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, this species is widely grown both in public places and homesteads.

Ethnobotanical information: Not known.

3. *Aglaonema crispum* (Pitcher & Manda) Nicolson, *Baileya* 15: 126 (1968). Birdsey, *Cultivat. Aroid.*: 17 (1951); Nicolson, *Smithsonian Contr. Bot.* 1: 54 (1969); Graf, *Exotica*, edn. 8, 119 (1976); *Tropica*, edn. 5: 87, 936 (1978-reprint 2003); Walters *et al.*, *European Gard. Fl.* 2 (2): 95 (1984-reprint 2003); A. Hay *et al.*, *Blumea Supplement* 8: 5 (1995); Govaerts & Frodin, *World Checkl. Bibliog. Araceae*: 55 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 22-23 (2007).

Photo ii (Page no. 98).

Schismatoglottis crispa Pitcher & Manda, *Gen. III. Cat. U.S.*

Nurseries: 95 (1892).

Aglaonema roebelinii Pitcher & Manda, Pl. Cat. U. S. Nurs.: 31
(1894).

Schismatoglottis roebelinii (Pitcher & Manda) Pitcher and Manda,
Gen. III. Guide Pl.: 141 (1895).

Neotype: Photograph labelled *Schismatoglottis roebelinii* on page 141 of Pitcher and Manda, *General Illustrated Catalogue of Plants* (1895).

Bengali / Local name: *Bahari Kachu*. English name: Painted Drop-Tongue.

A herb, stem erect, 40-120 cm tall, 0.8-3.0 cm thick, internodes about 1 cm long. Leaves petiolate, petiole 8-25 cm long, sheaths 4-18 cm long, leaf blades elliptic to narrowly elliptic, 14-32 × 5-12 cm, base obtuse, sub-rounded or broadly acute, apex acuminate, silvery variegation covering most of the upper surface of each half of the leaf blade, leaving the midrib and marginal areas free, venation rather weakly differentiated into 4-8 primary lateral veins diverging from the midrib, texture coriaceous. Peduncles 2-5 together, 4-14 cm long. Spathe fading from green to yellow, then black, 4-7 × 2.0-2.5 cm, stipe 0.3-1.0 cm long. Spadix 2-3 cm long, 0.7-2.0 cm shorter than the spathe. Pistillate portion 0.2-0.4 cm long (-1 cm in fruit), pistils 10-17. Staminate portion 1.6-2.6 cm long, 0.2-0.3 cm thick. Fruits becoming yellow, then red, 1.5-2.0 cm long, 0.9-1.5 cm thick.

Flowering and fruiting period: June-October.

Chromosome number: 2n = 60 (Petersen, 1989).

Distribution: Bangladesh, Native to the Philippines (Nicolson, 1969).

Specimen examined:

Dhaka : Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1439 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

4. *Aglaonema hookerianum* Schott, Bonplandia 7: 30 (1859). Hook. f., Fl. Brit. India 6: 529 (1893-reprint 1954); Prain, Beng. Pl. 2: 1114 (1903-reprint 1981); Engler, Pflanzenr. 64 (IV. 23Dc): 25 (1915); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Mitra, Fl. Pl. E. India 1: 76 (1958); Hu, Dansk Bot. Arkiv 23 (4): 423 (1968); Nicolson, Smith. Contr. Bot. 1: 28-29 (1969); Rao and Verma, Bull. Bot. Surv. India 18 (1-4): 29 (1976); Deb, Fl. Tripura State 2: 395 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 5 (1989); Noltie, Fl. Bhutan 3(1): 131 (1994); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 55 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 23-24 (2007). **Photo 2 (Page no. 152).**

Aglaonema clarkei Hook. f., Fl. Brit. India 6: 529 (1893-reprint 1954); Prain, Bang. Pl. 2: 1114 (1903-reprint 1981); Heinig, List Chittagong: 74 (1925); Mitra, Fl. Pl. E. India 1: 76 (1958); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 5 (1989).

Type: India, Churra (Cherrapunji), 2000 ft, 15 June (1850), Hooker and Thomson s.n. (holotype: K).

Bengali / Local name: *Horina Sak*.

English name: Not known.

A herb, stem erect, 40-50 cm or more tall, 1.5-2.0 cm thick, internodes 1.5-3.0 cm long. Leaves petiolate, petiole up to 24 cm long, sheaths membranous, up to 15 cm long, leaf blade up to 27 × 7-12 cm, ovate to elliptic or lanceolate to narrowly elliptic, base often unequal, rounded, obtuse or broadly acute, rarely acute, apex often apiculate, acuminate, not variegated, leaf-acumen less than 2.5 cm long from point of 1 cm blade width, venation weakly to strongly differentiated into 7-13 primary lateral veins diverging from the midrib. Peduncles usually 1-3 together, up to 21 cm long. Spathe 3-7 cm long, decurrent for 1.5 cm, stipe absent. Spadix 2.5-4.0 cm long, thin, cylindrical. Pistillate portion 0.3-0.6 cm long, attached to the spathe, pistils 10-15. Staminate portion 2.0-3.7 cm long, 0.3-0.6 cm thick, stamens free, filaments very short. Ovary ovoid, narrowed into the short, stout style, stigma disc-like. Fruit up to 3 cm long and 1.4 cm broad, red.

Flowering and fruiting period: June-July.

Chromosome number: Not known.

Habitat: Shady areas in deep forest.

Distribution: Bangladesh, Northeastern India (Khasia Hills and Cachar) and Myanmar (Arakan).

Specimens examined:

Bandarban: Hatimata para, Ruma, 26.02.1988, M.K. Alam, EB 77 (CFRIH); On the way of Betchari, 22.09.2004, Hosne Ara HA 1218 (DACB); Bolipara, 24.09.2004, Hosne Ara HA 1356 (DACB).

Chittagong: Locality, Collection date & number unknown, Hooker & Thomson (K); Locality unknown, 10.06.1869, C.B. Clarke 8266 (K); Locality & Collection number unknown, June 1874, R.L. Keenan (K); Hazarikhil, 11.10.1905, D. Avoper 25974 (CAL); 02.04.1998, Rahman *et al.* 2782 (HCU); Chunati Sanctuary, Napora, 30.12.1989, Khan, Huq & Alam K 8195 (BNH, FRIH); Dhopachari, Gondamara, Chandanaish, 02.09.1999, Boyce, Toha & Rahman 5538 (HCU, K); Goalmara, Chunati, 09.06.2001, Sarder Nasir Uddin 921 (DACB); Hazarikhil forest, 27.09.2005, Hosne Ara HA 2300 (DACB).

Chittagong Hill Tracts: Locality unknown, 28.02.1879, J.S. Gamble 6766 A (K); Locality unknown, March 1980, J.S. Gamble 7888 (K).

Cox's Bazar: Signal Hill & Kalatali, 08.10.1943, Sinclair 3263 (E 00075391); Dailyachara, 03.04.1945, Sinclair 4071 (E 00075392); Teknaf, 22.11.1978, Alam & Womesley 3128 (FRIH); Barachara, Bhangamura, 20.03.1996, Rahman & Uddin 82 (HCU); Teknaf Game Reserve, Whykeon range, Rhykong beat, 29.09.2005, Hosne Ara HA 2351 (DACB); Himchari, 30.09.2005, Hosne Ara HA 1524 (DACB).

East Bengal: Bangladesh, Locality, Collection date & number unknown, Griffith 5902 (K).

Khulna: Sundarban, 29.06.1973, A.M. Huq 976 (DACB).

Moulvibazar: Adampur beat, Kalengi, 03.05.2003, Hosne Ara HA 231 (DACB); Kawargola forest, 18.05.2005, Hosne Ara 1627 (DACB); Muraichara beat, 19.05.2005, Hosne Ara HA 1670 (DACB); Madhabkundo, 20.05.2005, Hosne Ara

(Photo 1) 152

HA 1719 (DACB); 06.07.2005, Hosne Ara HA 1834 (DACB); Juri forest, 01.12.2014, Hosne Ara HA 286 (DACB).

Rangamati : Burkul, 03.03.1876, J.L. Lister 135 (CAL); Near Burkul, 07.04.1986, J.L. Lister (CAL, K); Pablakhali, 02.04.1965, Das (FRIH); Barkal, 12.06.1983, Huq, Rahman & Mia H 5756 (DACB); Kaptai reserve forest, Kamellachara, 12.04.1986, M.S. Khan 7685 (DACB); Kaptai, Kamailyarchari, 26.04.1988, M.K. Alam 6144 (FRIH); Jamaichari of Sitapahar West, 25.04.1997, Khan, Yusuf, Alam & Nasir K 9881 (DACB); Kaptai, Sitapahar, 17.08.1998, Rahman & Toha 3283 (HCU); Sitapahar forest, 04.06.1999, Huq & Mia H 10637 (DACB); Kaptai, Rampahar, 06.09.1999, Boyce, Toha & Rahman 5757 (HCU, K); Kaptai Lake, Shubalong, 10.09.1999, Boyce, Toha & Rahman 5651 (HCU, K); Sitapahar forest, 22.09.2002, Sarder Nasir Uddin 1422 (DACB); Rampahar, Kaptai, 02.10.2002, Sarder Nasir Uddin 1772 (DACB); Sitapahar forest, 08.07.2003, Hosne Ara & Sarder Nasir Uddin HA 416 (DACB); Karnafuli Sadar beat, Kaptai, 22.03.2010, Sarder Nasir Uddin 4127 (DACB).

Sylhet: Locality, Collection date & number unknown, J.D. Hooker & Thomson (K).

Economic uses/values/harmful aspects: It is grown as an ornamental plant.

Ethnobotanical information: Not known.

5. *Aglaonema marantifolium* Blume, Rumphia 1: 153 (1837). Engler in Engler, Pflanzenr. 64 (IV. 23 Dc): 26-27 (1915); Nicolson, Smithsonian Contr. Bot. 1: 47-49 (1969); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 56 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 24 (2007). **Photo 3 (Page no. 156).**

Calla oblongifolia Roxburgh, Fl. Ind. 3: 516 (1832); Wight, Icon. Pl. Ind. Or. 3: t. 806 (1844).

Aglaonema oblongifolium (Roxb.) Kunth, Enum. Pl. 3: 55 (1841), [not Schott, 1829].

Scindapsus erectus Presl, Epimel. Bot. 242 (1851).

Aglaonema novoguineense Engler, Bot. Jahrb. Syst. 25: 22 (1898).

Lectotype: Amboina., *Zippel s.n.* - Herb. Leiden.

Bengali / Local name: *Ban Kachu*.

English name: Not known.

An evergreen herb, stem erect, 1-3 cm thick, internodes c 2 cm long. Leaves petiolate, petiole 18-25 cm long, sheaths with membranous margins, 11-20 cm long, leaf blade narrowly oblong or narrowly oblanceolate, 22-35 × 7.5-15.0 cm, base obtuse to subrounded, apex acuminate, often apiculate, variegation none, venation undifferentiated to weakly differentiated into 5-8 primary lateral veins diverging from the midrib, texture coriaceous. Peduncles 2-5 together, rarely solitary, 10-15 cm long. Spathe green, turning yellow with age, not differentiated into a tube and blade, 4-7 cm long, stipe 0.7-1.5 cm long. Spadix shorter than the spathe. Pistillate portion 0.2-0.8 cm long, pistils 10-20, stigma broad, yellow, the style distinctly contracted. Staminate portion 1.2-2.7 cm long, stamens free, filaments usually distinct. Ovary sub-globose, 1-locular, ovule-1, anatropous, placentation basal, style short, stigma broad, discoid. Fruits 1.5-3.0 × 0.7-1.7 cm, becoming bright red.

Flowering and fruiting period: Apparently non seasonal.

Chromosome number: Not known.

Habitat: Shady and damp places in forests as an undergrowth.

Distribution: Bangladesh, Moluccas through New Guinea.

Specimens examined:

Mymensingh: Madhupur forest, 25.05.2000, Hosne Ara HA 45 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 15.04.2005, Hosne Ara HA 1462 (DACB) [originally collected from Madhupur forest under Mymensingh district].

Economic uses/values/harmful aspects: This species is widely grown as an ornamental plant.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 12 (2): 39-48, 2005).

6. *Aglaonema modestum* Schott *ex* Engler, Engl. in DC. Monogr. Phan. 2: 442 (1879). Engler, in Engler, Pflanzenr. 64 (IV. 23 Dc): 29-30 (1915); Bailey, Manual Cult. Pl.: 182 (1949); Birdsey, Cultivat. Aroid.: 17 (1951); Nicolson, Smithsonian Contr. Bot. 1: 26-28 (1969); Graf, Exotica, edn. 8: 119 (1976); Tropica, edn. 5: 87, 936 (1978-reprint 2003); Everett, Encyclopedia Horticult. 1: 86 (1980); Walters *et al.*, European Gard. Fl. 2 (2): 95 (1984-reprint 2003); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 56 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 24-25 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 23 (2010). **Photo 4 (Page no. 156).**

Aglaonema acutispathum N.E. Brown, Gard. Chron. 24: 39 (1885).

Aglaonema laoticum Gangnepain Notul. Syst. (Paris) 9: 117 (1941).

Holotype: Philippines, Manila, Guadichaud in Herb. Mus. Paris.

Bengali / Local name: *Jongle Kachu*.

English name: Malayan Sword,
Japanese-leaf.

A herb, stem dark green, erect, 40-70 cm tall, 1.5-2.0 cm in diameter, internodes 0.4-3.0 cm long. Leaves mostly crowded at stem apex, petiolate, petiole 5-24 cm long, green, upper portion flattened, sheaths broad and membranous, 11 cm long, leaf blade entire, ovate to elliptic or lanceolate to narrowly elliptic, 27 × 10 cm, base often unequal, obtuse to rounded, apex gradually long acuminate, over 2.5 cm long from point of 1 cm blade width, variegation none, venation weakly to strongly differentiated in to 4-6 primary lateral veins diverging from the midrib. Peduncles 3 together, 12 cm long, usually more than half as long as the petiole. Spathe ovate, erect, not differentiated into a tube and blade, convolute at the base, open above, 4.0 × 1.5 cm, green, turning yellow with age, stipe none. Spadix thin-cylindric, 2.8 cm long, shorter than the spathe apex. Pistillate portion 0.3 cm long, attached to the spathe. Pistils 9. Staminate portion 2.5 cm long, 0.5 cm thick, stamens free, filaments usually distinct, anthers dehiscent by a pore. Ovary subglobose, 1-locular, ovule 1, anatropous, placentation basal, style short, stigma broad, discoid. Fruits orange, 2 cm long, 1.0 cm thick.

Flowering and fruiting period: March-April.

(Photo 3) 156

Chromosome number: Not known.

Habitat: Shady hill slopes adjacent to *chhara* in deep forests.

Distribution: Bangladesh, Southern China, northern Laos and northern Thailand.

Specimens examined:

Moulvibazar: Adampur forest, Kalengi hill, 16.04.2004, Hosne Ara HA 717 (DACB); 18.05.2004, Hosne Ara HA 1626 (DACB); 03.07.2005, Hosne Ara HA 1766 (DACB); Pavel Partha 650 (JUH).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 25.02.2008, Hosne Ara HA 2732 (DACB) [Originally collected from Kawargola forest under Moulvibazar district].

Rangamati: Sitapahar forest, 08.01.1995, Mezanul Hoque 7360 (FRIH); Jamaichari, Sitapahar, 25.10.1995, Mohiuddin & Mezanul Hoque 7518 (FRIH); 12.05.1996, Alam & Mohiuddin 7616 (FRIH); Kaptai, Kamailyarchari, 26.04.1988, M.K. Alam 6144 (FRIH); Chunati reserve range, Goalmara, 28.06.1997, Rahman's collector Ullah 1292 (HCU).

Economic uses/values/harmful aspects: It is grown as an ornamental plant.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 34 (1): 49-51, 2005).

7. *Aglaonema nitidum* (Jack) Kunth, Enum. Pl. 3: 56 (1841). Birdsey, Cultivat. Aroid.: 19 (1951); Nicolson, Smithsonian Contr. Bot. 1: 33-37 (1969); Graf, Exotica edn. 8: 117 (1976); Walters *et al.*, European Gard. Fl. 2 (2): 96 (1984-reprint 2003); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 56 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 25-26 (2007). **Photo iii (Page no. 98).**

Calla nitida Jack, Malayan Misc. 1 (1): 24 (1820).

Arum interifolium Link, Enum. Pl. Hort. Regel. Berol.: 394 (1822).

Type: Malay, Penang, August 1822, Wallich, E. India Co. 8965A (neotype: K).

Bengali / Local name: *Ban Kachu*.

English name: Not known.

A herb, stem erect or with lower part reclining on the ground in larger plants, 1 m or more in height, 0.5-5.0 cm thick. Internodes 0.5-2.0 cm long. Leaves petiolate, petioles 8-30 cm long, sheaths with scarious margins, 5-25 cm long, leaf blades narrowly elliptic to narrowly oblong or oblanceolate, 15-50 × 7-16 cm, base acute to attenuate, rarely broadly acute, apex often apiculate, acuminate to broadly acute or shortly acuminate, silvery variegation along the primary lateral veins, venation usually undifferentiated in dry material but sometimes weakly differentiated into 5-9 or more primary veins diverging from the midrib at an angle of 35-55°, texture coriaceous. Peduncles rarely solitary, 2-5 together, 5-20 cm long, commonly equalling or surpassing the subtending petiole. Spathe light green but frequently turning white with age, eventually withering, 3-8 cm long, stipe 0.2-0.9 cm long. Spadix cylindrical, equalling or slightly exceeding the spathe, 1-7 cm long. Pistillate portion 0.2-1.0 cm long (-2 cm in fruit), pistils 16-37, scattered at anthesis, stigma yellowish, up to 0.3 cm broad, the style weakly constricted. Staminate portion 1-6 cm long, 1.5 cm thick. Fruits white.

Flowering and fruiting period: Non seasonal.

Chromosome number: $2n = 40$ (Petersen, 1989).

Habitat: Damp and well-shaded places.

Distribution: Bangladesh, Southern Myanmar, Malaysia and Indonesia.

Specimen examined:

Dhaka: Banani area, 04.10.2004, Hosne Ara HA 1449 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, it is commonly grown both in public places and homesteads.

Ethnobotanical information: Not known.

2. Genus: *Alocasia* (Schott) G. Don in Sweet,

Hort. Brit., ed. 3: 631 (1839) *nom. cons.*

Type species: *A. cucullata* (Loureiro) G. Don

(*Arum cucullatum* Loureiro), *typ. cons.*

Medium-sized to rarely arborescent and gigantic, perennial herbs, stem thick, often hypogeal, sometimes stoloniferous and bulbiferous, epigeal stem usually erect, with short internodes, rarely elongated and creeping, with milky latex. Leaves few to several in the terminal crown, sometimes each subtended by a cataphyll, petiole long, sheathing below, sheath persistent, leaf blade variable, usually cordate-sagittate at the base, glabrous, entire, sometimes peltate, venation pinnately reticulate, the secondary veins are arching and form collective veins parallel to and in between the primary veins. Inflorescence 2-many in each floral sympodium, appearing with the leaves. Peduncle usually shorter than the petiole. Spathe strongly constricted between the tube and the blade. Spadix sessile, sometimes shortly stipitate, shorter than the spathe, divided into a basal pistillate portion, a short sterile portion, a staminate portion and a terminal sterile smooth or roughened appendix. Flowers unisexual, perigone absent. Male flower 3-12 androus, stamens united into an obpyramidal, subhexagonal, truncate synandrium, anthers dehiscing by apical pore. Sterile male flowers shallow, obpyramidal, compressed, truncate. Female flowers with ovoid or oblong ovary, unilocular or partially 3-4 locular at the apex, ovules few, orthotropous, placentation basal, style very short or absent, stigma depressed-capitate, distinctly 3-4 lobed. Fruit a berry, orange to red, ellipsoid or obconic-ellipsoid or sub-globose, 1-5 seeded. Seed sub-globose to ellipsoid, testa thick, smooth or scabrous.

About 60-70 species are distributed throughout tropical Asia, Australasia, Malay Archipelago and Melanesia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 13 species.

Key to the species

- | | | |
|----|---|---------------------|
| 1. | Leaf blade deeply pinnatifid or sub-pinnatifid | 2 |
| - | Leaf blade simple, not pinnatifid or not sub-pinnatifid | 3 |
| 2. | Upper surface of leaf blade deep glossy green and lower surface purple | sanderiana |
| - | Upper and lower surfaces of leaf blade dark bright green | portei |
| 3. | Leaf distinctly peltate | 4 |
| - | Leaf very shortly peltate or not peltate | 5 |
| 4. | Apical lobe of the leaves with 3-4 pairs of lateral nerves | navicularis |
| - | Apical lobe of the leaves with 5-9 pairs of lateral nerves | 6 |
| 5. | Tuber edible, leaf not peltate | macrorrhizos |
| - | Tuber not edible, leaf very shortly Peltate | 7 |
| 6. | Leaves broadly ovate | 8 |
| - | Leaves not broadly ovate | 9 |
| 7. | Leaves small, pointed, deep green with prominent veins | cucullata |
| - | Leaves large with deeply depressed veins, dark metallic and shining green, lower surface purple | cuprea |

- | | | |
|-----|--|-----------------------|
| 8. | Basal lobes of the leaves broadly ovate, very much rounded in outline and without a distinct tip | odora |
| - | Basal lobes of the leaves triangular, only slightly curving in outline and with a distinct tip | 10 |
| 9. | Style short, not stout | 11 |
| - | Style distinct, stout | 12 |
| 10. | Sterile male zone present above the sterile interstice | fallax |
| - | Sterile male zone absent above the sterile interstice | hararganjensis |
| 11. | Leaves elongate-rhombic caudate-acuminate | acuminata |
| - | Leaves oblong-sagittate | decipiens |
| 12. | Petiole and peduncle dark purple, inflorescence in groups of up to 3 | salarkhanii |
| - | Petiole and peduncle green, inflorescence in groups of up to 25 (usually 12) | fornicata |

8. *Alocasia acuminata* Schott, Bonplandia 7: 28 (1859). Hook. f., Fl. Brit. India 6: 527 (1893-reprint 1954); Prain, Beng. Pl. 2: 1111 (1903-reprint 1981); Krause in Engler Pflanzenr. 71 (IV. 23E): 94-95 (1920); Heinig, List Chittagong: 74 (1925); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Mitra, Fl. Pl. E. India 1: 79 (1958); Deb, Fl. Tripura State 2: 396 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 5 (1989); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 26-27 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 79 (2010). **Photo 5 (Page no. 169).**

Type: Chittagong (Hooker f. *et* Thomson-Herb. Kew); Saluan River (Wallich n. 8946-Herb. Kew).

Bengali / Local name: *Bannyo Kachu*.

English name: Not known.

A herb, stem stout, rhizomatous, generally elongate, later decumbent, erect, 8-75 cm long, 2.5-6.0 cm in diameter, evergreen. Leaves c 5-8 together, petioles 15-80 cm long, glabrous, bright green; blades simple, 20-50 cm long, 8-20 cm in diameter, membranous, distinctly peltate, elongate-rhombic, caudate-acuminate, contracted opposite the basal lobes which are half as long as the anticus and connate for three-fourths of their length, apical lobe with 5-9 pairs of lateral nerves, sinus narrow. Inflorescence paired at the leaf bases. Peduncle shorter than the petiole, green, 9-20 cm long, subtended by cataphylls. Spathe 12-16 cm long, strongly constricted between the tube and the limb, tube shorter than the limb, ovoid, green, 3.0-4.5 cm long, persistent, limb 9.0-11.5 cm long, lanceolate, canoe-shaped, whitish or pale green. Spadix subequalling the spathe, 10-12 cm long, sessile, female zone 1.0-1.5 cm long, 1.1 cm in diameter, ovaries pale green, subglobose, style short, not stout, stigma capitate and very slightly 3-lobed, white, placentation basal. Sterile interstice 3.5 cm long, 0.5 cm in diameter, whitish. Male zone 2.5 cm long, 0.9 cm in diameter, subcylindric, narrowed at the base and apex, the base corresponding with the spathe constriction, synandria rhombo-hexagonal, c 0.1 cm in diameter. Appendix narrow conical, 2.5-5.0 cm long, whitish, demarcated from male zone by a strong constriction, narrowly conic, pointed. Fruit a berry, orange-red. Seed sub-globose.

Flowering and fruiting period: May-August.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Shady moist hill slopes.

Distribution: Bangladesh, Myanmar.

Specimens examined:

Bagerhat: Kachua, 17.02.1986, Huq & Mia H 7404 (DACB).

Bandarban: On the way of Betchari, 22.09.2004, Hosne Ara HA 1217 (DACB).

Bogra: Beltola, 06.02.2003, Hosne Ara & Rezia Khatun HA 143 (DACB).

Barisal: East Narayanpur and Dostani village, 22.02.2008, Hosne Ara HA 2666 (DACB); Kashipur, Lakaotta, 23.02.2008, Hosne Ara HA 2684, 2685, 2686, 2687 (DACB).

Chittagong: Sitakunda, 10.01.1851, Collection number unknown, Hooker & Thomson (K); Chunati Reserve Range, 27.03.1998, Rahman, Wilcock and others 2579 (HCU); Dhopachari, Chamachari, 04.06.1998, Rahman *et al.* 3065 (HCU); Dhopachari, Chandanaish, Gondamara, 02.09.1999, Boyce, Toha & Rahman 5539 and 5541 (HCU, K).

Cox's Bazar: Panerchara, Tulabagan, 30.03.1998, Rahman & Toha 2716 (HCU); Teknaf, Whykeong, 29.03.1998, Rahman, Wilcock and others 2636 (HCU); 11.09.1999, Boyce, Toha & Rahman 5880 (HCU, K); Teknaf Game Reserve, Whykon Range, Rhykong beat, 29.09.2005, Hosne Ara HA 2354 (DACB); Upper Rezu range, 29.09.2005, Hosne Ara HA 2405 (DACB).

Dhaka: Keraniganj, 17.01.1978, Huq & Rahman H 3752 (DACB); Sonargaon, 07.07.2005, Hosne Ara HA 1917 (DACB).

Faridpur: Bagat, Magura-Faridpur road, 06.01.1976, Huq, Rahman & Mia H 2033 (DACB); Faridpur-Goalanda, on the way, 08.01.1976, Huq, Rahman & Mia H 2119 (DACB).

Habiganj: Satchari, 17.05.2005, Hosne Ara HA 1574 (DACB).

Kushtia: Munshiganj, 11.06.1974, Khan & Huq K 3935 (DACB); Munshiganj thana, on way to Mominpur, 25.09.1978, Khan & Huq K 5070 (DACB).

Moulvibazar: Madhabkundo, 05.06.1998, Hosne Ara HA 37 (DACB); Lawachara National Park, 12.05.2009, Sarder Nasir Uddin 3634 (DACB); Madhabkundo, 05.07.2002, Hosne Ara & Sarder Nasir Uddin HA 88 (DACB); Kulaura, Gazipur beat, Hararganj reserve forest, 06.07.2002, Hosne Ara HA 93 (DACB); Lawachara reserve forest, 02.05.2003, Hosne Ara HA 208 (DACB); 15.05.2005, Hosne Ara HA 1466 (DACB); Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1621 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1706 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1780 (DACB); Madhabkundo, 06.07.2005, Hosne Ara HA 1823 (DACB); Satchari forest area, 07.07.2005, Hosne Ara HA 1865

(DACB); Muraichara beat, Ichachara forest, 07.05.2010, Hosne Ara HA 2754 (DACB); Madhabkundo, 03.12.2014, Hosne Ara HA 2871 (DACB).

Mymensingh: Nogua, 13.01.1979, Mahbuba Halim 352 (DACB).

Narayanganj: Sonargaon, 07.07.2005, Hosne Ara HA 1917 (DACB).

Noakhali: Momarijpur (P.S. Dagunbhuia), 18.11.1981, Huq, Rahman, Halim & Begum H 5264 (DACB); Sadar, Ram Sankar Gopai, 13.01.1992, Akram Hossain 231 (CFRIH).

Patuakhali: Kalapara, Baliatoli, 01.09.2007, M. Sultana 1630 (DUSH); Galachipa, Noluabaghi 11.12.2008, M. Sultana 1720 (DUSH).

Rangamati: Kaptai, Sitapahar, 27.06.1998, Rahman, Toha 3232 (HCU); Sitapahar forest, Kaptai, 04.06.1999, Huq & Mia H 10638 (DACB); Kaptai Lake, Pablakhali, 04.09.1999, Boyce, Toha & Rahman 5645 (HCU & K); Kaptai, Rampahar, 06.09.1999, Boyce, Toha & Rahman 5756 (HCU & K); Kaptai, Shapchari, Sita Pahar, 17.06.2001, Sarder Nasir Uddin 1030 (DACB); Opposite to the forest office, Kaptai, 17.06.2001, Sarder Nasir Uddin 1045 (DACB).

Sherpur: Rangtia range, Gazni beat, 09.10.2003, Hosne Ara HA 640 (DACB).

Tangail: Madhupur forest area, 20.09.1980, Mia, Huq & Rahman M 424 (DACB); Modupur, Rasulpur, 06.10.2003, Hosne Ara HA 543, 544 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

9. *Alocasia cucullata* (Lour.) G. Don in Sweet, Hort. Brit. ed. 3: 631 (1839) (*'cucullatum'*). Hook. f., Fl. Brit. India 6: 525 (1893-reprint 1954); Prain, Beng. Pl. 2: 1111 (1903-reprint 1981); Krause in Engler Pflanzenr. 71 (IV. 23E): 77 (1920); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 100 (1953); Mitra, Fl. Pl. E. India 1: 79 (1958); Hu, Dansk Bot. Arkiv 23 (4): 430-432 (1968); Hotta, Mem. Fac. Sci. Kyoto Imp. Univ., Ser. Biol. 4: 94 (1970); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 27-28 (1976); Graf, Exotica, edn. 8: 127 (1976); Graf, Tropica, edn. 5: 88, 937 (1978-reprint 2003); Nicolson, Fl. Vitiensis Nova 1: 454-455 (1979); Deb, Fl. Tripura State 2: 396 (1983); Walters *et al.*, European Gard. Fl. 2 (2): 101 (1984-reprint 2003);

Burnett, *Aroideana* 7 (3 & 4): 112-113 (1984); Nicolson in Dassanayake & Fosberg, *Rev. Handb. Fl. Ceylon* 6: 56 (1987); Karthikeyan *et al.*, *Fl. India Enum. in Fl. India ser. 4*: 5 (1989); A. Hay *et al.*, *Blumea Supplement* 8: 13 (1995); Liu & Huang, *Fl. Taiwan*: 799 (1996); Govaerts & Frodin, *World Checkl. Bibliog. Araceae*: 65 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 27-28 (2007); Heng & Boyce in Heng *et al.*, *Fl. China* 23: 78 (2010). **Photo 6 (Page no. 169).**

Arum cucullatum Lour., *Fl. Cochinch* 2: 536 (1790); ed Willd., 656 (1793); Roxb., *Fl. Ind.* 3: 501 (1832); Wight, *Icon. Pl. Ind. Or.* 3: 6, t. 787 (1844).

Caladium cucullatum (Lour.) Pers., *Syn. Pl.* 2: 575 (1807).

Colocasia cucullata (Lour.) Schott in Schott & Endl., *Melet. Bot.*: 18 (1832).

Type: Canton, China, specimens unknown but to be sought at BM and P.

Bengali / Local name: *Bish kachu*.

English name: Chinese Taro, Chinese Ape, Buddha's Hard, Hooded Dwarf Elephant Ear.

Evergreen herb, erect, above-ground stem distinct, stout, 50-80 × 5-15 cm, branched, base with many stolons. Leaves many, petioles up to 75 cm long, sheathing for 30 cm, green. Leaf blade small, simple, pointed, broadly ovate-cordate, 10-40 × 7-28 cm, sub-leathery, very shortly peltate (fused for 1-2 cm), about as long as broad, posterior lobes very short, deep green with prominent veins, broadly ovate-cordate, acute, base shallowly cordate, primary veins 4 on each side, radiating from the petiole, arching. Inflorescence rarely produced, usually solitary, sometimes paired, axillary, subtended by membranous cataphylls. Peduncle up to 35 cm long. Spathe up to 15 cm long, green, the lower 5-6 cm darker, limb narrowly cymbiform, 5-10 × 3-5 cm, margins convolute. Spadix 8-14 cm long, female zone cylindric, 1.5-2.5 cm × c 7 mm; sterile zone 2-3 cm × c 3 mm; male zone c 3.4 cm × 8.0 mm; appendix whitish, narrowly conic, c 3.5 cm × 5 mm. Fruit a berry, rarely produced, sub-globose, 6-8 mm in diameter, 1-seeded, ripening red.

Flowering and fruiting period: May-July.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Shady and damp places in the forests and village thickets.

Distribution: Bangladesh, Southeastern Asia.

Specimens examined:

Bandarban: Lama Upazila, Shabitchari, 19.12.1990, Mia, Rahman & Mahfuz M 2617 (DACB).

Chittagong: Fatiqchari, 27.09.2005, Hosne Ara HA 2312 (DACB).

Cox's Bazar: Himchari, 30.09.2005, Hosne Ara HA 2525(DACB).

Dhaka: BNH Office, Originally collected from Kishoreganj district, 15.05.1981, Mahbuba Halim 930 (DACB).

Kishoreganj: Kishoreganj to Mohilontho, 13.01.1979, Mahbuba Halim 334 (DACB).

Khagrachari: Jamtoli, 12.07.2003, Hosne Ara & Sarder Nasir Uddin HA 485 (DACB).

Moulvibazar: Adampur, 05.02.1979, A.M. Huq 4242 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1745 (DACB); 07.09.2005, Hosne Ara HA 2216 (DACB).

Narayanganj: Sonargaon, 07.07.2005, Hosne Ara HA 1910 (DACB).

Patuakhali: Patuakhali Sadar, Lohalia, 14.05.2005, M. Sultana 724 (DUSH).

Sylhet: Locality, Collection date and number unknown, J.D. Hooker & Thomson (K).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: The plant is crushed and the paste is applied externally on the body for curing the pain of viper bites, abscesses, rheumatism and arthritis (Heng, 1979). The plant is used for medicinal purposes by the indigenous people of Bangladesh.

10. *Alocasia cuprea* (C. Koch & Bouché) C. Koch, Wochenschr. Vereines Befoerd. Gartenbanes Koenigl. Preuss. Staaten 4: 141 (1861). Krause in Engler Pflanzenr. 71 (IV. 23E): 110 (1920); Bailey, Manual Cultivat. Pl.: 189-190 (1949); Bridsey,

Cultivat. Aroid.: 23 (1951); Graf, Exotica, edn. 8: 124 (1976); Graf, Tropica, edn. 5: 88, 937 (1978-reprint 2003); Walters *et al.*, European Gard. Fl. 2 (2): 103 (1984-reprint 2003); Burnett, Aroideana 7 (3 & 4): 76-77 (1984); A. Hay *et al.*, Blumea Supplement 8: 13 (1995); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 65 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 28 (2007).

Photo iv (Page no. 98).

Caladium cupreum C. Koch & Bouché in Ind. Sem. Hort. Berol.: 6
(1854).

Type: Borneo (Sabah).

Bengali / Local name: *Bahari Kachu*.

English name: Not known.

Herb, rhizome decumbent, 80 × 6 cm. Leaves several together, petiole c 70 cm long, green, faintly mottled-brown or greenish-brown throughout, sheathing in the lower one-fifth, blades simple, large with deeply depressed veins, coriaceous, hanging, ovate, c 60 × 40 cm, adaxially glossy bronze-green, darker near the primary veins, abaxially purple, anterior lobe with the tip obtuse and abruptly and shortly acuminate, anterior costa with 8-11 primary lateral veins on each side, posterior lobes completely united except for a shallow retuse notch, rounded. Inflorescences paired, not forming multiple series, subtended by cataphylls. Peduncle similar to the petiole, c 22 cm long. Spathe green to greenish-purple, c 10 cm long, lower spathe oblong-ovoid, c 4.5 × 2.0 cm, limb about equalling the lower spathe, at first erect and cucullate, then sharply deflexed, separated from the lower spathe by an abrupt constriction. Spadix considerably shorter than the spathe, c 6 cm long, very shortly stipitate, cylindrical except the appendix, the female zone narrowly cylindrical, c 2 cm long, 8 mm wide, ovaries sub-globose, longitudinally 3-4 ribbed, stigma raised on a very short slender style, conspicuously 2-4 lobed. Sterile interstice not attenuate, isodiametric with male and female zones, synandrodia rhomboid, in 2 whorls. Male zone cylindrical, c 2 cm long, synandria rhomboid, 4-6 merous. Appendix c 2 cm long, white, spindle-shaped, blunt, faintly irregularly channelled, constricted at the union with the male zone.

Flowering and fruiting period: May-October.

Chromosome number: 2n = 28 (Fedorov, 1969).

Habitat: Slopes in the rain forest, sandstone and limestone, at c 1000-1500 m altitude (Hay, 1998).

Distribution: Bangladesh, Malaysia and Borneo (Indonesia).

Specimen examined:

Dhaka : Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1440 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, this species is commonly planted both in public places and homesteads.

Ethnobotanical information: Not known.

11. *Alocasia decipiens* Schott, Bonplandia 7: 28 (1859) *et in* Prodr. 151 (1860). Engler in DC. Mon. Phan. 2: 504 (1879); Hook. f., Fl. Brit. India 6: 626 (1893-reprint 1954); Krause in Engler Pflanzenr. 71 (IV. 23E): 92 (1920); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 5 (1989); Parmar in Shetty & Singh, Fl. Rajasthan 3: 869 (1993); Pullaiah, Fl. Andhra Pradesh 3: 1020-1021 (1997); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 66 (2002) Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 29 (2007). **Photo 7 (Page no. 169).**

Arum fornicatum Wight, Icon. Pl. Ind. Or. 3. t. 789 (1844), non Roxb., (1832), nec Wight, t. 792 (1844).

Type: Myanmar, Andaman: Port Blair (S. Kurz-Herb. Calcutta).

Bengali / Local name: *Jangli Kachu*.

English name: Not known.

A stout herb, stem decumbent or erect, up to 62 cm long. Leaves c 6 together, petiole up to 87 cm long, sheathing in lower third to half, blades simple, 40-57 × 20.0-28.5 cm, distinctly peltate, oblong-sagittate, apical lobe acuminate- cuspidate, with 6-9 pairs of lateral nerves, sinus c 16.5 cm long, broad open, basal lobes about half as long as the apical lobe, subacute. Inflorescence paired among the leaf bases, subtended by cataphylls up to c 27.5 cm long. Peduncle shorter than the petiole, 30-40 cm long. Spathe c 17 cm long, strongly constricted between the tube and the limb, tube shorter than the limb, ovoid, green, c 4 cm long, persistent, limb c 13 × 5 cm, oblong-cymbiform, acuminate, whitish or yellowish-green. Spadix shorter than the

(Photo 5) 169

spathe, 13 cm long, female zone 2 cm long, 1.5 cm in diameter, ovaries pale green, globose, 0.2 cm long, 0.2 cm in diameter, style short, not stout, stigma capitate and 3-lobed, the lobes conic, yellow, ovules 4, placentation basal. Sterile interstice 3 cm long, 0.8 cm in diameter, whitish. Male zone 2 cm long, 1.4 cm in diameter, subcylindric, narrowed at the base and the apex, the base corresponding with the spathe constriction, synandria rhombo-hexagonal, c 0.1 cm in diameter. Appendix narrow conical, 6 cm long, whitish, slightly thicker than the male zone at the base. Fruit a berry, red when ripe. Seed sub-globose.

Flowering and fruiting period: June-July.

Chromosome number: $2n = 24$ (Petersen, 1989).

Habitat: Shady hill slopes adjacent to *chhara* in hilly areas in deep forests.

Distribution: Bangladesh, The Andaman and Nicobar Islands (India).

Specimen examined:

Netrakona: Durgapur thana, Khalikpur, 17.06.2004, Hosne Ara HA 775, 776 (DACB); Pavel Partha 667 (JUH).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 11 (2): 61-64, 2004).

12. *Alocasia fallax* Schott in Bonplandia 7: 28 (1859). Hook. f., Fl. Brit. India 6: 527 (1893-reprint 1954); Krause in Engler Pflanzenr. 71 (IV. 23E): 94 (1920); Mitra, Fl. Pl. E. India 1: 79 (1958); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 29 (1976); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 5 (1989); Noltie, Fl. Bhutan 3 (1): 138 (1994); Hajra & Verma, Fl. Sikkim 1: 185 (1996); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 66 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 29-30 (2007). **Photo 8 (Page no. 172).**

Type: Sikkim Himalaya to Assam. Sikkim (D. Prain-Herb. Calcutta).

Bengali / Local name: *Bara Jongle Kachu*. English name: Not known.

Evergreen perennial herb, stem stout, erect to decumbent, c 106 cm long and 8 cm in diameter. Leaves simple, c 64.5 × 49 cm, anterior lobes c 38.5 cm long with round tip, posterior lobes c 26 cm long, distinctly peltate for c 3 cm, round and crisped, cuspidate, base cordate, margin entire, sinus 8-14 cm long, apical lobe with 5-9 pairs of lateral nerves, basal lobes strongly angled, slightly curving in outline, petiole up to 89 cm long. Inflorescence up to 5 in centre of the leaf crown, bloom one after another, subtended by cataphylls; cataphylls c 46 cm long, tip of the cataphylls shortly pointed, c 2.8 cm long. Peduncle shorter than the petiole, up to 30-46 cm long and 1.0-1.5 cm in diameter at the base, green. Spathe membranaceous, up to 19 cm long, strongly constricted between the tube and the blade, tube green, c 3 cm long, oblong-ellipsoid, shorter than the blade, persistent, blade ovate, cuspidate, open, up to 16 cm long, light greenish-yellow. Spadix shorter than the spathe, female zone short, c 1.5 × 1.5 cm, with 100-160 close-packed pistils, sterile interstice c 1.3 cm long, sterile male zone present above the sterile interstice, c 0.6 cm long and c 1.1 cm in diameter, male zone cylindrical, c 1.8 × 0.7 cm, creamy, appendix stout, conical, 1.7-6.5 cm long, 1.5 cm in diameter at the base, tip blunt. Ovaries ovoid, c 2.5 × 2 mm, green, ovules about 5, large, on basal placentation and erect funicles, style short, brown, stout, stigma depressed-capitate, 3-cleft. Fruits c 6 mm in diameter, globose, 1-seeded.

Flowering and fruiting period: May-December.

Chromosome number: 2n=28 (Sultana *et al.* 2011).

Habitat: Shady areas of hill slopes and foot hills in rain forests.

Distribution: Bangladesh, Bhutan and India (Darjeeling, Sikkim Himalaya and Khasia Hills).

Specimens examined:

Habiganj: Chunarughat thana, Rema-Kalenga wild life sanctuary, Kalenga beat, 06.08.2000, Md. Zashim Uddin 1090 (DUH).

Netrakona: Durgapur thana, Bijoypur, 16.06.2004, Hosne Ara HA 746 (DACB); Utrail bazar, Vabanipur, 18.06.2004, Hosne Ara HA 836 (DACB).

Tangail: Madhupur, Dokhola, 06.10.2003, Hosne Ara HA 537 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 22.06.2015, Hosne Ara HA 2884 (DACB) [Originally collected from Bijoypur under Netrokona district].

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Economic uses/values/harmful aspects: Not available.

Ethnobotanical information: Not available.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 8 (2): 87-90, 2001).

13. *Alocasia fornicata* (Roxb.) Schott, Oesterr. Bot. Wochenbl. 4: 410 (1854). Hook. f., Fl. Brit. India 6: 526 (1893-reprint 1954); Prain, Beng. Pl. 2: 1111 (1903-reprint 1981); Krause in Engler, Pflanzenr. 71 (IV. 23E): 94 (1920); Haines, Bot. Bihar and Orissa: 869-871 (1924-reprint 1978); Heinig, List Chittagong: 74 (1925); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 100 (1953); Mitra, Fl. Pl. E. India 1: 79 (1958); Balakrishnan, Bull. Bot. Surv. India 6: 91 (1964); Nicolson in Saldanha & Nicolson, Fl. Hassan Dist.: 783 (1976); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 27-28 (1976); Bennet, Fl. Howrah Dist.: 96 (1979); Deb, Fl. Tripura State 2: 396 (1983); Balakrishnan, Fl. Jowai 2: 564 (1983); Bakshi, Fl. Murshidabad Dist.: 335 (1984); Sharma *et al.*, Fl. Karnataka: 296 (1984); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 56-58 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 5 (1989); Islam, Fl. Majuli: 335 (1990); Pullaiah, Fl. Andhra Pradesh 3: 1020-1021 (1997); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 66 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 30-31 (2007). **Photo 9 (Page no. 175).**

Arum fornicatum Roxb., Fl. Ind. 3: 501 (1832); Wight, Icon. Pl. Ind. Or. 3: 6, t. 792 [prob. also t. 789] (1844).

Colocasia fornicata (Roxb.) Kunth, Enum. Pl. 3: 41 (1841); Thw., Enum. Pl. Zeyl. 432 (1864).

Lectotype: Bengal & Chittagong. Roxb. drawing [reproduced by Wight, Ic. Pl. Ind. Or. 3: 6, t. 792 (1844)].

Bengali / Local name: *Salu Kachu*.

English name: Not known.

A herb with erect or inclined stem, up to 1 m long, c 4 cm thick with short internodes. Petiole green, 20-50 cm long. Leaves simple, distinctly peltate, ovate-lanceolate, sagittate, 20-45 × 10-25 cm, apical lobe acute or obtuse with 5-9 pairs of lateral nerves, slightly wavy at the margin, basal lobes about half or less as long as the

apical, obtuse or subacute, connate for one-tenth to half its length, petioles 20-60 cm long, together with the peduncles, green or black-blotched. Inflorescence in groups of up to 25 (usually 12) in the centre of the leafy crown, bloom one after another. Peduncles green, 12-40 cm long, elongating during maturation. Spathes 10-12 cm long, with a basal persistent portion of about 4 cm long, convolute, ellipsoid, dark green, and an upper portion of deciduous limb c 6-8 cm long, cymbiform, broad-ovate, abruptly cuspidate, light greenish-yellow. Spadix slightly shorter than the spathe, male and female floriferous zones separated by about 2 cm long neuter zone, male zone 1.7-2.0 cm long, female zone c 1 cm long, appendage conoid, 4 cm long. Synandrium with a flat crenulate top. Ovaries ovoid, style distinct, stout, c 1 mm long, stigma capitate, 3-4 lobed, ovules 3-5. Fruit a sub-globose berry, 3.2-4.0 mm in diameter, when ripe orange-red or scarlet-red.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 28, 42, 56$ (Petersen, 1989).

Habitat: Shady damp places in the forests and also in village thickets.

Distribution: Bangladesh, Northeast and South India and Sri Lanka.

Specimens examined:

Barisal: East Narayanpur and Dostani village, 22.02.2008, Hosne Ara HA 2665 (DACB); Kashipur, Lakaotta, 23.02.2008, Hosne Ara HA 2681, 2682, 2683 (DACB).

Bogra: Mohastangarh, 05.02.2003, Hosne Ara & Rezia Khatun HA 140 (DACB); Beltola, 06.02.2003, Hosne Ara & Rezia Khatun HA 144, 154 (DACB); Beltola, 06.02.2004, Hosne Ara & Rezia Khatun HA 156 (DACB); Shibgonj area, 19.08.2005, Hosne Ara HA 2190 (DACB); Dhunot upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2800 (DACB).

Dhaka: Dhanmandi area, 20.05.1968, Mozahar 124 (DUSH); Bangladesh National Herbarium garden (Cultivated), 10.05.2015, Hosne Ara HA 2879 (DACB) [Originally collected from Beltola village under Bogra district].

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 5960 (K).

Jessore: Jessore town area, 26.05.2012, Hosne Ara HA 2840 (DACB).

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Netrakona: Farangpara, 18.06.2004, Hosne Ara HA 869 (DACB).

Noakhali: Amanatpur, 3 miles off from Chaumohani, 19.11.1981, Huq, Rahman, Halim & Begum H 5307 (DACB).

Patuakhali: Bauphal thana, Vill. Indrakool, 16.03.1973, Khan & Huq K 2884 (DACB); Galachipa, Rangabali, 24.03.2006, M. Sultana 1209 (DUSH); Kalapara, Kuakata, 04.02.2007, M. Sultana 1622 (DUSH).

Rajbari: Rajbariarea, 26.05.2012, Hosne Ara HA 2823 (DACB).

Sherpur: Rangtia range, Gazni beat, 21.06.2004, Hosne Ara HA 922 (DACB).

Sirajganj: Kazipur upazilla to Charkhada village, 18.03.2011, Hosne ara HA 2789 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: In India, people of the Konda Reddis and Savaras tribes use rhizome paste to treat wounds and kill worms in domestic animals. Khonds and Nuka Doras people also apply the rhizome paste for curing their heel cracks and wounds (Rao and Henry, 1996).

14. *Alocasia hararganjensis* H. Ara & M.A. Hassan, sp. nov. Photo 10 (Page no. 179).

Alocasia hararganjensis H. Ara & M.A. Hassan is closely related to *A. fallax* Schott but readily differentiated by the (i) leaf shape, (ii) length of cataphyll tip, (iii) sterile male zone and (iv) chromosome number.

Holotype: Bangladesh, Moulvibazar district, Gazipur beat, Hararganj reserve forest, 21.05.2005, Hosne Ara HA 1740 (DACB).

Bengali/Local name: *Not available.*

English name: Not Known.

Massive subarborescent pachycaul herb, c 3.5 m high. Stem erect to decumbent, to c 10 cm in diameter, over c 2.3 m long, clothed in the brown remains of old leaf bases. Leaves several together, held almost erect or slightly curved; petiole c 1.2 m long,

sheathing c 1/2 from the base of petiole, eglandular, light green, wing of sheath out-rolled; blade narrowly sagittate to ovato-sagittate, slightly glossy, leathery, glabrous, dark-green adaxially, pale green abaxially, usually bullate, 40-50 cm long, 40-48 cm diameter at the base, margin entire to slightly sinuate; anterior lobes 35-42 cm long with apiculate tip c 1 cm long; anterior costa prominent on both surfaces, glabrous on both surfaces, primary veins 7-11 on each side, prominent on both surfaces, diversing at 45⁰-70⁰, secondary veins flush on both surfaces; interprimary collective veins well-defined; submarginal vein, c 3 mm from the margin; glands in the axils of primary veins absent or extremely inconspicuous; posterior lobes 30-35 cm long, rounded; petiole for c 1.9 cm; posterior costae straight. Inflorescences 10 in the centre of the leafy crown, bloom one after another, subtended by cataphylls; cataphylls 66-68 cm long, tip of the cataphylls pointed, c 8 cm long, green; peduncle smooth, 50-64 cm long, 1.0-1.5 cm in diameter at the base, green. Spathe 18.5-21.0 cm long, constricted at level of sterile zone of spadix; lower spathe 4.5-5.0 cm long, light green, broadly ovoid-cylindric; limb 14-16 cm long, 6.5-7.0 cm in diameter, light greenish yellow, thinly leathery. Spadix shorter than spathe, 12-15 cm long, sessile; female zone 1.8-2.0 cm long, 1.5-2.0 cm in diameter at the base, with 120-200 close-packed pistils; ovary green, ovoid to subglobose, 2-3 x 2.0-2.3 mm, unilocular, with basal placenta; style 0.5-0.8 mm long, 0.6 mm in diameter, cream coloured; stigma subglobose, weakly 3-4 lobed, the lobes rounded, creamy; sterile interstice 2.0-2.5 cm long, with 7-8 whorls of rhombohexagonal synandrodia, the lowermost whorls isodiametric with female zone and resembling connate staminodes; sterile male zone absent above the sterile interstice; male zone creamy, 2.5-3.5 cm long, 1.0-1.5 cm in diameter; synandria creamy, rhombo-hexagonal, 2.0-2.3 mm in diameter, opening through apical slits; appendix ivory, 5.5-7.5 cm long, slightly thicker than the male zone at the base, then tapering gradually to a fine point, smooth to faintly rugose. Fruiting peduncles 40-59 cm long, bend, fruiting spathe whitish, pendulous, 5-6 cm long, the spathe dehiscing longitudinally; fruits yellowish (usually does not mature), rather small, 3-4 mm in diameter.

Flowering and fruiting period: Flowering was observed in March to October.

Chromosome number: $2n = 30$ (Worked out in Cytogenetics Lab., DU).

Habitat: Grows on the hill slopes as under growth.

Distribution: North-Eastern part of Bangladesh, Moulvibazar district (within greater Sylhet).

Specimens examined:

Habiganj: Kalenga beat, Kalenga, 03.07.2005, Hosne Ara HA 1771 (DACB).

Moulvibazar: Gazipur beat, Hararganj reserve forest, 07.05.2003, Hosne Ara HA 315 (DACB); Sreemongal, Lawachara reserve forest, 15.05.2005, Hosne Ara HA 1468 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1707 (DACB); Gazipur beat, Hararganj reserve forest, 21.05.2005, Hosne Ara HA 1740 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1779 (DACB); Gazipur beat, Hararganj forest, 05.07.2005, Hosne Ara HA 1804 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 22.06.2015, Hosne Ara HA 2885 (DACB) [Originally collected from Hararganj reserve forest under Moulvibazar district].

Economic uses/values/harmful aspect: Not available.

Ethnobotanical information: Not available.

Etymology: The species is named after the name of locality Hararganj, under the Moulvibazar district; the first location it was found.

The major morphological differences between two taxa of *Alocasia* (Schott) G. Don are outlined in Table-6.1.

Table 6.1. Morphological comparison of *Alocasia hararganjensis* H. Ara & M.A. Hassan, sp. nov. with *Alocasia fallax* Schott

Characters	<i>Alocasia hararganjensis</i> H. Ara & M.A. Hassan	<i>Alocasia fallax</i> Schott
Leaf shape	narrowly to ovate sagittate, tip acute	round and crisped, tip round
Inflorescence and cataphyll	up to 10 in centre of the leaf crown, tip of the cataphylls long pointed, c 8 cm long	up to 5 in centre of the leaf crown, tip of the cataphylls shortly pointed, c 2.8 cm long
Spadix	male zone 2.5-3.5 cm long	male zone c 1.8 cm long

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Characters	<i>Alocasia hararganjensis</i> H. Ara & M.A. Hassan	<i>Alocasia fallax</i> Schott
Sterile male zone	absent above the sterile interstice	present above the sterile interstice
Chromosome number	30	28

15. *Alocasia macrorrhizos* (L.) G. Don in Sweet, Hort. Brit. ed. 3: 631 (1839) ('macrorrhizon'). Hook. f., Fl. Brit. India 6: 526 (1893-reprint 1954); Krause in Engler, Pflanzenr. 71 (IV. 23E): 84 (1920); Haines, Bot. Bihar and Orissa: 869-870 (1924-reprint 1978); Heinig, List Chittagong: 74 (1925); Fischer in Gamble, Fl. Pres. Madras: 1103-1104 (1931-reprint 1967); Furtado, Gard. Bull. Straits Settlem. 11: 252 (1941); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 100 (1953); Mitra, Fl. Pl. E. India 1: 79 (1958); Hu, Dansk Bot. Arkiv 23 (4): 432 (1968); Nasir, Fl. Pakistan 120: 8 (1978); Graf, Tropica, edn. 5: 85, 937 (1978-reprint 2003); Nicolson, Fl. Vitiensis Nova 1: 455-456 (1979); Bakshi, Fl. Murshidabad Dist.: 335 (1984); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 58 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 5 (1989); Parmer in Shetty & Singh, Fl. Rajasthan 3: 869 (1993); Noltie, Fl. Bhutan 3(1): 139 (1994); A. Hay, Blumea Supplement 8: 17 (1995); Hajra & Verma, Fl. Sikkim 1: 186 (1996); Liu & Huang, Fl. Taiwan: 799-800 (1996); Pullaiah, Fl. Andra Pradesh 3: 1020-1021 (1997); A. Hay, Gard. Bull. Singapore 51: 19-22 (1999); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 67-87 (2002); Sarma & Sarkar in Singh & Rao, Fl. Palamau Dist. Jharkhand: 625-626 (2002); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez & Strong, Contr. U.S. Nat. Herb. 52: 23 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 31-32 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 77-78 (2010).

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Arum macrorrhizon. L., Sp. Pl. 965. (1753).

Arum indicum Lour., Fl. Cochinch. 536 (1790); Willdenow ed. 2: 655(1793); Roxb., Fl. Ind. ed. 2. 3: 498 (1832).

Colocasia indica (Lour.) Kunth, Enum. Pl. 3: 39 (1841).

Alocasia indica (Lour.) Spach, Hist. Nat. Veg. Phan. 12: 47 (1846); Prain, Beng. Pl. 2: 1111 (1903-reprint 1981); Krause in Engler, Pflanzenr. 71 (IV. 23E): 87 (1920); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1&2): 100 (1953); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 27-28 (1976); Deb, Fl. Tripura State 2: 395-396 (1983).

Lectotype: Sri Lanka. Hermann, Parad. Bat. t. 73 (1698).

Bengali/Local name: *Man Kachu*,
Fan Kachu.

English name: Giant Taro, Elephant Ear
Taro.

Very robust, evergreen herb, stem caulescent, 15-18 cm thick, edible. Leaves petiolate, petiole 0.5-1.2 m long, green, stout, sheathing in the lower third, leaf blade simple, not peltate, erect, broadly ovate, large, 60-120 × 50-65 cm, margin entire or subundulate, abruptly acute, bright green above, paler beneath, basal lobes rounded, incurved, 30 × 30 cm, veins very prominent on both sides of the blade. Inflorescences 2 or more in each axil, subtended by membranous cataphylls, peduncles usually shorter than the petioles, 15-30 cm long. Spathe constricted, up to 35 cm long, lower 3-5 cm long, convolute, persistent and green, upper part 20-30 cm long, cymbiform, narrowly oblong, cream-coloured and withering. Spadix sessile, almost equal or shorter than the spathe, basal pistillate portion 2.0-2.5 cm long, yellow, neuter portion 3.0-3.5 cm long, staminate portion 7-8 cm long, with an apical, sterile, tapering, cylindrical, 11.5-15.5 cm long appendix. Pistillate flowers naked, numerous, ovary more or less ovoid, unilocular, ovules orthotropous, style very short, stigma distinctly 3-4 lobed. Neuters many, cream-coloured. Staminate flowers numerous, dehiscence by apical pores. Fruits of ellipsoid berries, orange, about 6 mm long, 1-few seeded.

Flowering and fruiting period: July-October.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Village shrubberies, banks of flowing streams, low-lying marshy areas and shades of trees and plantations.

Distribution: Bangladesh, India through Southeast Asia and the Pacific Islands.

Specimens examined:

Barisal: East Narayanpur and Dostani village, 22.02.2008, Hosne Ara 2661 (DACB); Kashipur, Lakaotta, Hosne Ara 2716 (DACB).

Bogra: Beltola, 18.03.2001, B.M. Rezia Khatun 2877 (DACB); 06.02.2003, Hosne Ara & Rezia Khatun HA 156 (DACB); Dhunot upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2791 (DACB).

Bandarban: On the way of Betchari, 22.09.2004, Hosne Ara HA 1252 (DACB).

Chittagong: Chunati, 26.09.2005, Hosne Ara 2222 (DACB); Herbang, 26.09.2005, Hosne Ara 2268 (DACB); Baramashi, teastate area, on the way of Hazarikhil, 27.09.2005, Hosne Ara 2303 (DACB); Fatiqchari, 27.09.2005, Hosne Ara 2308 (DACB); Hathazari, Nandirkir, 27.09.2005, Hosne Ara 2316 (DACB); Chittagong University area, 28.09.2005, Hosne Ara 2334 (DACB); BCSIR Campus area, 28.09.2005, Hosne Ara 2344 (DACB); Bariadhala, 01.10.2005, Hosne Ara 2573 (DACB); Bara Kumira, 01.10.2005, Hosne Ara 2580 (DACB); Sitakundo, 01.10.2005, Hosne Ara 2593 (DACB); Mirsarai, 01.10.2005, Hosne Ara 2600 (DACB); Town area, 01.10.2005, Hosne Ara 2612 (DACB); Foiage lake area, 01.10.2005, Hosne Ara 2616 (DACB).

Comilla: Jashpur, 26.09.2004, Hosne Ara HA 1392 (DACB).

Cox's bazar: Ramu, 26.09.2005, Hosne Ara 2283 (DACB); Punnagram, 26.09.2005, Hosne Ara 2288 (DACB); Taknaf Game Reserve, Whykeon Range, Rhykong beat, 29.09.2005, Hosne Ara 2359 (DACB); Upper Rezu range, 29.09.2005, Hosne Ara 2403 (DACB); Chota Inani, 30.09.2005, Hosne Ara 2435 (DACB); Bara Inani, 30.09.2005, Hosne Ara 2465 (DACB); Swankhali, 30.09.2005, Hosne Ara 2502 (DACB); Himchari, 30.09.2005, Hosne Ara 2526 (DACB); Cox's bazar town area, 30.09.2005, Hosne Ara 2563 (DACB); Eidgah, 01.10.2005, Hosne Ara 2566 (DACB).

Dhaka: Khilgaon area, 15.04.1988, Hosne Ara 1 (DACB); 12.08.1990, Hosne Ara 16 (DACB); Malibagh Chowdhury para, 26.08.1999, Hosne Ara 40 (DACB); Bangladesh National Herbarium garden (Cultivated), 15.03.2009, Hosne Ara 2746 (DACB) [Originally collected from Khulna district]; Savar, 26.05.2012, Hosne Ara HA 2806a (DACB).

Dinajpur: Town area, 17.08.2005, Hosne Ara 2030 (DACB); Ramsagar, 17.08.2005, Hosne Ara 2065 (DACB); Kantazir, Mandir area, 18.08.2005, Hosne Ara HA 2106 (DACB); Near Birganj Sal forest, 18.08.2005, Hosne Ara HA 2128 (DACB); Near

Nawabganj Sal forest, 18.08.2005, Hosne Ara HA 2138 (DACB); Raniganj, 19.08.2005, Hosne Ara HA 2165 (DACB); Fultala, 19.08.2005, Hosne Ara HA 2174 (DACB).

Gazipur: Burulia village, 25.07.2004, Hosne Ara HA 1080 (DACB); Kaliakair, 19.08.2005, Hosne Ara HA 2206 (DACB).

Habiganj: Kalenga beat, Kalenga, 16.05.2005, Hosne Ara HA 1539 (DACB); Satchari, 17.05.2005, Hosne Ara HA 1585 (DACB); 07.07.2005, Hosne Ara HA 1868 (DACB).

Jessore: Jessore town area, 26.05.2012, Hosne Ara HA 2837 (DAVB).

Kharachari: Jamtoli, 12.07.2003, Hosne Ara & Sarder Nasir Uddin HA 490 (DACB); Narikal Begun College road, 12.07.2003, Hosne Ara HA 502 (DACB).

Kurigram: Singhimari village, 20.05.2013, Hosne Ara HA 2847 (DACB); Baruitari village, 24.08.2013, Hosne Ara HA 2854 (DACB).

Magura: Magura area, 26.05.2012, Hosne Ara HA 2830 (DACB).

Manikganj: Manikganj area, 26.05.2012, Hosne Ara HA 2815 (DACB).

Moulvibazar: Sreemongal, Lawachara, 15.05.2005, Hosne Ara HA 1475, 1495 (DACB); Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1622 (DACB); Muraichara, 19.05.2005, Hosne Ara HA 1673 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1720 (DACB); Gazipur beat, Hararganj reserve forest, 21.05.2005, Hosne Ara HA 1741 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1750 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1787 (DACB); Gazipur beat, Hararganj forest, 05.07.2005, Hosne Ara HA 1805 (DACB); Madhabkundo, 06.07.2005, Hosne Ara HA 1827(a) (DACB); Muraichara beat, Awolachara punji, 07.05.2010, Hosne Ara 2766 (DACB); Town area, Hosne Ara 2770 (DACB).

Mymensingh: Haluaghat thana, Koroitoli, 20.06.2004, Hosne Ara HA 908 (DACB).

Narayanganj: Sonargaon, 07.7.2005, Hosne Ara HA 1911 (DACB).

Narsingdi: Narsingdi Sadar, 07.07.2005, Hosne Ara HA 1881 (DACB).

Netrakona: Durgapur thana, Bijoypur, 16.06.2004, Hosne Ara HA 753 (DACB); Attrakhali, 17.06.2004, Hosne Ara HA 780 (DACB); Durgapur thana, Vabanipur,

18.06.2004, Hosne Ara HA 849 (DACB); Farangpara, 18.06.2004, Hosne Ara HA 868 (DACB).

Patuakhali: Kalapara, Dhankhali, 12.03.1999, M. Sultana 336 (DUSH); Patuakhali Sadar, Lobalia, 18.11.2004, M. Sultana 479 (DUSH); Galachipa, Basbunia, 01.03.2005, M. Sultana 670 (DUSH); Kalapara, Kuakata, 08.01.2006, M. Sultana 1065 (DUSH); Bauphal, Bogha 03.06.2006, M. Sultana 1378 (DUSH); Dasmina, Ranggopaldi, 02.02.2007, M. Sultana 1553 (DUSH).

Panchagarh: Banglabanda, Tetulia upazilla, 17.08.2005, Hosne Ara 1978 (DACB).

Rajbari: Rajbari area, 26.05.2012, Hosne Ara HA 2820 (DACB).

Rangamati: Tourist spot, Hanging bridge area, 18.09.2004, Hosne Ara HA 1091 (DACB); Rangamati, DC Bangloo area, 20.09.2004, Hosne Ara HA 1159 (DACB).

Sherpur: Rangtia range, Samaschura beat, 10.10.2003, Hosne Ara 699 (DACB); Rangtia range, Gazni beat, 21.06.2004, Hosne Ara HA 923 (DACB).

Sirajganj: Kazipur upazilla to Charkhadah village, 18.03.2011, Hosne Ara HA 2782 (DACB).

Sunamganj: Town area, 06.06.1998, Hosne Ara HA 40 (DACB).

Sylhet: Locality, Collection date, year & number unknown, J.D. Hooker & Thomson (K).

Tangail: Mirzapur, 19.08.2005, Hosne Ara HA 2194 (DACB); Modupur, Dokhola, 06.10.2003, Hosne Ara HA 547 (DACB).

Thakurgaon: Dharmagar, 17.08.2005, Hosne Ara HA 2008 (DACB).

Economic uses/values/harmful aspects: *Mankachu* is used as a vegetable for its large edible tuber. It is commercially cultivated in some places of Barisal, Patuakhali, Jessore and Khulna districts of Bangladesh. It is also cultivated for its ornamental and medicinal values. Leaf juice is astringent and is used against tumours and insect stings. Tuber is used in rheumatism, anasarca, jaundice, leprosy and diseases of the abdomen and spleen. It also acts as a mild laxative and diuretic. Ash obtained by burning the tuber is applied in a thin layer to cure lacerations and infections of the tongue and the mouth (Ghani, 2003).

Ethnobotanical information: In Chapai Nawabganj district, people insert an infected finger inside the petiole of the plant for about a day as a cure for infection.

16. *Alocasia navicularis* K. Koch & Bouche' in Index Seminum. Hort. Berol. 1855 (App.): 2 (1855). Hook. f., Fl. Brit. India 6: 527 (1893-reprint 1954); Krause in Engler, Pflanzenr. 71 (IV. 23E): 92 (1920); Mitra, Fl. Pl. E. India 1: 79 (1958); Hu, Dansk Bot. Arkiv 23(4): 432-433 (1968); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 27-29 (1976); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 6 (1989); Hajra & Verma, Fl. Sikkim 1: 186 (1996); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 68 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 32 (2007). **Photo 12 (Page no. 186).**

Colocasia navicularis K. Koch *et* Bouche' in Index Seminum. Hort. Berol. 1853. App. 3, 1853; *et* in Ann. Sci. Nat. Paris 4, 1: 338 (1854).

Type: Khasia (Hooker f. *et* Thomson-Herb. Berlin).

Bengali / Local name: *Ban Kachu*.

English name: Not known.

A herb with a stout caudex, up to 1.5 m long, evergreen, erect to decumbent. Leaves simple, several together, 22-43 × 12-24 cm, distinctly peltate, broadly oblong sagittate, narrowed opposite the basal lobes, pale green, apical lobe cuspidate, with 3-4 pairs of lateral nerves, sinus 10-15 cm long, basal lobes triangular, diverging, about half as long as the apical lobe, connate for about one-fourth to half its length, petiole up to 1.5 m long. Peduncle shorter than the petiole, 15-25 cm long, 1.0-1.5 cm broad. Spathe 11-20 cm long, strongly constricted between the tube and the limb, tube green, 4-5 cm long, ovoid-globose, shorter than the blade, persistent, limb 7-10 × 4-5 cm, cymbiform, cuspidate, dark yellow. Spadix shorter than the spathe, shortly stipitate, 9.5-13.0 cm long, male and female zones separated by a 2-3 cm long neuter zone, male zone c 2 cm long, female zone 1.5-2.5 cm long, appendage conoid, sinuously sulcate, white, 4.0-5.5 cm long. Ovaries ovoid, green, c 3 mm in diameter, ovules 4 or 5, on the basal placentation, style very short, stigma sessile, 3 or 4 lobed, lobes blunt. Fruiting spathe ellipsoid, 5-11 cm. Fruit dark red while ripening, ellipsoid, c 10 × 6 mm.

(Photo 11) 186

Flowering and fruiting period: June-August.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Shady and moist areas at foothills.

Distribution: Bangladesh, Northeastern India and eastwards to northern Thailand.

Specimen examined:

Moulvibazar: Kulaura, Gazipur beat, Hararganj reserve forest, 06.07.2002, Hosne Ara & Sarder Nasir Uddin HA 118 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 31 (2): 135-137, 2002).

17. *Alocasia odora* (Roxb.) K. Koch, Ind. Seminum Hort. Berol. 1854 (App.): 5 (1854). Krause in Engler, Pflanzenr. 71 (IV. 23E): 90 (1920); Haines, Bot. Bihar and Orissa: 869-870 (1924-reprint 1978); Hotta, Mem. Fac. Sci. Kyoto Imp. Univ., Ser. Boil. 4: 94-95 (1970); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 27-28 (1976); Graf, Exotica, edn. 8: 125 (1976); Tropical, edn. 5: 937 (1978-reprint 2003); Deb, Fl. Tripura State 2: 396 (1983); Walters *et al.*, European Gard. Fl. 2 (2): 101-102 (1984-reprint 2003); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 6 (1989); Noltie, Fl. Bhutan 3(1): 139 (1994); Hajra & Verma, Fl. Sikkim 1: 186 (1996); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 69 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 32-33 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 76-77 (2010). **Photo 13 (Page no. 189).**

Arum odorum Roxb. Fl. Ind. 3: 499 (1832).

Alocasia tonkinensis Engl., Krause in Engler
Pflanzenr. 71 (IV. 23E): 91 (1920).

Type: Silhet (Wallich no. 420-Herb. Kew).

Bengali / Local name: *Bara Jongle Kachu*.

English name: Not known.

Large evergreen perennial herb, above-ground stem stout, erect to decumbent, 0.3-1.0 m high, 5-15 cm thick, unbranched, base with stolons. Leaves simple, several together, coriaceous, distinctly peltate, broadly ovate, cordate, 50-130 × 40-100 cm, bright green, apical lobe short acuminate at the apex, with a stout midrib, margins undulate and with 5-12 pairs of lateral nerves, basal lobes broadly ovate, very much rounded in outline, petioles stout, up to 1 m (or more) long. Peduncles 2-3 together, cylindrical, green, 12-35 cm long. Spathe constricted, 13-25 cm long, tube inrolled, green, ovoid, 3-5 cm long, limb initially inrolled, afterwards during anthesis navicular, coriaceous, cymbiform, cuspidate, 10-20 × 4-5 cm, pale green or greenish white. Spadix shorter than spathe, shortly stipitate, white, fragrant, male and female floriferous zones separated by a 2.5-4.0 cm long neuter zone. Female zone 1-2 × c 1.5 cm; ovary pale green, c 3 mm in diameter, stigma sessile, weakly 3-lobed. Male zone whitish, cylindrical, 3-5 × c 2 cm; synandria rhombic-hexagonal, c 1.5 mm in diam.; appendix white, narrowly conoid, sinuous, c 3.0-5.5 × 1-2 cm, markedly thicker than male zone at base, slowly tapering toward apex. Fruit a berry, ovoid, red, c 1 cm long, seeds 1-2.

Flowering and fruiting period: January-December.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Shady and moist places in forests and village thickets.

Distribution: Bangladesh, Assam and Meghalaya of eastern India.

Specimens examined:

Bogra: Beltola, 06.02.2003, Hosne Ara & Rezia Khatun HA 153 (DACB).

Mymensingh: Mymensingh, Khalbola, Ishwarganj, 17.02.2003, Hosne Ara & Ruhul Amin Fakir HA 161 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 25.02.2008, Hosne Ara HA 2730 (DACB); 27.04.2008, Hosne Ara HA 2741 (DACB) [Originally collected from Khalbola, Ishwarganj under Mymensingh district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: The rhizomes of the plant possess medicinal value in curing stomach ache, abdominal pain, cholera and hemia. The same is crushed into a

(Photo 13) 189

paste and applied externally on the human body to cure abscesses and insect or snake bites (Heng, 1979). The plant is used for medicinal purposes by the village people of Bangladesh.

18. *Alocasia portei* Schott, *Bonplandia* 10: 148 (1862). Walters *et al.*, *European Gard. Fl.* 2(2): 102 (1984-reprint 2003); Burnett, *Aroideana* 7 (3 & 4): 126-127 (1984); A. Hay, *Gard. Bull. Singapore* 51: 25-27 (1999); Govaerts & Frodin, *World Checkl. Bibliog. Araceae*: 69 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 33-34 (2007). **Photo v (Page no. 98).**

Schizocasia portei (Schott) Engl., in Beccari, *Malesia* 1: 295 (1883); Krause in Engler, *Pflanzenr.* 71 (IV. 23E): 117 (1920).

Schizocasia regnieri L. Linden & Rodigas, *III. Hort.* 34: 17 (1887).

Neotype: Schott *Icones* no. 3085.

Bengali / Local name: *Bahari Kachu*.

English name: Not known.

Massive arborescent herb, 6 m tall, stem erect, 40 cm in diameter at the base (thickening with age), distally to c 15 cm in diameter, older parts developing tessellated 'bark'. Leaves several together, more or less erect, petiole 1.5 m long, chocolate, sheathing in the lower third, blade sagittate and deeply pinnatifid, dark bright green, coriaceous, anterior lobe 1.5 m long, with up to 10 linear-lanceolate, round-tipped segments, margins strongly crisped, primary veins prominent below. Inflorescences in numerous pairs clustered in the centre of the leaf crown, subtended by a conspicuous brown-mottled, lanceolate cataphylls. Peduncle 30 cm long. Spathe 40 cm long, lower part subcylindric, dark brownish-green, 5 cm long, limb linear to oblong-lanceolate, at first erect and canoe-shaped and cucullate, thence reflexed at the constriction, pale brownish, mottled and streaked chocolate-brown, membranous. Spadix somewhat shorter than the spathe, 32 cm long, female zone sessile, 4.0 × 1.5 cm, ovaries sub-globose, c 2.5 mm in diameter, style very short, stigma weakly lobed. Sterile interstice c 2 cm long, narrowed, corresponding with spathe constriction,

white. Male zone whitish, 8.0×1.5 cm, cylindrical, synandria rhombo-hexagonal, 1.2 mm in diameter (dry). Appendix basally slightly thicker than the male zone, the subcylindrical and distally tapering fruiting spathe ovoid, c 10×5 cm.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Secondary forests at low to medium elevations.

Distribution: Bangladesh, Endemic to the Philippines (Hay, 1999).

Specimens examined:

Dhaka : Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1441 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, it is commonly planted both in public places and homesteads.

Ethnobotanical information: Not known.

19. *Alocasia salarkhanii* H. Ara & M.A. Hassan, sp. nov. Photo 14 (Page no. 194).

Alocasia salarkhanii H. Ara & M.A. Hassan is closely related to *Alocasia fornicata* (Roxb.) Schott but can be easily differentiated by (i) petiole and peduncle colour, (ii) number of inflorescences, (iii) base of appendix and (iv) chromosome structure.

Holotype: Bangladesh, Moulvibazar district, Lawachara reserve forest, 15.05.20005, Hosne Ara HA 1467 (DACB).

Bengali / Local name: Not available.

English name: Not known.

Small to moderately robust herb, stem erect to decumbent, to 3-4 cm in diameter; to over c 60 cm long, clothed in the brown remains of old leaf bases. Leaves several together, held almost erect or slightly curved; petiole 35-52 cm long, sheathing c1/3 from the base of petiole, eglandular, deep purple, wings of the sheath out-rolled; blade hastato-sagittate, rather narrowly triangular, the margin entire to slightly undulate, glossy, leathery, dark green, glabrous adaxially, pale green and pubescent abaxially, 31-51 cm long, 14.0-21.5 cm in diameter at the base; anterior lobes 18-33 cm long with apiculate tip 0.6-1.0 cm long; anterior costa prominent on both surfaces, glabrous

on both surfaces, primary veins 6 on each side, prominent on both surfaces, diversing at 45° - 90° , secondary venation flush on both surfaces, mostly arising from the primary veins at a wide angle then sooner or later deflected towards the margin, forming variously well-defined interprimary collective veins or these absent, interprimary collective veins when present weakly undulating to strongly zig-zagging at broad acute angles; submarginal vein 0.8-1 cm from the margin; glands in the axils of primary veins absent or extremely inconspicuous; posterior lobes 13-18 cm long, acute, peltate for 2.3-3.0 cm; posterior costae straight to incurved. Inflorescences 3 in the center of the leaf crown, bloom one after another, subtended by a cataphyll, cataphyll up to 25 cm long, purple; peduncle deep purple; smooth, 26-31 cm long, 0.7-1.3 cm in diameter at the base. Spathe ca. 15 cm long; lower spathe convolute, c 4.2 cm long, green; limb c 11.7 cm long, c 4.8 cm in diameter, light yellowish with violet or pink mixed on both sides. Spadix shorter than spathe, c 11.5 cm long, lower fertile female zone c 1 cm long, sterile female zone ca. 0.5 cm long, c 1.3 cm in diameter, at the base; pistils closely packed; ovary sub-globose, green, 2 x 2 mm, unilocular, with basal placenta; style distinct, stout, c 0.5 mm long, c 0.8 mm in diameter, light yellow; stigma 3-4 lobed, lobes acute, light yellow more or less spreading; sterile interstice c 2 cm long, narrower than the fertile zones, corresponding with the spathe constriction; lower synandrodia often with incompletely connate staminodes, the rest elongate rhombo-hexagonal, flat-topped; male zone cylindrical, somewhat tapered at the base, c 2.3 cm long, c 0.8 cm thick, ivory in colour; synandria more or less hexagonal, c 2 mm in diameter, androus; appendix c 3.5 cm long, ca. 0.8 cm thick at the middle, about the same thickness at the male zone, gradually tapering to a pointed tip, cream coloured. Fruiting peduncle 33-35 cm long, fruiting spathe ovoid, 4-6 cm long; fruit orange-red.

Flowering and fruiting period: May-August.

Chromosome number: $2n = 28$ (Afroz *et al.* 2013).

Habitat: Grows on the hilly area as under growth.

Distribution: North-Eastern part of Bangladesh, Moulvibazar district (within greater Sylhet).

Specimens examined:

Moulvibazar: Lawachara reserve forest, 15.05. 2005, Hosne Ara HA 1467 (DACB); 04.07.2005, Hosne Ara HA 1781 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 07.05.2006, Hosne Ara HA 2630 (DACB); Bangladesh National Herbarium garden (Cultivated), 30.05.2006, Hosne Ara HA 2651 (DACB)[Originally collected from Lawachara reserve forest under Moulvibazar districts].

Economic uses/values/hamful aspect: Not Known.

Ethnobotanical information: Not Known.

Etymology: It is named in honour of Dr. Md. Salar Khan, father of plant taxonomy in Bangladesh.

The major morphological and cytological differences between two taxa of *Alocasia* (Schott) G. Don are outlined in Table-6.2.

Table 6.2. **Morphological and Cytological comparison of *Alocasia salarkhanii* H. Ara & M.A. Hassan, sp. nov. with *Alocasia fornicata* (Roxb.) Schott**

Characters	<i>Alocasia salarkhanii</i> H. Ara & M.A. Hassan	<i>Alocasia fornicata</i> (Roxb.) Schott
Petiole & peduncle	deep purple	green
Leaf blade	long elliptic	hastate
Inflorescence	in groups of up to 3	in groups of 12, up to 25
Style	c 0.5 mm long	c 1.0 mm long
Male zone	c 2.3 cm long	1.5-1.8 cm long
Appendix	base of the appendix equal to the male zone	base of the appendix wider than the male zone
Chromosome number	28 (22m+6sm)	28 (18m+10sm)
CMA and DAPI	CMA-band and DAPI band absent one CMA-positive satellite present	CMA-band and DAPI band present no CMA-positive satellite present

m = metacentric chromosome, sm = submetacentric chromosome.

(Photo 14) 194

20. *Alocasia sanderiana* W. Bull, Retail List: 11 (1884). Merr., Fl. Manila: 132 (1912); Krause in Engler, Pflanzenr. 71 (IV. 23E): 104 (1920); Bailey, Manual Cult. Pl.: 189-190 (1949); Birdsey, Cultivat. Aroid.: 27 (1951); Graf, Exotica, edn. 8: 127 (1976); Tropica, edn. 5: 88, 937 (1978-reprint 2003); Burnett, Aroideana 7 (3 & 4): 100-102 (1984); Walters *et al.*, European Gard. Fl. 2(2): 102 (1984-reprint 2003); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 70 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 34-35 (2007). **Photo vi (Page no. 98).**

Schizocasia sanderiana (W. Bull) Engl., Bot. Jahrb.
Syst. 25: 26 (1898).

Type: W. Bull, Retail List (1884) un-numbered, fig. P. 3 (sterile).

Bengali / Local name: *Bahari Kachu*.

English name: Kris Plant.

A moderately robust, c 60 cm tall herb, stem decumbent to creeping, 15 × 2 cm. Leaves solitary to few together, interspersed with cataphylls, cataphylls papery, narrowly lanceolate, petiole up to 60 cm long, sheathing in the lower one-fifth to a quarter, blade sagittate, upper surface deep glossy green, lower surface purple, deeply undulate to sub-pinnatifid, anterior lobe up to 24 cm long, primary veins and costae white to yellowish, secondary veins emerging from the primary at a wide angle. Inflorescence mostly paired. Peduncle slender, 14-18 cm long. Spathe 6-10 cm long, lower part 1.5-2.0 cm long, ovoid, limb 4-8 cm long, more or less canoe-shaped. Spadix somewhat shorter than half the length of the spathe, stipitate for 5 mm, female zone 1 cm long, ovaries c 2 cm in diameter, sub-globose, stigma sessile, sharply 3-4 lobed. Sterile interstice corresponding to the spathe constriction, 5 mm long, tapering distally. Male zone c 1.2 cm long, 4-5 mm thick (dry), synandria rhombo-hexagonal. Appendix short, equalling the male zone.

Flowering and fruiting period: June-August.

Chromosome number: 2n=28 (Petersen, 1989).

Habitat: Partially shady and damp places.

Distribution: Bangladesh, Endemic to the Philippines (Hay, 1999).

Specimen examined:

Dhaka : Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1442 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

3. Genus: **Amorphophallus** Blume *ex* Decaisne in Nouv.

Ann. Mus. Hist. Nat. 3: 366 (1834), *nom. cons.*

Type species: *A. campanulatus* Decaisne (= *A. paeoniifolius* (Dennstedt) Nicolson).

Seasonally dormant or rarely semi-evergreen herbs, tuber usually globose, depressed-globose, sometimes irregularly elongate-cylindric, napiform or carrot-shaped, rarely rhizomatous or stoloniferous. Leaf usually solitary, rarely paired or several, petiole stout, long, sheath very short, blade divided into 3 segments, segments commonly once to several times pinnately divided into leaflets, secondary veins of leaflets diverging obliquely from midrib, sometimes bulbils present at the junction of divisions. Inflorescence solitary, subtended by a membranous cataphylls, usually flowering without leaves, rarely with the leaves, peduncle short or long, similar to the petiole. Spathe variously coloured, marcescent and finally deciduous, boat-shaped, clearly differentiated into the tube and the blade, sometimes constricted between them. Spadix sessile or shortly stipitate. Female zone cylindrical, shorter, equalling or longer than the male zone, male zone usually contiguous with the female, sometimes separated by a sterile zone, terminal appendix usually present, rarely absent or reduced to a stub, very variable in shape, surface smooth, rugulose, or with distinct, variously-shaped staminodes, often only at the base, apex acute or obtuse, inside a narrow canal or a large cavity. Flowers unisexual, perigone absent. Male flower 1-6 androus, pores apical, rarely lateral or subterminal. Female flowers consisting of one pistil, ovary sessile or shortly stipitate, 1 ovule per locule, basifixed, or rarely axillary about halfway up the ovary, style present or absent, stigma terminal or rarely subterminal, concave or flattened, during anthesis covered with a sticky fluid. Fruit a

berry, sometimes very large, 1-few seeded, orange-red, white and yellow, rarely blue. Seed globose, sub-globose, ovoid or ellipsoid, testa smooth, thin.

About 170 species is distributed throughout tropical Africa, Madagascar, tropical Asia, Malay Archipelago, Melanesia and Australasia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 7 species.

Key to the species

- | | | |
|----|---|-----------------------|
| 1. | Leaves bulbiferous at the forks | 2 |
| - | Leaves not bulbiferous at the forks | 3 |
| 2. | Corms globose, 5-10 cm broad, brown, warty | bulbifer |
| - | Tuber elongate, usually unbranched, about 12 cm long | longituberosus |
| 3. | Spathe broad campanulate | paeoniifolius |
| - | Spathe not broad campanulate | 4 |
| 4. | Tip of the spadix covered with sterile flowers | margaritifera |
| - | Tip of the spadix naked forming a sterile appendix | 5 |
| 5. | Spadix appendix tuberculate, yellow | napalensis |
| - | Spadix appendix smooth, whitish | 6 |
| 6. | Spathe ovate-lanceolate, acuminate, a few staminode present at the base of appendix | krausei |
| - | Spathe erect, cymbiform, staminode not present at the base of appendix | excentricus |

21. *Amorphophallus bulbifer* (Sims) Blume in Rumphia 1: 148 (1837). Kunth, Enum. Pl. 3: 34 (1841); Hook. f., Fl. Brit. India 6: 515 (1893-reprint 1954); Prain,

Beng. Pl. 2: 1110 (1903-reprint 1981); Cooke, Fl. Pres. Bombay: 825 (1908); Engler, Pflanzendr. 48 (IV. 23C): 98 (1911); Haines, Bot. Bihar and Orissa: 862 (1924-reprint 1978); Heinig, List Chittagong: 74 (1925); Fischer in Gamble, Fl. Pres. Madras: 1587 (1931), repr. ed. 3: 1106 (1967); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 26-27 (1931); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 100 (1953); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Mitra, Fl. Pl. E. India 1: 75 (1958); Spring, Fl. Sikkim Himal.: 394(1966); Hara, Fl. Eastern Himalaya: 394 (1966); Nicolson in Saldanha & Nicolson, Fl. Hassan Dist.: 783 (1976); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 20-22 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 88 (1978); Graf, Tropica, edn. 5: 939-940 (1978-reprint 2003); Bennet, Fl. Howrah Dist.: 93 (1979); Deb, Fl. Tripura State 2: 397 (1983); Balakrishnan, Fl. Jowai 2: 562 (1983); Bakshi, Fl. Murshidabad Dist.: 336 (1984); Sharma *et al.*, Fl. Karnataka: 296 (1984); Mukherjee, Fl. Pachmarhi & Bori Reserves: 312 (1984); Walters *et al.*, European Gard. Fl. 2 (2): 89-90 (1984-reprint 2003); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 6 (1989); Henry *et al.*, Fl. Tamil Nadu, ser. 1, 3: 55 (1989); Vajravelu, Fl. Palghat Dist.: 531 (1990); Roy *et al.*, Fl. Madhya Pradesh: 449 (1992); Noltie, Fl. Bhutan 3(1): 132 (1994); Saxena & Brahmam, Fl. Orissa 4: 2034 (1996); Hajra & Verma, Fl. Sikkim 1: 186 (1996); Pullaiah, Fl. Andhra Pradesh 3: 1022 (1997); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 35-36 (2007). **Photo 15 (Page no. 203).**

Arum bulbiferum Roxb. [Hort. Beng. 65 (1814), *nom. nud.*] *ex* Sims, Curtis's Bot. Mag. 46: t. 2072 (1819), *Ibid.* 51: t. 2508 (1824); Roxb., Fl. Ind. 3: 510 (1832); Wight, Icon. Pl. Ind. Or. 3: 783 (1844).

Pythonium bulbiferum (Sims) Schott in Schott & Endl., Melet. Bot. 18 (1832).

Conophallus bulbifer (Sims) Schott, Syn. Aroid.: 34 (1856).

Conophallus tuberculiger Schott, Bonplandia 7: 28 (1856).

Amorphophallus tuberculiger (Schott) Engl. in DC., Monogr. Phan. 2: 317 (1879); Hook. f., Fl. Brit. India 6: 517 (1893).

Amorphophallus bulbifer var. *marmoratus* Engl., Pflanzenr. 48 (IV. 23C): 99 (1911); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 6 (1989).

Amorphophallus bulbifer var. *atroviridimaculatus* Engl., Pflanzenr. 48 (IV. 23C): 99 (1911).

Amorphophallus bulbifer var. *tuberculiger* (Schott) Engl., Pflanzenr. 48 (IV. 23C): 99 (1911); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 6 (1989).

Type: Illustration of *Arum bulbiferum*, t. 2072, Published by Sims in Bot. Mag. Vol. 46 (1819).

Bengali / Local names: *Amla-bela*, *Jongle Ol*. English name: Voodoo Lily.

Corms globose, 5-10 cm in diameter, brown, warty. Leaf solitary, petiole 30-120 cm long, 2-5 cm in diameter, smooth, greenish or pinkish-white or mauve, with deep green or greenish-brown stripes or blotches, a bulbil arises at the junction of the three petiolules (initially it appears as a convex point), more bulbils arise at other intersections and rarely along the main veins above on the leaflets, lamina 30-50 cm in diameter, tripartite, the lateral parts sometimes again bifurcating, all ultimately divided into oblong-obovate, acuminate, 5-20 cm long decurrent lobes, margins with a translucent pink colouration, especially when young, conspicuously pinnately veined and with sub-marginal veins. Peduncle 13-50 cm long, 1-2 cm in diameter, coloured like the petiole. Spathe convolute at the base, spreading above into an ovate, obtuse limb, 8-30 cm long, 5-22 cm broad, outside pale pink-mauve with green blotches, inside pale pink-mauve with numerous red papillae towards the base, upper portion yellowish-cream in colour, ultimately reflexed. Spadix usually longer or shorter than the spathe, stipitate for 5-8 mm, female floriferous zone 1.5-5.0 × 1.2-2.0 cm, male floriferous zone cylindrical, 2.5-7.0 × 1.5-3.5 cm, appendage oblong or narrowly conoid, obtuse, 4-14 × 2.0-3.5 cm, flesh-coloured. Pistillate flowers numerous, ovary sub-globose, 1-2 locular with 1 ovule in each locule, stigma very short-styled, discoid, inconspicuously 2-3 lobed, anthers sessile, dehiscence by the apical pores. Fruit a berry, usually 1-seeded.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 26, 36, 39$ (Petersen, 1989).

Habitat: Shady and moist areas of hill slopes and foothills of the forest.

Distribution: Bangladesh, India (Sikkim and Khasia Hills) and Myanmar.

Specimens examined:

Bandarban: On the way of Betchari, 22.09.2004, Hosne Ara HA 1219, 1220 (DACB).

Chittagong: Chittagong, Oct. 1940, S.K. Sen, N.L. Pal & R. Khan (DUSH); Ichamak, 20.09.1986, Alam 5651 (FRIH); Baramashi tea state area, on the way of Hazarikil, 27.09.2005, Hosne Ara HA 2305 (DACB); Fatiqchari, 27.09.2005, Hosne Ara HA 2307 (DACB); Sitakundo, 01.10.2005, Hosne Ara HA 2595 (DACB); Mirsarai, 01.10.2005, Hosne Ara HA 2604 (DACB); Town area, 01.10.2005, Hosne Ara HA 2611 (DACB); Foliage lake area, 01.10.2005, Hosne Ara HA 2615 (DACB).

Comilla: Dargatilla, 26.09.2004, Hosne Ara HA 1417 (DACB).

Cox's Bazar: Signal Hill and Kelatali, 08.10.1943, Sinclare (E 00075390), Jilamja, 14.05.1945, Sinclare 4314 (E 00075389); Teknaf, 23.10.1963, Khan 723 (DUSH); Teknaf Game Reserve, Whykeon Range, Rhykong beat, 29.09.2005, Hosne Ara HA 2357 (DACB); Chota Inani, 30.09.2005, Hosne Ara HA 2434 (DACB); Bara Inani, 30.09.2005, Hosne Ara HA 2463 (DACB); Swankhali, 30.09.2005, Hosne Ara HA 2506 (DACB); Himchari, 30.09.2005, Hosne Ara HA 2527 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 30.05.2006, Hosne Ara HA 2630 (DACB) [Originally collected from Kawargola forest under Moulvibazar district].

Dinajpur: Singra forest, 18.08.2005, Hosne Ara HA 2074 (DACB).

Habiganj: Kalenga beat, Kalenga, 05.05.2003, Hosne Ara HA 275, 276, 277, 278, 280 (DACB); 06.05.2003, Hosne Ara HA 306, 307, 308 (DACB); Kalengi beat, 17.08.2004, Hosne Ara HA 1087, 1088 (DACB); Kalenga beat, Kalenga, 16.05.2005, Hosne Ara HA 1530, 1531, 1532, 1533, 1535, 1543, 1544, 1545 (DACB); Satchari forest 17.05.2005, Hosne Ara HA 1579, 1580, 1581 (DACB).

Khagrachari : Dighinala, Bagaichari, Marisha road, 30.08.1997, Rahman *et al.* 1882 (HCU), Matiranga, Muslimpara, 29.08.1998, Rahman *et al.* 1842 (HCU); Matiranga, 11.07.2003, Hosne Ara & Sarder Nasir Uddin HA 451, 452, 453, 454, 455, 456, 457, 458 (DACB); Allutilla, 11.07.2003, Hosne Ara & Sarder Nasir Uddin HA 474, 475, 476, 477 (DACB).

Moulvibazar: Madhabkundo, 05.07.2002, Hosne Ara & Sarder Nasir Uddin HA 89, 90 (DACB); Lawachara reserve forest, 02.05.2003, Hosne Ara HA 200 (DACB); Adampur beat, Kawargola forest, 03.05.2003, Hosne Ara HA 237, 238, 239, 240, 241, 242, 243, 244, 245 (DACB); Madhabkundo, 04.05.2003, Hosne Ara HA 269, 270 (DACB); Adampur beat, 17.08.2004, Hosne Ara HA 1089 (DACB); Sreemongal, Lawachara reserve forest, 15.05.2005, Hosne Ara HA 1482, 1483, 1484, 1485 (DACB); Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1630, 1632, 1631, 1633 (DACB); Muraichara, 19.05.2005, Hosne Ara HA 1679 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1716 (DACB); Hararganj reserve forest, Gazipur, 21.05.2005, Hosne Ara HA 1734 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1748, 1768 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1774 (DACB); Madhabkundo, 06.07.2005, Hosne Ara HA 1840, 1841, 1842 (DACB); Satchari forest area, 07.07.2005, Hosne Ara HA 1863 (DACB); Adampur beat, Kawargola forest, 06.10.2005, Hosne Ara HA 2621 (DACB).

Netrakona: Durgapur thana, Bijoypur, 16.06.2004, Hosne Ara HA 748, 749, 750 (DACB).

Panchagarh: Dabiganj, Bak dur jhula, 01.07.1998, Mia, Nasir, Mosharaf & Haroon M 3984 (DACB).

Rangamati: Kaptai, Sitapahar, Jamaichari, 25.10.1995, Mohiuddin & Mezanul 7544 (FRIH); Kaptai, Sitapahar, 16.06.2001, Sarder Nasir Uddin N 1021 (DACB); Kaptai, Sitapahar, Sitarghat, 24.09.2002, Sarder Nasir Uddin N 1522 (DACB); Kaptai, Bangchhari, 06.07.2003, Hosne Ara & Sarder Nasir Uddin HA 318, 319, 320, 321, 322, 323, 324, 325 (DACB); Kaptai, Rampahar, 07.07.2003, Hosne Ara & Sarder Nasir Uddin HA 351, 353, 354, 355, 356, 357, 358 (DACB); Kaptai, Shilsori village, Velbapara, 08.07.2003, Hosne Ara & Sarder Nasir Uddin HA 384, 385, 386, 387, 388, 389 (DACB); Kaptai, Shilsori, 09.07.2003, Hosne Ara & Sarder Nasir Uddin HA

439, 440, 441, 442 (DACB); Pharua Reserve forest, Bilaichari, 21.07.2009, Sarder Nasir Uddin N 3740 (DACB).

Sherpur: Gajni forest, 06.05.1982, Mia *et al.* M 787 (DACB); Rangtia Range, Samaschura beat, 10.10.2003, Hosne Ara HA 647, 685, 686 (DACB); Rangtia range, Gazni beat, 21.06.2004, Hosne Ara HA 920 (DACB); Jhenaigati thana, Rangtia hill, 22.06.2004, Hosne Ara HA 1027, 1031 (DACB); Gazni, 28.10.2007, Ershad Tutul 300 (DUSH); Runctia, 31.10.2009, M. Khatun 539 (DUSH).

Thakurgoan: Sadar thana, Debipur, 08.08.1998, Khan, Haroon, Nasir & Zashim K 10095 (DACB).

Economic uses/values/harmful aspects: The petiole and young leaves are used as a vegetable by the indigenous and local people.

Ethnobotanical information: The juice extracted from the leaf and petiole of the plant is applied externally as a medicine to cure warts of the human body.

22. *Amorphophallus excentricus* Hett., Blumea 39 (1-2): 254-257 (1994). Hetterscheid and Ittenbach, Aroideana 19: 67 (1996). **Photo 16 (Page no. 203).**

Type: Hetterscheid H. AM. 154-T (L holo; spirit coll.), 19-viii-1992, cult. Hort. Bot. Leiden *ex* Thailand.

Bengali / Local names: *Ban Ol Kachu*.

English name : Not Known.

Tuber subglobose, c 11 cm in diameter and c 11 cm in high. Leaf solitary; petiole c 120 cm long and c 4 cm in diameter at base and tapering towards the tip, smooth, creamy with bottle green mottlings and paler towards the tip. Lamina c 65 cm in diameter, leaflets elliptic-lanceolate, acuminate, 2-20 cm long, 2-5 cm in diameter, marginal surface slightly undulate, dark green above and paler below. Peduncle 98 cm long, 2.5 cm in diameter, smooth, cream with bottle green mottlings, covered by cataphylls. Cataphyll c 23 cm long, c 7 cm in diameter Spathe erect, cymbiform, not differentiate into tube and limb, c 33 cm long, c 10.5 cm in diameter at base, cream colour small wart at the base. Spadix shorter than spathe, c 29.5 cm long; female flowers below in a zone, cylindrical, c 4 cm long, c 2 cm in diameter; no sterile region

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between male and female zone. Male flowers in a zone c 8 cm long, c 2 cm in diameter; appendix elongate, smooth, top acute or slightly rounded, base constricted, staminode absent at the base of appendix, c 17 cm long, c 3 cm in diameter, at the middle, tapering towards the tip, light yellow. Ovary sub-globose, c 1 mm long, c 2 mm in diameter, greenish, unilocular with a single basal anatropous ovule; style very short, 0.5 mm long; stigma 1.5-2.5 mm in diameter, 0.5-1 mm high, inconspicuously 4-lobed with a bigger medium lobe, yellowish to brownish in colour. Male flowers pale yellowish, consisting of 3-5 stamens; stamens 2 mm long and 1.5 mm in diameter, anthers truncate.

Flowering period: June.

Chromosome number: Not known.

Habitat: Grows in shady places of forest.

Distribution: Bangladesh, Peninsular Thailand.

Specimens examined:

Moulvibazar: Madhabkundo forest, 05.06.1998, Hosne Ara HA 35 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 26.06.2004, Hosne Ara HA 1075 (DACB) [Originally collected from Madhabkundo forest under Moulvibazar district].

Economic uses/values/hermful aspect: Not available.

Ethnobotanical information: Not available.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 19 (1): 17-23, 2012).

23. *Amorphophallus krausei* Engl., Engler, Pflanzenr. 48 (IV. 23 C): 94 (1911). Hettterscheid and Ittenbach, Aroideana 19: 92-93 (1996); Heng & Hettterscheid in Heng *et al.*, Fl. China 23: 30 (2010). **Photo 17 (Page no. 206).**

Amorphophallus ximengensior H. Li, Journ. Wuhan Bot.
Resear. 6 (3): 212-214 (1988).

Type: Sheik Mokim in June 1901-Herb. Hort. Calcutta.

Bengali / Local names: *Ban Ol Kachu*.

English name: Not known.

Tuber globose, c 9 cm in diameter, c 6.5 cm in high, no branching. Leaf solitary; petiole smooth, 20-120 cm long, 1-2 cm in diameter, dark rich reddish green with a few small dark elongated or paler green spots, the intensity of colours and the extension of the pattern variable; lamina 60-80 cm in diameter; leaflets elliptic-lanceolate, acuminate, base decurrent, 2-25 cm long. 1-3 cm in diameter, upper side green, lower side paler green. Peduncle 34-45 cm long, 1.3 cm in diameter at base, smooth, dark rich reddish green with a few small dark elongated green spots near the base and at the middle of the peduncle, covered by about two cataphylls, each cataphyll 3.0-16.5 cm long and 2 cm in diameter at the base, outside brown with green spots, inside white. Spathe ovate lanceolate, acuminate, 19.0-21.5 cm long, c 6 cm in diameter at the middle, c 7 cm in diameter at the base, basally convolute for 3.5-4.0 cm, remainder flattened, erect, greenish purple with light green spot outside, inside at the middle light greenish yellow and smooth, very light pinkish purple area at the base within, no distinct warts present, upper side of the spathe twisted, light purple colour, the margin of the spathe reflexed at maturity, top acute, twisted for 5 cm long. Spadix stipitate to 2-3 mm; 17.5-21.0 cm long, shorter or longer than spathe; female zone cylindrical, 2-3 cm long, 1.4-1.5 cm in diameter, flowers congested; a few staminode present between male and female zone, 2-3 mm long; male zone elongate, 4.5-6.5 cm long, 1.3-1.7 cm in diameter, flowers congested; appendix elongate, conical, 10.5-12.0 cm long, 2.1-2.8 cm diameter at the middle, base slightly widened, surface smooth, dark yellow, a few staminode present at the base of appendix. Ovaries subglobose, c 2 mm in diameter, c 1.5 mm long, pale green, unilocular; style, c 0.8 mm long, c 0.6 mm diameter, cream colour; stigma c 1.3 mm diameter, c 0.5 mm high, with a shallow irregular central depression, yellowish or orange. Male flowers having 1 or 2 stamens, stamens 1.0-2.1 mm high; filaments thick, 1-2 mm high, 1.0-1.4 mm in diameter, orange; anthers subtruncated, 0.1 mm high, 0.7-1.5 mm in diameter.

Flowering and fruiting period: May to July.

Chromosome number: Not known.

Habitat: Grows in shady, moist places of hill slope, damp places of forest under growth and often mixed with bamboo.

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Distribution: Bangladesh, northern Thailand, northern Myanmar and southern China.

Specimens examined:

Moulvibazar: Lawachara reserve forest, 02.05.2003, Hosne Ara HA 202 (DACB); 15.05.2005, Hosne Ara HA 1477, 1478, 1479, 1480, 1481 (DACB); Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1634, 1635, 1636, 1637 (DACB); Gazipur beat, Hararganj reserve forest, 21.05.2005, Hosne Ara HA 1733 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1769 (DACB); Lawachara reserve forest, 04. 07. 2005, Hosne Ara HA 1775, 1776 (DACB); Gazipur beat, Hararganj reserve forest, 05.07.2005, Hosne Ara HA 1808, 1809 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 28. 05. 2006, Hosne Ara HA 2645 (DACB); 30. 05. 2006, Hosne Ara HA 2646 (DACB); 25.06.2008, Hosne Ara HA 2744 (DACB) [Originally collected from Hararganj reserve forest under Moulvibazar district].

Economic uses/values/hermful aspect: Not available.

Ethnobotanical information: Not available.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 19 (1): 17-23, 2012).

24. *Amorphophallus longituberosus* (Engl.) Engl. et Gehrm., Engler, Pflanzenr. 48 (1V. 23C): 73-74 (1911). Hu, Dansk Bot. Arkiv 23(4): 434-436 (1968); Hettterscheid and Ittenbach, Aroideana 19: 96-97 (1996); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 36-37 (2007). **Photo 18 (Page no. 210).**

Hydrosme longituberosa Engl. in Bot. Tidsskr. 24: 273 (1902).

Type: J. Schmidt n. 541-Herb. Berlin, Kopenhagen.

Bengali / Local names: *Huchi*.

English name: Not known.

A tuberous herb, tuber elongate, usually unbranched, about 12 cm long, top part about 4 cm in diameter. Leaf solitary, petiole c 30 cm long, c 1.5 cm in diameter at the base, smooth, with a whitish waxy cover, dark greenish-black, mottled or covered with irregular cream-white spots on the surface, lamina highly dissected, tripartite, leaflets

elliptic or lanceolate, c 8×3 cm, short or long acuminate, green above and pale beneath. Inflorescence long peduncled, peduncle as long as petiole. Spathe about 10.5×8.0 cm, not differentiated into the tube and the blade, erect, elliptic to elongate triangular, tip acute, base convolute, widening at male anthesis, base inside nearly smooth, with few, scattered, shallow warts and pale to dark maroon in colour, outside pale grey with several dark grey spots/stripes and small white dots or uniformly green or greenish-white. Spadix sessile, slightly shorter than the spathe, c 9.5 cm long. Male flowers in a zone c 2.5 cm long, c 1 cm in diameter, anthers 6-7 on a thick column. Female flowers below, in a zone c 1.5 cm long, ovary globose, 2-loculed, ovule 1, placenta basal, anatropous, style c 1.5 mm long, stigma 3-4 lobed. Appendix c 5.5 cm long, c 2 cm in diameter.

Flowering and fruiting period: May-June.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Village thickets in shady areas.

Distribution: Bangladesh, Thailand and Northwest Malaysia.

Specimens examined:

Bogra: Gabtoli thana, Beltola village, 08.05.2002, B.M. Rezia Khatun 3603 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 07.05.2006, Hosne Ara HA 2636 (DACB); 16.05.2015, Hosne Ara HA 2880 (DACB) [Originally collected from Beltola village under Bogra district].

Kurigram: Singhimari village, 20.05.2013, Hosne Ara HA 2844 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Its leaves and petioles are used as a vegetable in the rural areas.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 9 (1): 81-84, 2002).

25. *Amorphophallus margaritifer* (Roxb.) Kunth, Enum. Pl. 3: 34 (1841). Hettterscheid & Sarker, Aroideana 19: 132-138 (1996); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 421 (2002). **Photo 19 (Page no. 210).**

Arum margaritifera Roxb., Fl. Ind. (Ed., Carey) 3: 512 (1832); Wight, Icon. Pl. Ind. Or. 3(1): 6, t. 795 (1844).

Plesmonium margaritifera (Roxb.) Schott, Syn. Aroid.: 34 (1856) ("*margaritifera*"); Gen. Aroid. t. 26 (1858); Hook. f., Fl. Brit. India 6: 518 (1893-reprint 1954); Prain, Beng. Pl. 2: 1110 (1903-reprint 1981); Engler, Pflanzenr. 48 (IV. 23C): 49-51 (1911); Haines, Bot. Bihar and Orissa: 860-861 (1924-reprint 1978); Fischer in Gamble, Fl. Pres. Madras 3: 1107 (1931-reprint 1967); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 101 (1953); Mitra, Fl. Pl. E. India 1: 75 (1958); Mukherjee, Fl. Pachmarhi & Bori Reserves: 313 (1984); Verma *et al.*, Fl. Raipur, Durg and Rajnandgaon: 396 (1985); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 12 (1989); Ellis, Fl. Nallamalais 2: 403-404 (1990); Parmar in Shetty & Singh, Fl. Rajasthan 3: 867 (1993); Pullaiah, Fl. Andhra Pradesh 3: 1026 (1997); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 70 (2007).

Plesmonium margaritifera f. *minor* Engl., Pflanzenr. 48 (IV. 23C): 51 (1911).

Lectotype: Wight, Icon. Pl. Ind. Or. 3(1): 6, t. 795 (1844).

Bengali / Local names: *Jongle Ol*.

English name: Not known.

Terrestrial herb, tuber 7-14 cm in diameter, bulbiferous all over the tuber. Leaves 15-30 cm in diameter, 3-sect, segments pinnatisect, leaflets entire, narrowly-lanceolate, acuminate, 10-15 cm long, green, petiole 30-40 cm long. Peduncles 30-50 cm long, stout, pale green streaked with darker green. Spathes 9-15 × 3-5 cm, erect, broadly ovate, obtuse, concave, loosely convolute below the middle, pale yellow-green, flushed with pink within, dark purple at the base, coriaceous. Spadix very stout, stipitate, obtuse, as long as the spathe or slightly longer, 9-16 cm long, stipitate for about 1 cm, with a basal pistillate portion about 1.5-3.5 cm long, the central neuter portion about 1.5-2.0 cm long, staminate portion about 3-4 cm long and the terminal portion occupied by sterile flowers (neuters). Pistillate flowers numerous, scattered, ovary globose, 2-3 locular, 1 ovule in each locule, style short, stigma 2-3 lobed,

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neuters obovoid/clavate, cream coloured. Anthers crowded, very short, dehiscence by apical pores. Fruit a berry, ovoid, 1-3 seeded.

Flowering and fruiting period: May-June.

Chromosome number: Not known.

Habitat: Shady moist areas on the forest floor.

Distribution: Bangladesh, India. This species was collected from Dhaka by C.B. Clarke (Hooker, 1893).

Specimen examined:

Rajshahi: Godagari Upazilla, 27.06.2014, Md. Sharif Hossain Sourav 01 (DACB).

Economic uses/values/harmful aspects: The species have some medicinal value.

Ethnobotanical information: The people of Goa (India) apply crushed seeds of the plant in tooth cavity to cure toothache. Because of its benumbing effect, the crushed seed is also used externally to cure bruises. The Mundas in India use well-ground raw tuber of the plant to cure body swellings (Caius, 1986).

26. *Amorphophallus napalensis* (Wall.) Bogner & Mayo, *Aroideana* 8(1): 19 (1985). Noltie, *Fl. Bhutan* 3(1): 133 (1994); Hettterscheid & Ittenbach, *Aroideana* 19: 103 (1996); Hajra & Verma, *Fl. Sikkim* 1: 186-187 (1996); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 37-38 (2007). **Photo 20 (Page no. 216).**

Thomsonia napalensis Wall., *Pl. Asiat. Rar.* 1: 83, t. 99 (1830); Blume in *Rumphia* 1: 150 (1835); Hook. f., *Fl. Brit. India* 6: 518 (1893-reprint 1954); Engler, *Pflanzenr.* 48 (IV. 23C): 56-58 (1911); Hara, *Fl. Eastern Himalaya*: 398 (1966); Hu, *Dansk Bot. Arkiv* 23 (4): 436-438 (1968); Rao & Verma, *Bull. Bot. Surv. India* 18 (1-4): 22 (1976); Hara *et al.*, *Enum. Fl. Pl. Nepal* 1: 92 (1978).

Pythonium wallichianum Schott, Schott & Endl., *Melet. Bot.*: 17 (1832).

Amorphophallus chlorospathus auct. non Kurz: Spring, *Fl. Sikkim Himal.*: f. 216-217 (1963).

Type: Nepal, in mountain forest, flowering in June, t. 99 (Wallich, Pl. Asiat. Rar., 1830).

Bengali / Local names: *Bannyo Ol Kachu*.

English name: Not known.

Tuberous herb, tuber c 14 cm in diameter, c 12 cm high, sub-globose, pale to dark dirty brownish colour. Leaf solitary, petiole stout, c 1 m long, c 2.5-3.5 cm in diameter at the base, pale green with more or less large, irregular dark green or blackish spots, lamina dissected, tripartite, each part many-lobed, lobes elliptic or oblong or elliptic-lanceolate or obovate, 9-20 cm long, 3-8 cm in diameter, upper surface pale green. Inflorescence long peduncled, c 72 cm long, stout, blotched like the petiole. Spathe longer, narrower, c 34 × 13.5 cm, not mottled outside, not differentiated into the tube and the blade, tip acute, outside and inside pale green, becoming yellowish-green at the male anthesis and then opening wider. Spadix exposed, very stout, c 25 × 2 cm, shorter than the spathe, with a rounded apex, green changing to yellow. Male flowers in a zone 10.5 cm long and 2 cm broad, anthers 3-5, subsessile, pale orange- yellow. Female flowers below, in a zone c 4.5 cm long and c 1.5 cm broad, appendix c 9.5 × 2.0 cm, tuberculate, yellowish with numerous small conical warts, ovary globose, 2-loculed, ovule 1, placenta basal, anatropous, style 1.5 mm long, stigma capitate, faintly 3-lobed.

Flowering and fruiting period: April-July.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Rain forests, shaded areas of hill slopes and foot hills, sometimes the hill tops.

Distribution: Bangladesh, Bhutan, Nepal and India (Darjeeling and Sikkim).

Specimens examined:

Habiganj: Chunarughat thana, Kalenga forest range, Kalenga beat area, 27.10.1999, Zashim Uddin 1058 (DUSH).

Mymensingh: Haluaghat, 06.10.2009, M. Khatun 115 (DUSH).

Sherpur: Jhenaigati thana, Rangtia hill, 22.06.2004, Hosne Ara HA 1028 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 30.09.2004, Hosne Ara HA 1436 (DACB) [Originally collected from Rangtia hill under Sherpur district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Indigenous people use its young leaves and petioles as a vegetable.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 30 (2): 153-155, 2001).

27. *Amorphophallus paeoniifolius* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan, Taxon 32: 130 (1983). Bakshi, Fl. Murshidabad Dist.: 336 (1984); Sharma *et al.*, Fl. Karnataka: 296 (1984); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 37-42 (1987); Henry *et al.*, Fl. Tamil Nadu, ser. 1, 3: 55 (1989); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 6 (1989); Kothari & Moorthy, Fl. Raigad Dist. Maharashtra State: 420 (1993); A. Hay *et al.*, Blumea Supplement 8: 27-28 (1995); Saxena & Brahmam, Fl. Orissa 4: 2034 (1996); Pullaiah, Fl. Andra Pradesh 3: 1022 (1997); Mayo *et al.*, Genera Araceae: 235-238 (1997); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 400-401 (1998); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 38-39 (2007). **Photo 21 (Page no. 216).**

Dracontium polyphyllum sensu Dennst., Schlüssel Hort. Malabar 13, 38 (1818), non L. (1753).

Arum campanulatum sensu auct. in part, not as to type of Roxb. (1820), *nom. illegit.*; Roxb., Pl. Corom. 3: t. 272 (1820); Hook., Bot. Mag. 55: t. 2812 (1828); Wight, Icon. Pl. Ind. Or. 3: 5 t. 782 (1844).

Amorphophallus campanulatus Decne., Nouv. Ann. Mus. Hist. Nat. Paris 3: 366 (1834); Decne., Herb. Timor: 38 (1835); Blume, Rumphia 1: 139, t. 32, 33 (1837); Thw., Enum. Pl. Zeyl.: 335 (1864); Hook. f., Fl. Brit. India 6: 513-514 (1893-reprint 1954); Prain, Beng. Pl. 2: 1109 (1903-reprint 1981); Cooke, Fl. Pres. Bombay: 825-826 (1908); Haines, Bot. Bihar and Orissa: 861-862 (1924-reprint 1978); Heinig, List Chittagong: 74 (1925); Fischer in Gamble, Fl. Pres. Madras: 1587 (1931), repr. ed. 3: 1106-1107 (1967); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 27 (1931); Datta & Mitra, Bull. Bot. Soc. Beng. 7

(1 & 2): 100 (1953); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Nicolson in Saldanha & Nicolson, Fl. Hassan Dist.: 783-784 (1976); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 20-22 (1976); Bennet, Fl. Howrah Dist.: 93 (1979); Deb, Fl. Tripura State 2: 397-398 (1983); Naithani, Fl. Chamoli 2: 669 (1985).

Amorphophallus dubius Blume, Rumphia 1: 142 (1837); Kunth, Enum. Pl. 3: 32 (1841); Schott, Syn. Aroid. 38 (1856); Prodr. Syst. Aroid. 130 (1860); Hook. f., Fl. Brit India 6: 514 (1893-reprint 1954); Engler, Pflanzenr. 48 (IV. 23C): 74-75 (1911); Fishcer in Gamble, Fl. Pres. Madras: 1587 (1931); repr. ed. 3: 1107 (1967).

Amorphophallus sativus Blume, Rumphia 1: 145 (1837); Engler, Pflanzenr. 48 (IV. 23C): 109 (1911).

Amorphophallus campanulatus var. *blumei* Prain, Beng. Pl. 2: 1109 (1903-reprint 1981).

Type: Mulenschena Rheede, Hort. Malab. 11: t. 19 (1692).

Bengali / Local names: *Ol Kachu*. English name: Elephant-yam.

An erect herb, corm depressed-globose, 5.5-15.0 cm thick and 18-25 cm in diameter, dark brown outside. Leaf solitary, petiole stout, 90-140 cm long, 4-8 cm in diameter, light green with white mottles and often muricate, lamina 30-90 cm across, tripartite, the lateral parts again bifurcating and ultimately divided into oblong, acuminate, 10-20 cm long decurrent lobes. Inflorescence short-peduncled, 4.5-8.0 cm long and 1-2 cm in diameter, blotched as in the petiole. Spathe broadly campanulate, 15-45 × 15-60 cm, base and limb often separated by a shallow constriction, margin undulate and crisped with a basal convolute and an upper spreading portion, outside light green with whitish patches, inside dark purple, with a yellowish area and the rest purple to green. Spadix very stout and sessile, 18-40 cm long, usually broader than long, with female flowers below, cylindric, 3-25 × 1-12 cm, flowers congested or slightly distant; male flowers above, about 3-6 cm long and with an apical naked, sterile, dark greenish-purple appendix, appendix irregularly lobed, spongy and whitish within, short or long conical with round or acute tipped, 4-15 × 3-8 cm. Pistillate flowers numerous, ovary sub-globose to ovoid, 2-3 locular, ovule 1 per locule, anatropous,

style twice the length of the ovary, maroon, stigma 2-3 lobed, reniform, pale or deep yellow coloured, staminate flowers arranged compactly in a sub-turbinate form, anthers sessile, 2-lobed, off-white coloured and dehiscence by apical pores. Fruit an obovoid berry, 2-3 seeded, orange to red in colour.

Flowering and fruiting period: May-November.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Damp and moist places under the shades of trees, forest areas and plantations.

Distribution: Bangladesh, Sri Lanka, India, Myanmar and Java (Indonesia).

Specimens examined:

Bandarban: Chimbuk, 29.06.1987, Das & Alam 5886 (FRIH).

Bengal: Locality, Collection date, year & number unknown, J.D. Hooker & Thomson (K).

Bogra: Dhunot Upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2795 (DACB).

Chittagong: Sitakundo, 22.06.1979, Mia & Rahman M 105 (DACB); Chunati, 26.09.2005, Hosne Ara HA 2226 (DACB); Bariadhala, 01.10.2005, Hosne Ara HA 2571 (DACB); Bara Kumira, 01.10.2005, Hosne Ara HA 2584 (DACB); Sitakundo, 01.10.2005, Hosne Ara HA 2596 (DACB); Mirsarai, 01.10.2005 Hosne Ara HA 2605 (DACB).

Cox's bazar: Ramu, 29.09.2005, Hosne Ara HA 2285 (DACB); Bara Inani, 30.09.2005, Hosne Ara HA 2464 (DACB); Swankhali, 30.09.2005, Hosne Ara HA 2505 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 30.05.2006, Hosne Ara HA 2652 (DACB) [Originally collected from Kalenga beat under Habiganj district].

Dinajpur: Singra forest, 18.08.2005, Hosne Ara HA 2075 (DACB).

Habiganj: Kalenga beat, Kalenga, 05.05.2003, Hosne Ara HA 279 (DACB).

Jessore: Jessore town area, 26.05.2012, Hosne Ara HA 2843 (DACB).

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Khagrachari: Jamtoli, 12.07.2003, Hosne Ara & Sarder Nasir Uddin HA 491 (DACB).

Kurigram: Singhimari village, 20.05.2013, Hosne Ara HA 2851 (DACB); Baruitari village, 24.08.2013, Hosne Ara HA 2859 (DACB).

Magura: Magura area, 26.05.2012, Hosne Ara 2835 (DACB).

Moulvibazar: Madhabkundo, 07.07.2002, Hosne Ara & Sarder Nasir Uddin HA 125 (DACB); Adampur beat, Kawargola forest, 06.10.2005, Hosne Ara HA 2622 (DACB).

Narayanganj: Sonargaon, 07.07.2005, Hosne Ara HA 1916 (DACB).

Narsingdi: Narsingdi Sadar, 07.07.2003, Hosne Ara HA 1887 (DACB).

Patuakhali: Galachipa, Amkhola, 01.02.2007, M Sultana 1465 (DUSH).

Rajbari: Rajbari area, 26.05.2012, Hosne Ara HA 2821 (DACB).

Rangamati: Rangamati area, 16.06.2001, Sarder Nasir Uddin 1021 (DACB).

Sherpur: Rangtia Range, Samaschura beat, 10.10.2003, Hosne Ara HA 688 (DACB).

Sirajganj: Kazipur Upazilla to Charkhadah village, 18.03.2011, Hosne Ara HA 2790 (DACB).

Sunamganj: Town area, 06.06.1998, Hosne Ara HA 44 (DACB).

Economic uses/values/harmful aspects: *Ol kachu* is a very common type of aroid in Bangladesh, and is cultivated for its edible corm. It is cultivated in the districts of Satkhira, Jessore and the Chittagong Hill Tracts on a commercial basis.

The tuber acts as appetiser, stomachic and tonic, and is used in the treatment of abdominal pains, tumours, asthma, bronchitis, vomiting, elephantiasis, piles, acute rheumatism, diseases of blood and enlargement of the spleen. Aerial parts of the plant are used in earache, swelling of throat, pimples, cholera, diarrhoea, pain, puerperal fever, kala-azar, neuralgia and bites of poisonous insects. Roots are emmenagogue, and used in boils and ophthalmia (Ghani, 2003).

Ethnobotanical information: People of Bangladesh eat fried *Olkachu* for the treatment of gout. The sap of petiole is used for relief of poisonous insect bite (Hassan, 1988).

4. Genus: *Anthurium* Schott, in

Wiener Z. Kunst 1829 (3): 828 (1829).

Type (Lectotype) species: *A. acaule* (Jacquin) Schott (*Pothos acaulis* Jacquin, see Britton & Wilson, Sci. Surv. Porto Rico 5: 128. 1923).

Evergreen herbs, stem erect, creeping, or short to long-climbing, rarely terrestrial, internodes very short or elongate. Leaves petiolate, petiole short or elongate, short vaginate at the base, always geniculate apically, blade small to very large (exceeding 2 m), usually coriaceous, rarely membranaceous or stiff and brittle, extraordinarily variable in shape, linear to orbicular in outline, rarely peltate, entire to trifid or trisect, or pedatifid or sub-palmatifid, or pedatisect to radiatisect, rarely the lobes or segments themselves pinnately lobed, blade cuneate to cordate at the base, sagittate or hastate. Inflorescence always solitary, peduncle usually rather elongated, rarely short. Spathe usually persistent, sometimes marcescent or deciduous, usually linear to linear-lanceolate, rarely elliptic to ovate, broadly cordate to sub-orbicular, erect, spreading or reflexed. Spadix sessile to long-stipitate, usually cylindric to conic, rarely clavate or globose, very short to very long (over 1 m). Flowers bisexual, perigoniolate, tepals 4, stamens 4, free, filaments sub-compressed, usually equalling tepals at anthesis, sometimes exceeding them, anthers short, connective slender, opening by a longitudinal slit. Ovary ovoid to oblong or obovoid, 2-locular, ovules 1-2 per locule, rarely more, anatropous, hemianatropous or sub-campylotropous, funicle short, placenta axile near the apex of the septum, stylar region inconspicuous to attenuated, stigma small, sub-capitate. Fruit a berry, variously shaped from globose to elongate-fusiform. Seed oblong to ellipsoid or sub-globose, sometimes curved, testa usually smooth or somewhat verrucose, thin.

Over 800 species distributed throughout tropical America and West Indies (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 2 cultivated species.

Key to the species

- | | | |
|----|---|---------------------|
| 1. | Cordate bright red spathe, spadix pendant and tipped yellow with white band | andreanum |
| - | Linear green spathe, spadix slender, yellowish green | crystallinum |

28. Anthurium andreanum Linden, Illustr. Hort. 24: 43, t. 271 (1877). Engl., Pflanzenr. 21 (IV. 23B): 241 (1905); Baily, Manual Cult. Pl.: 184 (1949); Graf, Exotica, edn. 8: 128, 1755 (1976); Tropica, edn. 5: 94, 941 (1978-reprint 2003); Nicolson, Fl. Vitiensis Nova 1: 445-446 (1979); Sheffer *et al.*, Taxon 29: 502 (1980); Walters *et al.*, European Gard. Fl. 2 (2): 83-84 (1984-reprint 2003); Mayo, Fl. Trop. E. Africa: 5 (1985); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 20 (1987); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 39-40 (2007).

Photo vii (Page no. 98).

Type: Colombia. Linden based the taxon on a cultivated plant originally collected by E. Andre' in 1876 in El Choco' Province, Colombia.

Bengali / Local names: *Bahari Kachu*.

English name: Flamingo Flower,
Boy Flower.

A small herb, stem usually less than 30 cm long, 1-2 cm in diameter, internodes short. Leaves petiolate, petiole 20-60 cm long, nearly erect, terete, short-vaginate at the base, leaf blade 17-50 × 11-22 cm, coriaceous, narrowly ovate, heart-shaped, green, with prominent, sometimes overlapping basal lobes, marginal vein arising from the first basal vein. Inflorescence more or less erect, usually held above the leaves. Spathe 6-15 × 5.0-12.5 cm, bright red, broadly ovate to almost rounded, cordate, puckered, often with prominently raised veins. Spadix pendand and tipped, 4-9 cm × 6-8 mm, usually white, becoming yellowish at least towards the apex, slightly tapered to the apex, usually curved slightly and directed downwards. Stamens 4, free. Ovary ovoid to oblong, 2-locular, ovules 1-2 per locule, anatropous, placentation axile. Fruit a berry, ovoid, reddish.

Flowering and fruiting period: January-December.

Chromosome number: $2n = 30, 32$ (Kumar and Subramaniam, 1986).

Habitat: Warm, moist environment and shady damp places (Bose and Chowdhury, 1991).

Distribution: Southwest Colombia and Northwest Ecuador, cultivated in Bangladesh.

Specimens examined:

Dhaka: Mirpur C & B garden, 06.03.1980, Mahbuba Halim 804 (DACB); Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1443 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

29. *Anthurium crystallinum* Linden & André, Linden, Cat: 90, t. 128 (1873); Illustration Horticole 20: 87 (1873). Engl., Pflanzenr. 21 (IV. 23B): 198 (1905); Baily, Manual Cult. Pl.: 185 (1949); Graf, Exotica, Edn. 8: 133 (1976); Tropica, edn. 5: 92, 941 (1978-reprint 2003); Walters *et al.*, European Gard. Fl. 2 (2): 83 (1984-reprint 2003); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 20 (1987); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 40 (2007). **Photo viii, viiia (Page no. 98).**

Type: Colombia.

Bengali / Local names: *Sundar Patar Kachu*.

English name: Crystal Hope.

An upright, epiphytic perennial herb with stem c 25 cm tall. Leaves large, broadly ovate to elliptic, velvety, deep green, pink-bronze when young, blades sharply reflexed and 30-45 cm long, midrib and veins white, petiole c 21 cm long, short-vaginate at the base. Spathe erect and spreading, narrow, green, c 8 cm long, spadix borne intermittently, yellowish green, 12-18 cm long. Flowers bisexual. Stamens 4, free. Ovary ovoid to oblong, 2-locular, ovules 1-2 per locule, anatropous, placentation axile, stigma small. Fruit a berry, globose. Seed sub-globose, testa smooth and thin.

Flowering and fruiting period: January-December.

Chromosome number: $2n = 30, 34$ (Kumar and Subramaniam, 1986).

Habitat: Warm, moist and shady places.

Distribution: Colombia, cultivated in Bangladesh.

Specimens examined:

Dhaka: Ramna Park, 19.02.1981, Mahbuba Halim 921 (DACB); Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1444 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, it is commonly planted both in public places and homesteads.

Ethnobotanical information: Not known.

5. Genus:*Ariopsis* Nimmo in J. Graham, Cat. Pl. Bombay: 252 (1839).

Type species : *A. peltata* Nimmo.

Small, seasonally dormant herbs, tuber sub-globose, hypogaeal. Leaves usually solitary, rarely few, petiole slender, sheath fairly short, peltate, cordate-ovate or only emarginate basally, thin, glaucous below, posterior lobes very short, primary lateral veins pinnate and also radiating from the petiole insertion, forming a sub-marginal collective vein, marginal vein also present, higher order venation reticulate. Inflorescence 1-3 in each floral sympodium, appearing with or without leaves, peduncle very slender, much longer than the spathe, erect. Spathe ovate, boat-shaped, fornicate, not constricted, gaping widely, not convolute at the base, marcescent. Spadix shorter than the spathe, female zone adnate to the spathe, very short and few-flowered, sometimes separated from the male zone by short, free, naked axis, male zone fertile to apex, relatively thick, cylindric-conoid, many-flowered. Flowers unisexual, perigone absent. Synandrium peltate, connate filaments forming a stipe longer and narrower than the dilated common connective, thecae sub-globose to ellipsoid, dehiscing by an oval pore. Ovary ovoid to ovoid-oblong, 1-locular, ovules many, orthotropous, placentae 4-6, parietal, stylar region absent, stigma stellate with

4-6 lacinate lobes. Fruit a berry, 4-6 angled, many-seeded. Seed oblong, apically narrowed and obtuse.

Two species distributed throughout tropical south Asia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 2 species.

Key to the species

1. Plants with both inflorescence and leaves appearing at the same time **peltata**
- Plants with inflorescence before the emergence of leaves **protanthera**

30. *Ariopsis peltata* Nimmo in Graham, Cat. Pl. Bombay & Civin. (Add. & Corr.): 252 (1839). Schott, Syn. Aroid.: 40 (1856); Gen. Aroid. t. 35 (1858); Prodr. Syst. Aroid.: 136 (1860); Hook. f., Fl. Brit. India 6: 519 (1893-reprint 1954); Cooke, Fl. Pres. Bombay: 827 (1908); Engler, Pflanzenr. 71 (IV. 23E): 130-131 (1920); Fischer in Gamble, Fl. Pres. Madras: 1580 (1931), repr. ed. 3: 1102 (1967); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 30 (1931); Mitra, Fl. Pl. E. India 1: 76 (1958); Nicolson in Saldanha & Nicolson, Fl. Hassan Dist.: 784 (1976); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 22-23 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 88 (1978); Sharma *et al.*, Fl. Karnataka: 296 (1984); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 7 (1989); Vajravelu, Fl. Palghat Dist.: 532 (1990); Kothari & Moorthy, Fl. Raigad Dist. Maharashtra State: 421 (1993); Noltie, Fl. Bhutan 3 (1): 130 (1994); Deshpande *et al.*, Fl. Mahabaleshwar Adjoin., Maharashtra: 614-615 (1995); Hajra & Verma, Fl. Sikkim 1: 187 (1996); Mayo *et al.*, Gen. Araceae: 275-276 (1997); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 179 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 41 (2007). **Photo 22 (Page no. 225).**

Remusatia vivipara sensu Wight, Icon. Pl. Ind. Or. 3: t. 900 (1845), *non* Schott (1832).

Ariopsis protanthera N.E. Brown, Rep. Roy. Gard. Kew. 51 (1877), *nom. nud.*

Ariopsis peltata f. *coaetanea* Engl., Pflanzenr. 71 (IV. 23E):
130-131 (1920).

Type: 'Concan', *Stocks s. n.* (K).

Bengali / Local names: *Choto Kachu*.

English name: Cute Little Oddball.

Small, tuberous herb, clustered with many slender root-fibres, tuber 1-3 cm in diameter, greenish. Leaves simple, usually solitary, lamina entire, peltate, apiculate, broadly ovate to sub-orbicular, cuspidate, base very shallowly cordate, posterior lobe very short, venation sub-palmate, 5-15 × 3.8-11.0 cm, thin textured, petiole slender, sheath fairly short, light green to purplish, 5-16 cm long, 2-3 mm in diameter. Inflorescence 1-3 in each floral sympodium, appearing with leaves. Peduncle very slender, much longer than the spathe, erect, 2-6 cm long. Spathe cymbiform, 0.8-1.7 × 0.6-1.2 cm, apiculate, incurved, not convolute at the base, marcescent, pinkish or mauve. Spadix shorter than the spathe, separated from male zone by short, free, naked axis, appendage absent, female part 2.5-6.5 mm, ovary 1-locular, ovules many, orthotropous, placentae 4-6, parietal, extending from the base to the apex of locule, style absent, stigma sessile, 4-6 lobed, yellowish-orange, male part embedded in the tissue of the spadix, of 2-loculed anthers connate in groups of three, ellipsoid, blunt, 4.5-8.0 × 2.0-3.8 mm, yellow, strongly stipitate. Fruit a berry, with a membranous wall, many-seeded. Seeds oblong, apically narrowed and obtuse, longitudinally furrowed.

Flowering and fruiting period: May-August.

Chromosome number: 2n = 28 (Petersen, 1989).

Habitat: On shady, wet rocks in deep forests.

Distribution: Bangladesh, India (Assam, Sikkim and the Western Ghats), Nepal, Bhutan and Myanmar.

Specimens examined:

Rangamati: Kaptai, Sita Pahar, Barochara, 17.06.2001, Sarder Nasir Uddin N 1029 (DACB); 24.09.2002, Sarder Nasir Uddin N 1545 (DACB); 08.07.2003, Hosne Ara & Sarder Nasir Uddin HA 435 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 30 (2): 159-160, 2001).

31. *Ariopsis protanthera* N.E. Br. in Rep. Roy. Gard. Kew 1877: 51 (1877). Engler, Pflanzendr. 71 (IV. 23E): 130-131 (1920); Mayo *et al.*, Gen. Araceae: 275-276 (1997); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 181 (2002). **Photo 23 (Page no. 225).**

Ariopsis peltata f. *protanthera* (N.E. Br.) Engl., Pflanzendr. 71 (IV. 23E): 130-131 (1920).

Type: Assam (Chatterjee-Herb. Calcutta).

Bengali / Local names: *Choto Kachu*.

English name: Not Known.

Diminutive tuberous-stemmed herb to 10 cm. Stems irregularly globose, white, green where exposed to light. Leaves usually solitary, rarely few. Petiole slender, sheaths fairly short. Blade peltate, cordate-ovate or only emarginate basally, thin, glaucous grey green with copious thick white latex when damaged, posterior lobes very short; primary lateral veins also present, higher order venation reticulate. Inflorescence 1-3 in each floral sympodium, appearing without leaves. Peduncle very slender, much longer than spathe, erect. Spathe ovate, boat-shaped, fornicate, not constricted, gaping widely, not convolute at base, marcescent. Spadix shorter than spathe, female zone adnate to spathe, very short and few flowered, sometimes separated from the male zone by a short, free, naked axis, male zone fertile to apex, relatively thick, cylindrical-conoid, many flowered. Flowers unisexual, perigone absent. Synandrium peltate, connate filaments forming a stipe longer and narrower than dilated common connective, thecae subglobose to ellipsoid, dehiscing by oval pore, synandria all connate apically, forming a continuous surface punctured by cavities with somewhat prominent margins into which pollen is shed from the surrounding thecae. Ovary ovoid to ovoid-oblong, 1-locular, ovules many, orthotropous, placenta 4 - 6, parietal.

(Photo 22) 225

Berries 4 - 6 angled, stigma persistent, many seeded. Seed oblong, apically narrowed and obtuse.

Flowering and fruiting period: Not available.

Chromosome number: Not Known.

Habitat: Shady seepage areas of nearly vertical slopes with remnant evergreen forest, geophytes on forest floor or in rock crevices.

Distribution: Bangladesh, North India.

Specimen examined:

Rangamati: Kaptai Lake, Shubalong, 05.09.1999, Boyce, Toha & Rahman 5648 (HCU, K).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: This plant has been reported as a new record for Bangladesh by Toha *et al.* (2004).

6. Genus: *Caladium* Ventenat, Descript. Pl. Nouv. Jard. Cels, 30 (1801).

Type (Lectotype) species: *C. bicolor* (Aiton) Ventenat

(*Arum bicolor* Aiton, see Hubbard & Rehder, Bot. Mus. Leaflet 1: 3. 1932).

Seasonally dormant or evergreen herbs, stem tuberous, sub-globose. Leaves several, petiole sheath distinct, leaf blade usually peltate, sometimes not, often variegated, cordate-sagittate or sagittate, rarely trisect, basal ribs well-developed, primary lateral veins pinnate, forming a sub-marginal collective vein, secondary and tertiary laterals arising from the primaries at a wide angle, forming an interprimary collective vein, higher order venation reticulate. Inflorescence 1-2 in each floral sympodium, appearing with or before leaves, peduncle rather long, often as long as the petiole. Spathe constricted, tube with convolute margins, usually ventricose-globose, persistent, green, eventually splitting in the fruit, blade white, boat-shaped, gaping, marcescent after anthesis and deciduous. Spadix a little shorter than the spathe, densely flowered, female zone cylindrical-conoid or ellipsoid, separated from the male

by a basally thicker zone of sterile male flowers, male zone fertile to the apex, subcylindric to subclavate, more than twice as long as the female zone. Flowers unisexual, perigone absent. Male flower 3-5 androus, stamens connate to obpyramidal, truncate to nearly concave, sinuously subhexagonal synandrium, common connective thick, dehiscing by short apical slit. Male flowers depressed-obpyramidal, compressed, truncate, lowermost often larger and prismatic, uppermost narrow and elongated. Ovary 1-2 locular, ovules 1-20, anatropous, funicle short, placentae subbasal or parietal, stylar region free, stigma nearly as wide as the ovary. Fruit a berry, 1-many seeded, white. Seed ovoid to ellipsoid.

About 12 species distributed throughout tropical America and West Indies (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 2 species.

Key to the species

- | | |
|--|-------------------|
| 1. Lamina ovate to elliptic, dark green to medium green or variegated with pink, red, or white | bicolor |
| - Lamina ovate, deep green with white blotches and spots above | humboldtii |

32. *Caladium bicolor* (Ait.) Vent., Mag. Encycl. 4 (16): 464 (1801). Engler, Pflanzenr. 71 (IV. 23E): 31 (1920); Standley, Fl. Panama, Ann. Missouri Bot. Gard. 31 (1): 37-38 (1944); Bailey, Manual Cult. Pl.: 188 (1949); Standley & Steyermark, Fl. Guatemala, Fieldiana, Bot. 24 (1): 322-323 (1958); Graf, Exotica, edn. 8: 149 (1976); Tropica, edn. 5: 96, 960 (1978-reprint 2003); Nicolson, Fl. Vitiensis Nova 1: 458 (1979); Madison, Selbyana 5: 370-373 (1981); Walters *et al.*, European Gard. Fl. 2 (2): 99 (1984-reprint 2003); Mayo, Fl. Trop. E. Africa: 5 (1985); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 51 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 10 (1989); Matthew, Excursion Fl. Cent. Tamilnadu, Ind.: 539 (1991); Noltie, Fl. Bhutan 3 (1): 156 (1994); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 401 (1998); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contr. U. S. Nat. Herb. 52: 29 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 42 (2007). **Photo 24 (Page no. 229).**

Arum bicolor Ait., Hort. Kew. 3: 316 (1789).

Cyrtospadix bicolor (Aiton) Britton & P. Wilson, Bot. Porto Rico 5: 126 (1923).

Xanthosoma sylvestre Bello, Anales Soc. Esp. Hist. Nat. 12: 114 (1883).

Bengali / Local names: *Bahari Kachu*. English name: Fancy-leaf Caladium.

Terrestrial tuberous herb, tuber starchy, fully subterranean or with the apex at soil line, flattened, sub-globose or sub-cylindric, 2-12 × 2.5-6.0 cm, white or yellowish within. Leaves several, erect, petiole 30-95 cm long, 4-8 mm thick, sheathing in the lower part, green or marked with small purplish or reddish striations, with a glaucous surface, lamina peltate, ovate to elliptic, 12-40 × 9-26 cm, the posterior lobes round, usually strikingly variegated with shades of green, white, red and pink, glaucous beneath. Inflorescence solitary or borne two or three together, peduncle equalling the petioles, erect. Spathe constricted, tube green, 2-3 cm long, blade white, 4-8 cm long, boat-shaped, deciduous. Spadix shorter than the spathe, lacking a sterile appendix, pistillate below and staminate to the apex with a constricted transition zone of sterile flowers. Female part of the spadix cylindric-conoid, 1-3 cm long, the stigmas often yellowish, the ovary sub-bilocular with two placentae and 10-12 ovules, anatropous, stigma nearly as wide as the ovary. Sterile flowers largest at the base, more elongate in the narrowed part of the spadix, the sterile part 1.0-2.4 cm long, male part of the spadix white, 2.5-6.0 cm long. Male flower 3-5 androus, stamens united into truncate synandrium with the marginal thecae, dehiscing by short apical slits. Fruit a berry, whitish, many-seeded. Seeds subovoid.

Flowering and fruiting period: April-June.

Chromosome number: 2n = 28 (Petersen, 1989).

Habitat: Shady moist areas of the forest floor.

Distribution: Bangladesh, South America, from Panama to Bolivia and eastward to the Atlantic coast of Brazil. Naturalized throughout the tropics (Madison, 1981).

(Photo 24) 229

Specimens examined:

Dhaka: BNH Office compound, 06.05.1980, Mahbuba Halim 849 (DACB); Khilgaon area, 16.04.1988, Hosne Ara HA 6 (DACB); Dhanmondi area, 18.04.1988, Hosne Ara HA 8 (DACB); 19.04.1988, Hosne Ara HA 9 (DACB); 11.05.1988, Hosne Ara HA 10 (DACB); Bangladesh National Herbarium garden (Cultivated), 30.05.2006, Hosne Ara HA 2649 (DACB) [Originally collected from Kawargola forest under Moulvibazar district].

Moulvibazar: Adampur beat, Kalenga, Kawargola forest, 11.06.2002, Pavel Partha 162 (JUH); 03.05.2003, Hosne Ara HA 228 (DACB); 03.05.2003, Pavel Partha 516 (JUH); 18.05.2005, Hosne Ara HA 1628 (DACB); Madhabkundo, 06.07.2005, Hosne Ara HA 1828 (DACB); Adampur beat, Kawargola forest, 06.10.2005, Hosne Ara HA 2626 (DACB).

Mymensingh: Dhubaura thana, Madhupara, 16.06.2004, Hosne Ara HA 745 (DACB).

Tangail: Sakhipur, 20.06.1978, Reaz 58 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 33 (1): 75-77, 2004).

33. *Caladium humboldtii* Schott, Oesterr. Bot. Wochenbl. 4: 417 (1854). Graf, Tropica, edn. 5: 96, 961 (1978-reprint 2003); Everett, Encycl. Horticult. 2: 545 (1981); Madison, Selbyana 5: 369-370 (1981); Walters *et al.*, European Gard. Fl. 2 (2): 99 (1984-reprint 2003); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 42-43 (2007). **Photo ix (Page no. 99).**

Caladium myriostigma C. Koch, Wochenschr. Gärtnerei
Pflanzenk.: 135 (1862).

Caladium humboldtii var. *myriostigma* (C. Koch) Engler,
D.C., Monogr. Phan. 2: 468 (1879).

Type: Brazil: Amazonas: San Carlos, n.v. "contra culevra," Humboldt & Bonpland 985 (B, non vidi, photo NY).

Bengali / Local names: *Pata Bahari Kachu*. English name: Not known.

Terrestrial herb, tuber globose, 1-2 cm in diameter, yellow within, suckering freely. Leaves several, erect, petioles terete, 10-24 cm × 1.0-1.5 mm, leaf blade ovate, small, membranaceous, peltate, with sagittate base, 5-9 × 2.0-4.5 cm, deep green with white blotches and spots above, paler below.

Flowering and fruiting period: As observed in Bangladesh for the last 20 years this species does not bloom.

Chromosome number: $2n = 19$ (Petersen, 1989).

Habitat: Shady moist places.

Distribution: Brazil and Venezuela, planted in Bangladesh.

Specimen examined:

Dhaka : Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1445 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

7. Genus: *Colocasia* Schott in Schott & Endlicher,

Melet. Bot. 18 (1832), *nom. cons.*

Type species: *C. antiquorum* Schott (*Arum colocasia* L.), *typ. cons.*

Small, medium-sized or gigantic, seasonally dormant or evergreen herbs with underground sub-globose or sub-cylindric tuber or short above-ground stem, sometimes stoloniferous. Leaves several, petiole sheathing below, rather long, blade peltate, ovate-cordate to sagittate-cordate, posterior lobes rounded, shortly to almost entirely connate, basal ribs well-developed, primary lateral veins pinnate, forming

sub-marginal collective veins, 1-2 marginal veins also present, secondary and tertiary laterals arising from the primaries at a wide angle. Inflorescence 1 or many in each floral sympodium, appearing with the leaves, peduncle much shorter than the petiole. Spathe constricted between the tube and the blade, sometimes with a second constriction above the male zone of the spadix, tube with convolute margins, usually much shorter than the blade, ovoid or oblong, persistent, enlarging in fruit and then splitting open irregularly, blade white to yellow, oblong and boat-shaped to narrowly lanceolate, reflexing at anthesis, later deciduous. Spadix sessile, shorter than the spathe, female zone short, separated from the male zone by a narrower zone of sterile male flowers, male zone cylindrical to fusiform, terminal appendix erect. Flowers unisexual, perigone absent. Male flowers 3-6 androus, stamens connate into a more or less truncate synandrium, thecae lateral, oblong-linear, dehiscent by apical pores. Sterile male flowers depressed-obpyramidal, truncate, laterally compressed. Ovary ovoid or oblong, 1-locular, ovules many, hemiorthotropous, funicles relatively long, placentae 2-5, parietal, stylar region short, stigma discoid-capitate or weakly lobed, sometimes extended upwards into a point. Fruit a berry, greenish to whitish, obconical or oblong, many-seeded. Seeds ovoid to ellipsoid, many-grooved.

Mayo *et al.*, 1997, reported 8 species distributed throughout tropical Asia and Malay Archipelago. However, in Bangladesh, with two new species this genus is now represented by 10 species and 3 varieties.

Key to the Species

- | | | |
|----|--------------------------|------------------|
| 1. | Appendix absent | 2 |
| - | Appendix present | 4 |
| 2. | Plants stoloniferous | lihengiae |
| - | Plants not stoloniferous | 3 |
| 3. | Spathe blade over 12 cm | mannii |
| - | Spathe blade under 12 cm | virosa |

- | | | |
|----|--|---------------------|
| 4. | Appendix small, up to 5 mm long | gigantea |
| - | Appendix longer than 5 mm | 5 |
| 5. | Leaf blade under 25 cm | 6 |
| - | Leaf blade over 25 cm | 8 |
| 6. | Plants rhizomatous, leaf blade narrowly oblong-ovoid | fallax |
| - | Plants cormous, leaf blade broadly ovate, cordate or subcordate | 7 |
| 7. | Leaf blade green with dark blotches between the nerves above | affinis |
| - | Leaf blade dark green above with a deep violet interveinal zone | heterochroma |
| 8. | Leaf blades deeply peltate, 60-84 × 50-65 cm, very broadly ovate-sagittate | oresbia |
| - | Leaf blades peltate, 45-52 × 32-36 cm, ovate-sagittate | 9 |
| 9. | Spathe having one constriction, sterile male zone absent below the appendix | esculenta |
| - | Spathe having two constriction, sterile male zone present below the appendix | hassanii |

34. *Colocasia affinis* Schott, Bonplandia 7: 28 (1859). Hook. f., Fl. Brit. India 6: 523 (1893-reprint 1954); Krause in Engler, Pflanzenr. 71 (IV. 23E): 64 (1920); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 26-27 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 91 (1978); Balakrishnan, Fl. Jowai 2: 564 (1983); Walters *et al.*, European Gard. Fl. 2 (2): 101 (1984-reprint 2003); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 10 (1989); Noltie, Fl. Bhutan 3 (1): 136-138 (1994); Hajra & Verma, Fl. Sikkim 1: 191 (1996); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 271-272 (2002);

Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 43-44 (2007); Heng & Boyce in Heng *et al.*, *Fl. China* 23: 75 (2010). **Photo 25 (Page no. 235).**

Alocasia jenningsii Veitch, *Fl. Serres.* 17: t.1818 (1868);
Illustr. *Hortic.* t. 585 (1869); *Gard. Chron.* 136 (1869).

Colocasia affinis var. *jenningsii* (Veitch) Engl. DC., *Monogr. Phan.*: 2: 493 (1879); Krause in Engler, *Pflanzenr.* 71 (IV. 23E): 64 (1920).

Type: Khasia, 2-4000', *J.D. Hooker, s.n.* (K).

Bengali / Local names: *Bahari Kachu.*

English name: Not known.

Small cormous herb, corm c 1.5 cm in diameter and c 1.0 cm high, stolons filiform. Leaves with petiole, blade broadly ovate, peltate, green with dark blotches between the nerves above, subcordate, acute at the tip, (sinus 0.2-1.0 cm) about 10-15 cm long and broad, intramarginal veins several, slightly glaucous beneath, thinner-textured, petioles more slender, 12-25 cm long, sheathing for almost half the length, sheaths yellowish-green. Peduncle slender, 6.5-12.0 cm long. Spathe 10-15 cm long with a basal convolute, persistent, tubular green portion of about 2.0-3.5 cm long and an upper expanded rose-yellowish portion about 8-12 cm long. Spadix with a basal pistillate portion, a neuteriflorous portion above, followed by a staminate portion and terminating into a naked sterile, subulate, golden yellow to cream coloured appendix, pistillate flowers naked, densely arranged. Ovary green, subovoid, unilocular, ovules many on parietal placentae, stigma sessile, discoid, neuters irregularly shaped, flat above, staminate flowers of 6-8 linear anthers, sessile, flat topped, dehiscence by apical pores.

Flowering and fruiting period: May-August.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Shady and moist hill slopes.

Distribution: Bangladesh, Tropical Himalayas (Sikkim, Assam) and Southwest India.

(Photo 25) 235

Specimens examined:

Mymensingh: Dhubaura thana, Madhupara, 16.06.2004, Hosne Ara HA 747 (DACB).

Netrakona: Vharatpur, 18.06.2004, Hosne Ara HA 861 (DACB).

Sherpur: Gopalpur beat, Maya-Ghashi, Monshapara, 20.06.2004, Hosne Ara HA 871 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 26.06.2004, Hosne Ara HA 1073 (DACB) [Originally collected from Monshapara under Sherpur district].

Economic uses/values/harmful aspects: It may be cultivated as an ornamental plant for its showy leaves and inflorescence.

Ethnobotanical information: Not known.

35. *Colocasia esculenta* (L.) Schott, Schott & Endl., Melet. Bot.: 18 (1832). Kunth, Enum. Pl. 3: 37 (1841); Blatter & McCann, J. Bombay. Nat. Hist. Soc. 35: 29-30 (1931); Birdsey, Cult. Aroid. 44-45 (1951); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 100 (1953); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Standley & Steyermark, Fl. Guatemala, Fieldiana, Bot. 24 (1): 323-324 (1958); Hu, Dansk Bot. Arkiv 23 (4): 428 (1968); Hotta, Mem. Fasc. Kyoto Univ., Ser. Biol. 4 (1): 91, fig. 4A-H (1970); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 26 (1976); Nicolson in Saldanha & Nicolson, Fl. Hassan Dist. 786 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 91 (1978); Nasir, Fl. Pakistan 120: 7 (1978); Nicolson, Fl. Vitiensis Nova 1: 456-457 (1979); Bennet, Fl. Howrah Dist.: 95-96 (1979); Deb, Fl. Tripura State 2: 398 (1983); Balakrishnan, Fl. Jowai 2: 564 (1983); Bakshi, Fl. Murshidabad Dist.: 337 (1984); Sharma *et al.*, Fl. Karnataka: 297 (1984); Walters *et al.*, European Gard. Fl. 2 (2): 100-101 (1984-reprint 2003); Mayo, Fl. Trop. E. Africa: 5 (1985); Naithani, Fl. Chamoli 2: 673 (1985); Verma *et al.*, Fl. Raipur, Durg and Rajnandgaon: 395 (1985); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 54 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 10 (1989); Vajravelu, Fl. Palghat Dist.: 533 (1990); Naithani, Fl. Pl. India, Nepal & Bhutan: 454 (1990); Matthew, Excursion Fl. Cent. Tamilnadu, Ind. 539 (1991); Kothari & Moorthy, Fl.

Raigad Dist. Maharashtra State: 422 (1993); Parmar in Shetty & Singh, Fl. Rajasthan 3: 865-866 (1993); Noltie, Fl. Bhutan 3(1): 136-137 (1994); A. Hay *et al.*, Blumea Supplement 8: 45 (1995); Deshpande *et al.*, Fl. Mahabaleshwar Adjoin., Maharashtra: 618 (1995); A. Hay, Sandakania 7: 33-36 (1996); Saxena and Brahmin, Fl. Orissa 4: 2041 (1996); Hajra & Verma, Fl. Sikkim 1: 191 (1996); Pullaiah, Fl. Andra Pradesh 3: 1024-1025 (1997); Bhattacharyya and Sarkar, Fl. W. Champaran Dist. Bihar: 401-402 (1998); Matthew, Fl. Palni Hills, S. Ind. 3: 1370 (1999); Hajra & Rao, Fl. Great Nicobar Island: 470 (1999); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 272-274 (2002); Sarma & Sarkar in Singh & Rao, Fl. Palamau Dist. Jharkhand: 627 (2002); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrib. U. S. Nat. Herb. 52: 30 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 44-45 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 74 (2010). **Photo 26 (Page no. 246).**

Arum esculentum L. Sp. Pl. 965 (1753).

Arum colocasia L., Sp. Pl. 965 (1753). Roxb., Fl. Ind. 3: 494 (ed. 2, 1832); Wight, Icon. Pl. Ind. Or. 3: 5, t. 786, f. 1 (1844).

Arum nymphaeaeifolium (Vent.) Roxb., Fl. Ind. 3: 495 (ed. 2, 1832); Wight, Icon. Pl. Ind. Or. 3: 786, t. 2 (1844).

Caladium nymphaeaeifolium Vent., Descr. Pl. Nouv. Jard. Cels: fol. t. 30 (1801); Wild., Sp. Pl. 4: 488 (1805).

Caladium acre R. Brown, Fl. Nouv. Holl. 1: 336. (1810).

Arum colocasioides Desfontaines, Cat. Pl. Hort. Reg. paris ed. 3, 385. (1829).

Arum nymphaeifolium (Vent.) Roxburgh, Fl. Ind. 3: 495 (1832); Wight, Icon. Pl. Ind. Or.: 5, t. 786, fig. 3 (1844).

Colocasia nymphaeifolia (Vent.) Kunth, Enum. Pl. 3: 37 (1841); Wight, Icon. Pl. Ind. Or. 3: 5, t. 786 (1844); Duthie, Fl. Upp. Gang. Plain, repr. ed., 2: 365 (1960); Prain, Beng. Pl. 2: 1112 (1903-reprint 1981).

Colocasia acris (R. Br.) Schott in Schott & Endlicher, Melet. Bot. 18 (1832); Kunth, Enum. Pl. 3: 38 (1841).

Colocasia antiquorum Schott in Schott & Endlicher, Melet. Bot. 18 (1832); Wight, Icon. Pl. Ind. Or. 3: 5, t. 786 (1844); Miquel, Fl. India Bat. 3: 202 (1855); Schott, Prodr. Syst. Aroid. 138 (1860); Bentham, Fl. Austral. 7: 155 (1878); Engler in Martius, Fl. Bras. 3 (2): 199 (1878); In Dc., Monogr. Phan. 2: 491 (1879); Hook. f., Fl. Brit. India 6: 523 (1893-reprint 1954); Bot. Mag. 120, t. 7364 (1894); N.E. Brown in Dyer, Fl. Trop. Africa 8: 164 (1901); Haines, Forest Fl. Chota Wagpur 551 (1910); Krause in Engler, Pflanzenr. 71 (IV. 23E): 65 (1920); Haines, Bot. Bihar & Orissa: 866 (1924); Fischer in Gamble, Fl. Pres. Madras 1580 (1931); repr. ed. 2, 3: 1102 (1967); Gagnapain, Fl. Gen. Indochine 6: 1139 (1942); Mitra, Fl. Pl. E. India 1: 78 (1958); Duthie, Fl. Upp. Gang. Plain, repr. ed., 2: 365 (1960); Prain, Beng. Pl. 2: 1112 (1903-reprint 1981); Heng & Boyce in Heng *et al.*, Fl. Chna 23: 74-75 (2010).

Colocasia pereorine Rafinesque, Fl. Tellur. 3: 65 (1836).

Colocasia vulgaris Rafinesque, Fl. Tellur. 3: 65 (1836).

Colocasia himalensis Royle, (III. Bot. Himal. 407. 1839), *nom. nud.*) Gard. Chron. 2: 372 (1893).

Colocasia euchlora C. Koch & Sello, Ind. Sem. Hort. Berol. App. 4 (1854).

Colocaia fontanesii Schott, Oesterr. Bot. Wochenbl. 4: 409 (1854).

Colocasia illustris Bull, Catal. 4 (1873); Fl. Mag. t. 107 (1874), teste Engler (1920).

Colocasia antiquorum var. *euchlora* (C. Koch) Schott ex Engler
in DC., Monogr. Phan. 2: 491 (1879); Krause in Engler,
Pflanzenr. 71 (IV. 23E): 67 (1920).

Colocasia antiquorum var. *illustris* (Bull) Engler in DC., Monogr.
Phan. 2: 492 (1879); Krause in Engler, Pflanzenr. 71 (IV.
23E): 67 (1920).

Colocasia antiquorum var. *esculenta* (L.) Schott ex Engler in DC.,
Monogr. Phan. 2: 492 (1879); Krause in Engler, Pflanzenr. 71
(IV. 23E): 67 (1920).

Colocasia antiquorum Schott var. *acris* (R. Br.) Schott ex Engler
in DC., Monogr. Phan. 2: 492 (1879); Krause in Engler,
Pflanzenr. 71 (IV. 23E): 68 (1920).

Alocasia dussii Hort. ex Dammann, Gartenfl. 41: 412 (1892).

Caladium colocasia (L.) W.F. Wight, Contr. U.S. Nat. Herb. 9:
208 (1905).

Colocasia antiquorum var. *globulifera* Engler & Krause in Engler,
Pflanzenr. 71 (IV. 23E): 68 (1920).

Colocasia esculenta var. *illustris* (Bull) Hill, Bot. Mus. Leaf.
Harvard Univ. 7: 118 (1939).

Colocasia esculenta var. *acris* (R. Br.) Hill, Bot. Mus. Leaf.
Harvard Univ. 7: 117 (1939).

Lectotype: Jamaica. Sloane, Voy. Jamaica 1: t. 106, f. 1. 1707, designated by
Nicolson in A. C. Smith, Fl. Vit. Nov. 1: 456 (1979).

Key to the varieties

1. Appendage of the spadix is shorter than the male portion, staminode portion absent above the female portion **2**
- Appendage of the spadix is longer than the male portion, staminode portion present above the female portion **antiquorum**

- | | | |
|----|--|------------------|
| 2. | Tuber longer, 35 × 15 cm, sometimes stolons are produced from the main tuber | esculenta |
| - | Tuber shorter, 3 × 4 cm, always stolons are produced from the main tuber | aqualitis |

var. **esculenta**

Bengali / Local names: *Kachu*.

English name: *Taro, Dasheen, Coco-yam*.

Perennial herb with underground tubers, large main tuber or corm with a few side tubers, tuber usually cylindrical, 35 × 15 cm, sometimes stolons are produced from the main tuber or corm. Leaves petiolate, petiole 30-85 cm long, sheathing for about 25-35 cm at the base, leaf blade peltate, 21-45 × 10-35 cm, ovate, acute, cordate, dark green above and light green beneath, base shallowly cordate, glaucous, venation pinnately reticulate, sinus 1-4 cm long. Inflorescence with axillary peduncle, shorter than the petiole, solitary-many. Peduncle 21-25 cm long. Spathe having one constriction, up to 28 cm long, glabrous, basal part convolute, persistent, green, 3-4 cm long, upper part lanceolate, yellow, 20-24 cm long. Spadix sessile, shorter than the spathe, 11.5-14.0 cm long, male and female zones usually separated by a flat elongate neuter, appendage cylindrical, constricted at the base. Female portion 2.5-3.5 cm long, 1.2 cm in diameter at the base, staminode portion absent, neuter portion 1.5-2.0 cm long, 0.5 cm in diameter at the middle, light yellow, male portion 3.7-4.5 cm long, 0.6-0.7 cm in diameter, golden yellow and the apical sterile appendix about 3-4 cm long, 0.4-0.5 cm in diameter at the base, golden yellow. Female flowers naked, many crowded at the base of the spadix, ovary ovoid with parietal placentation and orthotropous ovules, green, 1.5 × 3 mm, style short, stigma 1 mm in diameter, yellow. Neuter flowers elongate, sub-rhomboidal to hexagonal, occupying the constricted zone of the spadix. Male flowers numerous, each with 6-8 linear, cream coloured anther lobes, dehiscence by apical pores, appendage shorter than the male portion, cream in colour, subcylindric, tapering towards the tip. Fruit a berry, ovoid, seeds elongate.

Flowering and fruiting period: May-October.

Chromosome number: 2n = 28 (Petersen, 1989).

Habitat: Sides of streams, ditches, water-logged low-lying areas, paddy fields, shady secondary forests and plantations.

Distribution: Bangladesh, Pan-tropical.

Specimens examined:

Bandarban: Alikadam, Thanci road, 13.10.1998, Rahman, David *et al.* 3753 (HCU); Ruma, 09.09.1987, Alam EB 53 (FRIH); On the way of Betchari, 22.09.2004, Hosne Ara HA 1253 (DACB); Kulpara, 23.09.2004, Hosne Ara HA 1289 (DACB); Lama, 06.12.2007, Bushra, Habib & Mofiz B 624 (DACB).

Barisal: East Narayanpur village and Dostani village, 22.02.2008, Hosne Ara HA 2660 (DACB); Kashipur, Lakaotta, 23.02.2008, Hosne Ara HA 2715 (DACB).

Bogra: Beltola, 06.02.2003, Hosne Ara & Rezia Khatun HA 158 (DACB); Shibgonj area, 19.08.2005, Hosne Ara HA 2183 (DACB).

Chittagong: Garjania, 04.07.1920, Cowan 995, 999 (E 00075385, E00075386); Korerhat, Noitila, 31.08.1999, Boyce, Toha & Rahman 5401, 5757 (HCU, K); Shubalong, 22.11.1980, Khan, Huq, Rahman & Mia K 6166 (DACB); Bansbaria, 21.08.1987, M.K. Alam 5919 (FRIH); Hinguli, Kamalar Thali, 31.08.1999, Boyce, Toha & Rahman 5402 (HCU, K); Chunati, 26.09.2005, Hosne Ara HA 2219 (DACB); Herbang, 26.09.2005, Hosne Ara HA 2267 (DACB); Hazarikil forest, 27.09.2005, Hosne Ara HA 2301 (DACB); Baramashi, teastate area, on the way of Hazarikhil, 27.09.2005, Hosne Ara HA 2302 (DACB); Fatiqchari, 27.09.2005, Hosne Ara HA 2307 (DACB); Hathazari, Nandirkir, 27.09.2005, Hosne Ara HA 2315 (DACB); Chittagong University area, 28.09.2005, Hosne Ara HA 2333 (DACB); BCSIR Campus area, 28.09.2005, Hosne Ara HA 2342 (DACB); Bariadhala, 01.10.2005, Hosne Ara HA 2572 (DACB); Barakumira, 01.10.2005, Hosne Ara HA 2582 (DACB); Sitakundo, 01.10.2005, Hosne Ara HA 2591 (DACB); Mirsarai, 01.10.2005, Hosne Ara HA 2599 (DACB); Town area, 01.10.2005, Hosne Ara HA 2610 (DACB); Foiage lake area, 01.10.2005, Hosne Ara HA 2618 (DACB).

Chittagong Hill Tracts: Ghagra, 27.04.1976, Huq, Rahman & Mia H 2467 (DACB).

Comilla: Jashpur, 26.09.2004, Hosne Ara HA 1389 (DACB).

Cox's Bazar: Korantan quartar, 11.10.1943, Sinclair 3277 (E 00079894); Kelatoli sorra, 10.05.1945, Sinclair 4274 (E 00075388); Teknaf, 24.10.1963, M.S. Khan 637

(DUSH); Neela range, Neela beat, 27.08.1991, Khan, Huq, Mia & Rahman K 8509 (DACB); Neela range, Whykong beat, 28.08.1991, Khan, Huq, Mia & Rahman K 8550 (DACB); Whykeong, Harikhola, 25.12.1996, Rahman *et al.* 634 (HCU); Kelatuli, 17.05.1999, Huq & Mia 10561 (DACB); Ramu, 26.09.2005, Hosne Ara HA 2282 (DACB); Punnagram, 26.09.2005, Hosne Ara HA 2287 (DACB); Teknaf Game Reserve, Whykeon Range, Rhykong beat, 29.09.2005, Hosne Ara HA 2356 (DACB); Upper Rezu range, 29.09.2005, Hosne Ara HA 2402 (DACB); Chota Inani 30.09.2005, Hosne Ara HA 2431 (DACB); Bara Inani, 30.09.2005, Hosne Ara HA 2461 (DACB); Swankhali, 30.09.2005, Hosne Ara HA 2500 (DACB); Himchari, 30.09.2005, Hosne Ara HA 2521 (DACB); Cox's bazar town area, 30.09.2005, Hosne Ara HA 2561 (DACB); Eidgah, 01.10.2005, Hosne Ara HA 2565 (DACB).

Dhaka: Dhaka, 21.07.1946, Sukdev (DUSH); Air port area, 19.09.1970, A.M. Huq 166 (DACB); Khilgaon area, 15.04.1988, Hosne Ara HA 4 (DACB); Khilgaon, Tilpapara, 26.08.2002, Hosne Ara HA 136 (DACB); Bangladesh National Herbarium garden (Cultivated), 26.06.2015, Hosne Ara HA 2886 (DACB) [Originally collected from Moulvibazar district].

Dinajpur: Khansama, Hossainpur, 24.08.1998, Mia *et al.* M 4170 (DACB); Town area, 17.08.2005, Hosne Ara HA 2026 (DACB); Ramsagar, 17.08.2005, Hosne Ara HA 2064 (DACB); Singra forest, 18.08.2005, Hosne Ara HA 2072 (DACB); Near Birgonj Sal forest, 18.08.2005, Hosne Ara HA 2126 (DACB); Near Nawabgonj Sal forest, 18.08.2005, Hosne Ara HA 2136 (DACB); Ranigonj, 19.08.2005, Hosne Ara HA 2163 (DACB); Fultala, 19.08.2005, Hosne Ara HA 2173 (DACB).

Gazipur: Burulia village, 25.07.2004, Hosne Ara HA 1079 (DACB); Kaliakair, 19.08.2005, Hosne Ara HA 2203 (DACB).

Habiganj: Kalenga beat, Kalenga, 16.05.2005, Hosne Ara HA 1537 (DACB); Satchari forest area, 17.05.2005, Hosne Ara HA 1582 (DACB); 07.07.2005, Hosne Ara HA 1871 (DACB).

Jessore: Rupganj, 29.08.1983, Huq, Mia & Mahbuba H 5974 (DACB); Monirampur, 05.01.2004, M. Khatun 382 (DUSH).

Khagrachari: Matiranga, 26.06.1985, Huq & Mia H 7171 (DACB); Alutilla, 11.07.2003, Hosne Ara & Sarder Nasir Uddin HA 462 (DACB); Jamtoli, 12.07.2003,

Hosne Ara & Sarder Nasir Uddin HA 489 (DACB); Narikal Begun College road, 12.07.2003, Hosne Ara & Sarder Nasir Uddin HA 503 (DACB).

Kurigram: Razarhat, 31.10.2007, Bushra, Habib & Mofiz B 430 (DACB).

Moulvibazar: Madhabkundo, 05.06.1998, Hosne Ara HA 33 (DACB); Madhabkundochara, 25.06.2001, Sarder Nasir Uddin N 1093, 1094 (DACB); 07.07.2002, Hosne Ara & Sarder Nasir Uddin, HA 124 (DACB); 04.05.2003, Hosne Ara HA 248 (DACB); Sreemongal, Lawachara, 15.05.2005, Hosne Ara HA 1474 (DACB); Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1619 (DACB); Muraichara, 19.05.2005, Hosne Ara HA 1671 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1711 (DACB); Gazipur beat, Harargonj reserve forest, 21.05.2005, Hosne Ara HA 1744 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1751 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1786 (DACB); Gazipur beat, Harargonj reserve forest, 05.07.2005, Hosne Ara HA 1800 (DACB); Madhabkundo, 06.07.2005, Hosne Ara HA 1824 (DACB); Adampur beat, Kowargola forest, 07.09.2005, Hosne Ara HA 2215 (DACB); Muraichara beat, Ichachhara forest, 07.05.2010, Hosne Ara HA 2757 (DACB); Muraichara beat, Awolachara punji, 07.05.2010, Hosne Ara HA 2764 (DACB); Town area, 07.05.2010, Hosne Ara HA 2768, 2769 (DACB).

Mymensingh: Mymensingh University Campus, 19.09.1980, Mia, Huq, & Rahman M 413 (DACB); Haluaghat thana, Koroitoli, 20.06.2004, Hosne Ara HA 907 (DACB).

Narsingdi: Narsingdi Sadar, 07.07.2005, Hosne Ara HA 1880 (DACB).

Narayanganj: Sonargaon, 03.10.1977, Huq & Rahman H 3491 (DACB); 07.07.2005, Hosne Ara HA 1909 (DACB).

Netrakona: Durgapur thana, Bijoypur, 16.06.2004, Hosne Ara HA 751 (DACB); Fantha, 17.06.2004, Hosne Ara HA 774 (DACB); Vabanipur, 18.06.2004, Hosne Ara HA 848 (DACB); Farangpara, 18.06.2004, Hosne Ara HA 867 (DACB).

Panchagarh: Banglabanda, Tetulia upazila, 17.08.2005, Hosne Ara HA 1976 (DACB).

Patuakhali: Patuakhali Sadar, Sobujbag, 21.07.1998, M. Sultana 08 (DUSH); Kalapara, Kuakata, 23.07.1998, M. Sultana 80 (DUSH); Galachipa, Noluabaghi,

31.01.1999, M. Sultana 234 (DUSH); Kalapara, Dhankhali, 12.03.1999, M. Sultana 337 (DUSH); Patuakhali Sadar, Lohalia, 17.11.2004, M. Sultana 451 (DUSH); Galachipa, Rangabali, 24.03.2006, M. Sultana 1194 (DUSH); Bauphal, Bogha, 03.06.2006, M. Sultana 1379 (DUSH); Galachipa, Majher char, 17.12.2010, M. Sultana 1843 (DUSH).

Rangamati: Shubalong, 22.11.1980, Khan, Huq, Rahman & Mia K 6166 (DACB); Kaptai, Sitapahar, 27.06.1998, Rahman & Toha *et al.* 3230 (HCU); 17.08.1998, Rahman & Toha 3286, 3289, 3290, 3294, 3296 (HCU); Kaptai, Debarmatha, 09.10.1998, Rahman, David, Khan 3607 (HCU); Rangamati Road, Shapchari, Manikchari, 30.08.1999, Boyce, Toha & Rahman 5398 (HCU, K); Kaptai, Shilsori Village, 09.07.2003, Hosne Ara & Sarder Nasir Uddin HA 445 (DACB); Tourist spot, Hanging bridge area, 18.09.2004, Hosne Ara HA 1092 (DACB); Rangamati DC Bangloo area, 20.09.2004, Hosne Ara HA 1157 (DACB).

Sherpur: Bakshigonj, Lawchapra, Dumurtola, 08.10.2003, Hosne Ara HA 593 (DACB); Rangtia range, Gazni beat, 09.10.2003, Hosne Ara HA 634 (DACB); Rangtia range, Samaschura beat, 10.10.2003, Hosne Ara HA 678 (DACB); Rangtia range, Gazni beat, 21.06.2004, Hosne Ara HA 921 (DACB); Ghenaigati thana, Samaschura beat, Samaschura forest, 23.06.2004, Hosne Ara HA 1063 (DACB); Gazni, 15.05.2007, Ershad Tutul 07 (DUSH).

Sunamganj: Sunamganj town area, 06.06.1998, Hosne Ara HA 42 (DACB).

Tangail: Modupur, Rasulpur, 06.10.2003, Hosne Ara HA 550 (DACB); Mirzapur, 19.08.2005, Hosne Ara HA 2193 (DACB).

Thakurgaon: Dhamagar, 17.08.2005, Hosne Ara HA 2006 (DACB).

Economic uses/values/harmful aspects: It has been an important foodstuff in tropical and subtropical regions for more than two thousand years. In Bangladesh, it is commercially cultivated all over the country. It plays an important role in meeting the demand for vegetables during the post-monsoon season when other vegetables are scarce. Almost the entire plant including the leaves, petioles, flowers, corms and stoloniferous runners are consumed as vegetables.

Ethanol extract of corms is hypotensive. Juice of leaves and roots is used in cancer treatment of the nose and warts. Leaves and raw corms cause severe irritation in the

mouth. Juice of the petioles is used as a styptic or astringent, stimulant and rubefacient and also in athlete's feet. Corm juice is a trypsin inhibitor and also used in alopecia and scorpion sting (Ghani, 2003).

Ethnobotanical information: The paste of petiole of the plant, if coated on the wound, prevents bleeding and acts as an antiseptic. The petiole of this plant is also used for curing the itching ear and ear infections (Hassan, 1988).

36. *Colocasia esculenta* (L.) Schott var. *antiquorum* (Schott) Hubb. & Rehder, Bot. Mus. Leaflet. 1 (1): 5 (1932). A Hay *et al.*, Blumea Supplement 8: 45 (1995). **Photo 27 (Page no. 246, 248).**

Type : 1079.4 (LINN).

Bengali / Local names: *Mukhi Kachu*.

English name: Not Known.

Herb with underground small corm but cormels are large and many. Petiole c 100 cm long, green or purple. Leaf blade broadly ovate-cordate, membranous, dark green above with a deep violet interveinal zone or dark green above and light green beneath. Peduncle green or dark purple, c 40 cm long, c 1.1 cm in diameter. Spathe 30.5-40.0 cm long, constricted, one constriction present between tube and limb, tube 8.5-10.0 cm long, light green, blade 24-30 cm long, c 5.5 cm in diameter at the middle, both side of the lower spathe green and both side of the limb light or golden yellow and more leathery, tip of the spathe pointed, green, c 0.5 cm long. Spadix shorter than the spathe, 19-27 cm long, female portion 2.3-3.2 cm long, 0.9-1.1 cm in diameter at the base, staminode portion 1.5-2.0 cm long, 0.5-0.8 cm in diameter at the base, cream, sterile portion 3-4 cm long, 0.5-0.8 cm in diameter, male portion 3.5-4.0 cm long, 0.6 cm in diameter, cream, appendix 8-13 cm long, 0.6-0.8 cm in diameter, cream and tip of the appendix blunt, not green in colour. Ovary green, c 3 × 3 mm, style short, stigma c 1 mm in diameter, light yellow. Staminode c 3 × 2 mm, cream in colour. Male flower 6-8 androus.

Flowering and fruiting period: May to October.

Chromosome number: 2n = 42 (Worked out in Cytogenetics Lab., DU).

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Habitat: Sides of streams, ditches, water-logged low-lying areas, shady secondary forests and plantations.

Distribution: Bangladesh, Pan-tropical.

Specimes examined:

Dinajpur: Dinajpur town area, 17.08.2005, Hosne Ara HA 2027 (DACB); Singra forest, 18.08.2005, Hosne Ara HA 2073 (DACB); Birgonj Sal forest, 18.08.2005, Hosne Ara HA 2127 (DACB); Nawabgonj Sal forest, 18.08.2005, Hosne Ara HA 2137 (DACB); Ranigonj, 19.08.2005, Hosne Ara HA 2164 (DACB).

Panchagarh: Tetulia upazilla, Banglabanda, 17.08.2005, Hosne Ara HA 1977 (DACB).

Thakurgaon: Dharmagar, 17.08.2005, Hosne Ara HA 2007 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 26.06.2015, Hosne Ara HA 2887 (DACB) [Originally collected from Panchagarh district].

Economic uses/values/harmful aspects: In Bangladesh, it is commercially cultivated all over the country. Almost the entire plant including the leaves, petioles, flowers and cormels are consumed as vegetables.

Ethnobotanical information: Not known.

37. *Colocasia esculenta* (L.) Schott var. *aqualitis* Hassk., Pl. Jav. Rar.: 150 (1848). A. Hay *et al.*, Blumea Supplement 8: 45 (1995). **Photo 28 (Page no. 248).**

Type: ? Hasskarl (? L).

Bengali / Local names: *Lati Kachu*.

English name: Not Known.

Herb with underground small tuber, c 3 × 4 cm, always stolons are produced from the main tuber. Petiole 75-108 cm long, green or purple. Leaf blade peltate, ovate or triangular, c 36.0 × 22.5 cm, sinus 8-10 cm long, dark green above and light green beneath. Peduncle green or dark purple. Spathe constricted, c 25 cm long, tube c 3 cm long, blade c 22 cm long, golden yellow, one constriction present between tube and limb, tip of the spathe pointed, green, c 0.3 cm long, both side of the lower spathe green and both side of the limb golden yellow and leathery. Spadix shorter than the

(Photo 27) 248

spathe, c 10 cm long, female portion 1.6-2.0 cm long, c 0.6 cm in diameter at the base, staminode portion absent, sterile portion c 1.5 cm long, cream colour, male portion 3.0-3.5 cm long, c 0.6 cm in diameter, golden yellow, appendix c 2.5 cm long, c 0.4 cm in diameter at the base, golden yellow and not pointed. Ovary green, c 1.5 × 2.0 mm, style short, stigma c 1 mm in diameter, yellow colour. Male flower 6-8 androus.

Flowering and fruiting period: May to October.

Chromosome number: Not known.

Habitat: Sides of streams, ditches, water-logged low-lying areas, shady secondary forests and plantations.

Distribution: Bangladesh, Pan-tropical.

Specimens examined:

Cox's Bazar : Teknaf, 28.10.1963, M. S. Khan 637 (DUSH).

Moulvibazar: Gazipur beat, Hararganj reserve forest, 21.05.2005, Hosne Ara HA 1738 (DACB).

Narayanganj: Sonargaon, 07.07.2005, Hosne Ara HA 1917 (DACB).

Rangamati: DC Bangloo area, 20.09.2004, Hosne Ara HA 1157 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 30.06.2015, Hosne Ara HA 2888 (DACB) [Originally collected from Rangamati district].

Economic uses/values/harmful aspects: In Bangladesh, it is commercially cultivated all over the country. Almost the entire plant including the leaves, petioles, flowers and stoloniferous runners are consumed as vegetables.

Ethnobotanical information: Not known.

38. *Colocasia fallax* Schott in Bonplandia 7: 28 (1859); Prodr. Syst. Aroid.: 138 (1860). Hook. f., Fl. Brit. India 6: 524 (1893-reprint 1954); Krause in Engler, Pflanzenr. 71 (IV. 23E): 64 (1920); Haines, Bot. Bihar and Orissa: 868 (1924-reprint 1978); Mitra, Fl. Pl. E. India 1: 78 (1958); Hu, Dansk Bot. Arkiv 23 (4): 429 (1968); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 10 (1989); Notile, Fl. Bhutan

3(1): 136-137(1994); Hajra & Verma, Fl. Sikim 1: 192 (1996); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 272 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 45-46 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 75 (2010).

Photo 29 (Page no. 252).

Colocasia kerrii Gagnep., Not. Syst. Paris 9: 130 (1941), *et in* Lecomte, Fl. Gen. Indo-chine 6: 1139 (1942).

Type: Silhet (Wallich n. 8944); Assam (Sheik Mokim n. 145-Herb Calcutta).

Key to the varieties

- | | |
|--|-----------------|
| 1. Petiole and peduncle green with purple to light purple admixture, peduncle c 20 cm long | purpurea |
| - Petiole and peduncle green throughout the length, peduncle c 28 cm long | fallax |

var. **fallax**

Bengali / Local name: *Ban Kachu*.

English name: Not known.

A herb, 30-45 cm high, rhizome 2.0-3.5 cm in diameter, freely rooting at the nodes. Stolon c 29 cm long, c 0.4 cm in diameter. Leaf blade 10-28.5 × 8-20 cm, narrowly oblong-ovoid, apiculate, base rounded with a shallow rounded sinus, sinus 0.2-1.0 cm long, slightly glaucous beneath, dark green above and light green beneath, intramarginal veins several, petiole longer than the blade, 12-81 cm long, sheathing for almost half the length, sheaths reddish-brown. Peduncle slender, 8-28 cm long, light green. Spathe erect, basal section 1.8-2.0 × 1.0-1.3 cm, green, blade narrowly lanceolate, very finely acuminate, orange-yellow, 6-14 cm long, thick, spathe and spadix almost equal in length. Female part of spadix 1.2-1.9 × 0.5 cm with 4-6 rows of whitish sterile ovaries at the base, no narrowed zone of neuters above, male part 1.1-1.4 × 0.4 cm, anthers oblong, slightly compressed with the flat top crenulate, dehiscing by apical pores, appendix 2.7-3.0 × 0.1-0.2 cm, acute, scaly-rough, with several rows of sterile male flowers at the base, 0.5-0.6 cm long, c 0.3 cm in diameter.

Ovaries sub-globose, c 1.1 mm in diameter, 1-locular, ovules many, hemiorthotropous on the parietal placentation, green, style short, stigma disciform. Fruit many-seeded, ovoid to ellipsoid.

Flowering and fruiting period: May-July.

Chromosome number: $2n = 42$ (Kumar and Subramaniam, 1986).

Habitat: Evergreen forests with deep humus soil and by the side of small streams.

Distribution: Bangladesh, Northern India eastward through Nepal, Sikkim, Khasia to Yunnan (southern China) and northern Thailand.

Specimens examined:

Cox's Bazar: Himchari, 30.09.2005, Hosne Ara HA 2531 (DACB).

Moulvibazar: Madhabkundo, 05.06.1998, Hosne Ara HA 34 (DACB); 05.07.2002, Hosne Ara & Sarder Nasir Uddin HA 92 (DACB); 04.05.2003, Hosne Ara HA 248 (DACB); 20.05.2005, Hosne Ara HA 1708 (DACB); 06.07.2005, Hosne Ara HA 1846 (DACB); 03.12.2014, Hosne Ara HA 2866 (DACB).

Rangamati: Kaptai, Sita Pahar, 17.08.1998, Rahman & Toha 3297 (HCU), Kaptai Lake, Shubalong, 05.09.1999, Boyce, Toha & Rahman 5650 (HCU, K); Shubalong water fall area, 19.09.2004, Hosne Ara HA 1127 (DACB).

Sherpur: Bakshigonj, Lawchapra, Dumurtola, 08.10.2003, Hosne Ara HA 595 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 20.06.2015, Hosne Ara HA 2882 (DACB) [Originally collected from Madhabkundo forest under Moulvibazar district].

Economic uses/values/harmful aspects: This species is used as a leafy vegetable in Yunnan and southern China (Heng, 1979). It may also be cultivated as an ornamental plant.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 7 (2): 85-87, 2000).

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39. Colocasia fallax Schott var. *purpurea* H. Ara & M.A. Hassan, **var. nov. Photo 30 (Page no. 255).**

Colocasia fallax Schott var. *purpurea* H. Ara & M.A. Hassan is very closely related to *Colocasia fallax* Schott var. *fallax* but they are differentiated by (i) petiole colour, (ii) length of sterile male zone and (iii) chromosome number.

Holotype: Bangladesh, Moulvibazar district, Madhabkundo reserve forest, 20.05.2005, Hosne Ara HA 1709 (DACB).

Bengali / Local name: *Ban Kachu*.

English name: Not known.

A herb, 30-68 cm high, rhizome c 1.5 cm in diameter, freely rooting at the nodes. Stolon c 39 cm long, c 0.5 cm in diameter. Leaf blade 10-25 × 8-23 cm, narrowly oblong-ovate, apiculate, base rounded with a shallow rounded sinus, sinus 0.2-1.0 cm long, slightly glaucous beneath, dark green above or dark green above with a deep violet interveinal zone and light green beneath, intramarginal veins several, petiole longer than the blade, 12-68 cm long, sheathing for almost half the length, green with purple, light and deep purple. Peduncle slender, 8-20 cm long, green with purple. Spathe erect, basal section 1.6-2.3 × 1.0-1.3 cm, green, blade narrowly lanceolate, very finely acuminate, orange-yellow, 6.0-14.5 cm long, more thick. Spadix shorter than spathe, female part 1.2-2.0 × 0.5-0.6 cm with 4-6 rows of whitish sterile ovaries at the base, no narrowed zone of neuters above, male part 1.5-2.1 × 0.4-0.6 cm, anthers oblong, slightly compressed with the flat top crenulate, dehiscing by apical pores, appendix 3.5-5.7 × 0.2-0.3 cm, acute, scaly-rough, with several rows of sterile male flowers at the base, c 1.1 cm long, c 0.3 cm in diameter. Ovaries sub-globose, c 1.1 mm in diam., 1-locular, ovules many, hemiorthotropous on the parietal placentation, green, style short, stigma disciform. Fruit many-seeded, ovoid to ellipsoid.

Flowering and fruiting period: April to September.

Chromosome number: $2n = 30$ (Begum and Alam, 2009).

Habitat: Grows on the hill slopes as under growth.

Distribution: North-Eastern part of Bangladesh, Moulvibazar district (within greater Sylhet).

Specimens examined:

Bandarban: Betchari forest area, 22.09.2004, Hosne Ara HA 1188 (DACB); Thanchi, 24.09.2004, Hosne Ara HA 1358 (DACB).

Moulvibazar: Madhabkundo reserve forest, 20.05.2005, Hosne Ara HA 1709 (DACB); 06.07.2005, Hosne Ara HA 1844 (DACB); 03.12.2014, Hosne Ara HA 2867 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 20.06.2015, Hosne Ara HA 2883 (DACB) [Originally collected from Madhabkundo forest under Moulvibazar district].

Economic uses/values/harmful aspects: Not available.

Ethnobotanical information: Not available.

Etymology: The variety is named after light purple colour character of its petiole and peduncle.

The major morphological and cytological differences between two taxa of *Colocasia fallax* Schott are outlined in Table-6.3.

Table-6.3. **Morphological and Cytological comparison of *Colocasia fallax* Schott var. *purpurea* H. Ara & M.A. Hassan, var. nov. with *Colocasia fallax* Schott var. *fallax***

Characters	<i>Colocasia fallax</i> Schott var. <i>purpurea</i> H. Ara & M.A. Hassan	<i>Colocasia fallax</i> Schott var. <i>fallax</i>
Petiole	petiole and peduncle green with purple to light purple admixture	petiole and peduncle green throughout the length
Sterile male zone	more than 1cm (1.1 cm long)	less than 1 cm (0.5-0.6 cm long)
Chromosome number	30	28
Acrocentric chromosome	1 pair acrocentric chromosomes present	no acrocentric chromosomes present

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Characters	<i>Colocasia fallax</i> Schott var. <i>purpurea</i> H. Ara & M.A. Hassan	<i>Colocasia fallax</i> Schott var. <i>fallax</i>
Small chromosome	7 pairs of very small chromosomes present	No very small chromosomes present
CMA-Band	CMA-positive bands 2	CMA-positive bands 8

40. *Colocasia gigantea* (Blume) Hook. f., Fl. Brit. India 6: 524 (1893-reprint 1954). Hu, Dansk Bot. Arkiv 23(4): 429 (1968); Hotta, Mem. Fac. Sci. Kyoto Imp. Univ., Ser. Biol. 4: 94 (1970); A. Hay, Sandakania 7: 36-39 (1996); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 273 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 46-47 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 74 (2010).

Photo 31 (Page no. 258).

Caladium giganteum Blume ex Hassk., Cat. Hort. Bogor. 56 (1844).

Leucocasia gigantea (Blume) Schott, Oesterr. Bot. Wochenbl. 7: 34 (1857); Gen. Aroid. 38 (1859), *et* Prodr. Syst. Aroid. 141 (1860).

Colocasia indica Engler in DC., Monogr. Phan. 2: 494 (1879), *et* Pflanzenr. 71 (IV. 23 E): 69-70 (1920), p.p., non Kunth. Enum. 3: 39 (1854).

Type: Indonesia, Java. *Blume s.n.* (L!, holo).

Bengali / Local name: *Salad Kachu*.

English name: Giant Elephant Ear, Indian Taro.

Perennial evergreen herb with a stout short above-ground stem, creeping to decumbent, clothed with marcescent leaf bases, 20-50 cm long, 4-6 cm in diameter, stolons 2-4, trailing horizontally, branching, thin, pale green, 30-40 cm long, 0.4-0.5 cm in diameter. Leaves several together, petiole light green, pruinose, 80-120 cm long, lower half of the length sheathing, blade ovate-cordate, apex short acuminate, undulate along the margin, base deeply cordate, sinus open, peltate, 50-58 × 30-52

cm, green or pale green above, glaucous below, primary lateral veins 6-7 pairs. Inflorescence 5-8 in each axil of leaf. Peduncle cylindrical, shorter than the petiole, 30-54 cm long, 1-2 cm in diameter, each one with a membranous cataphyll, nearly equalling the length of the peduncle. Spathe white, oblong, distinctly constricted, 12-24 cm long, tube light green, ellipsoid, inrolled, 3.5-5.0 cm long, limb white, erect, 8.5-19.0 cm long, boat-shaped, 3.0-5.5 cm in diameter, deciduous. Spadix sessile, shorter than the spathe, 9-20 cm long. Female portion yellow, conic, 1.5-2.0 cm long, 1.5-2.0 cm in diameter, ovaries numerous, narrow, ovules scattered, placentation parietal, style distinct but very short, less than 0.5 mm long, stigma light yellow, c 2 mm in diameter. Sterile portion slender, 3.0-4.5 cm long. Male portion 5-14 cm long, c 1.1 cm in diameter, appendix very short, acute, 1-5 mm long, surface slightly and irregularly rugose. Flowers unisexual, naked. Fruit an oblong berry, c 5 mm long, seeds many, spindle-shaped, with many distinct longitudinal striates.

Flowering and fruiting period: April-September. Flowering of the plant is not an annual phenomenon but occurs at an intervals of 6-7 years.

Chromosome number: $2n = 28, 42$ (Petersen, 1989).

Habitat: Shady places of hill slopes and foothills.

Distribution: Bangladesh, Native of southern China and Indo-China to the Malay Peninsula and Sumatra and Java of Indonesia.

Specimens examined:

Bandarban: On the way of Betchari, 22.09.2004, Hosne Ara HA 1254, 1255 (DACB); Kulpara, 23.09.2004, Hosne Ara HA 1290 (DACB); Betchari forest area, 23.09.2004, Hosne Ara HA 1355 (DACB).

Khagrachari: Jamtoli, 12.07.2003, Hosne Ara and Sardar Nasir Uddin HA 483 (DACB).

Patuakhali: Patuakhali Sadar, Lohalia, 19.11.2004, M. Sultana 500 (DUSH); Galachipa Amkhola, 01.02.2007, M. Sultana 1453 (DUSH).

Rangamati: Kaptai, Shilsori village, 08.07.2003, Hosne Ara & Sardar Nasir Uddin HA 390, 415 (DACB); Silchari, 08.07.2003, M. Khatun 334 (DUSH); Kaptai,

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Sitapahar, 14.10.2003, Hosne Ara HA 712 (DACB); Rajbari area, 18.09.2004, Hosne Ara HA 1119 (DACB).

Dhaka: BADC office, Airport road (Cultivated), 22.04.2006, Hosne Ara HA 2627 (DACB) [Originally collected from Panchari under Khagrachari district]; Bangladesh National Herbarium garden (Cultivated), 30.04.2008, Hosne Ara HA 2741 (DACB) [Originally collected from Shilsori village under Rangamati district].

Economic uses/values/harmful aspects: The petioles and leaves of the plant are rich in iron, calcium and vitamin C. In Bangladesh, children and women generally suffer from a deficiency of iron, calcium and vitamin C and, as such, the plant may be consumed as a supplement. The plant can be cultivated in kitchen gardens for ready availability. It is also cultivated for its edible petioles (Hotta, 1970).

Ethnobotanical information: The indigenous people of Bangladesh use the petiole of the plant in salads. Leaves and petioles are also used in curries.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 13 (2): 83-91, 2006).

41. *Colocasia hassanii* H. Ara, sp. nov. Photo 32 (Page no. 262).

Colocasia hassanii H. Ara is closely related to *Colocasia esculenta* (L.) Schott but can be easily differentiated by the (i) number of constriction (two) present in spathe, (ii) the presence of sterile male zone in spadix and (iii) bitter in taste.

Bengali / Local name: *Tita Kachu*.

English name: Bitter Taro (proposed).

Holotype: Bangladesh, Bandarban district, On the way of Betchari, 22. 09. 2004, Hosne Ara HA 1215, 1216 (DACB).

Annual herb with perennial, underground small cormous herb, corm c 2.5 cm in diameter, and c 2 cm high, stolons 1-2, trailing horizontally, non-branching, thin, pale green or pale purple, c 20 cm long, ca. 0.5 cm in diameter. Leaves 4-6; petiole 20-65 cm long, sheathing for about 1/3 at the base; blade peltate, 15-45 x 8.0-30 cm, ovate, acute, cordate, dark green above and light green beneath, base shallowly cordate,

glaucous, venation pinnately reticulate, sinus 1-3 cm long. Inflorescence 1-2. Peduncle 10-14 cm long, shorter than petiole. Spathe having two constriction, 15.0-25.5 cm long, lower convolute part (tube) light green, 4.0-6.5 cm long, c 2 cm in diameter, nearly cylindrical; upper part lanceolate, light yellow, 11-19 cm long. Spadix sessile, shorter than spathe, 10-19 long, female zone cylindrical, 2.8-3.0 cm long, c 1 cm in diameter; staminode c 1.8 cm long, creamy; sterile portion slender, c 1.8 cm long, creamy, c 0.4 cm broad at the middle; male portion 2.1-2.8 cm long, 0.4-0.5 cm in diameter; a sterile male portion present below the appendix, 0.4-0.5 cm long, c 0.2 cm in diameter; appendix 6.5-10.0 cm long, 0.3-0.5 cm in diameter. Ovaries numerous, narrow, green, 3-5 x 2-3 mm; style very short, green; stigma c 0.05 cm in diameter, yellow, parietal placentation, ovule 6, c 1.5 x 1.0 mm; staminode cream colour, c 0.15 x 0.2 cm; male flower 6-8 androus, c 0.1 x 0.12 cm. Fruit a berry.

Flowering period: June to October.

Chromosome number: $2n=28$ (Worked out in Cytogenetics Lab., DU).

Habitat: Grows in the hilly areas as under growth.

Distribution: Eastern hilly areas of Bangladesh (Bandarban and Rangamati hill districts and Moulvibazar district of greater Sylhet).

Specimens examined:

Bandarban: On the way of Betchari, 22.09.2004, Hosne Ara HA 1215, 1216 (DACB); Meghla forest area, 23.09.2004, Hosne Ara HA 1291, 1292 (DACB).

Cox's Bazar: Chota Inani, 30.09.2005, Hosne Ara HA 2432 (DACB); Bara Inani, 30.09.2005, Hosne Ara HA 2462 (DACB); Himchari area, 30.09.2005, Hosne Ara HA 2522 (DACB).

Khagrachari: Alutilla, 11.07.2003, Hosne Ara & Sarder Nasir Uddin HA 461 (DACB); Jamtoli, 12.07.2003, Hosne Ara HA 484 (DACB).

Moulvibazar: Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1747 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1777 (DACB); Adampur beat, Kawargola forest, 06.10.2005, Hosne Ara HA 2625 (DACB).

Rangamati: Kaptai, Shilsori village, Velbapara, 08.07.2003, Hosne Ara & Sarder Nasir Uddin HA 391 (DACB); Kaptai, Sitapahar, 14.10.2003, Hosne Ara HA 711 (DACB); Rajbari area, 18.09.2004, Hosne Ara HA 1122 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 18.06.2015, Hosne Ara HA 2881 (DACB) [Originally collected from Bandarban district].

Economic uses/values/harmful aspect: The petioles of the plants are used as a vegetable.

Ethnobotanical information: The indigenous people of Bangladesh use the petioles in curries.

Etymology: This species is named in honour of Dr. Mohammad Abul Hassan, Professor of Botany, University of Dhaka, who has made outstanding contribution to the taxonomy of flowering plants of Bangladesh.

The major morphological differences between two taxa of *Colocasia* Schott are outlined in Table-6.4.

Table 6.4. **Morphological comparison of *Colocasia hassanii* H. Ara sp. nov. with *Colocasia esculenta* (L.) Schott**

Character	<i>Colocasia hassanii</i> H. Ara	<i>Colocasia esculenta</i> (L.) Schott
Petiole	c 62 cm long, green or purple, spotted	c 100 cm long, green or purple, not spotted
Spathe	two constrictions present between tube and limb	one constriction present between tube and limb
Tip of the spathe	Tip of the spathe c 0.7 cm long.	tip of the spathe c 0.3 cm long
Tube and limb of the spathe	both side of the lower spathe light green and both side of the limb light yellow and leathery	both side of the lower spathe green and both side of the limb golden yellow and leathery
Spadix	sterile male portion (0.4-0.5 cm long) present	sterile male portion absent

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Character	<i>Colocasia hassanii</i> H. Ara	<i>Colocasia esculenta</i> (L.) Schott
Tip of the appendix	pointed, c 0.7 cm long	obtuse (blunt)
Taste	bitter	not bitter

42. *Colocasia heterochroma* H. Li *et* Z. X. & Wei, Acta Bot. Yunnan. 15 (1): 16-17 (1993). Govaerts & Frodin, world Cheekl. Bibliog. Araceae: 273 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 47-48 (2007). **Photo 33 (Page no. 266).**

Type: China (Yunnan), Li Heng 9108.

Bengali / Local name: *Bahari Kachu*.

English name: Not known.

Cormous herb, corm c 1.5 cm in diameter and c 1 cm high. Stolons very slender, more or less concealed with thin, dark brown cataphylls. Leaves usually 4-5, petioles pale green, 17-25 × 0.3 cm, longer than the blade, blade 6.5-16.0 × 5-12 cm, ovate-cordate, membranous, peltate, tip acute, margin entire, base rounded with a shallow rounded sinus, sinus 0.5-1.5 cm long, dark green above with a deep violet interveinal zone, light green beneath, slightly glaucous. Inflorescence 1-2. Peduncle 4-8 cm long, shorter than the petiole. Spathe 7.0-9.5 cm long, having two constrictions, one between the tube and the blade and the other within the blade above the male zone dividing the blade into lower and upper parts, spathe tube 1.5 × 1.5 cm, green, lower part of blade 0.7-1.3 × 1.3 cm, inside dark violet and outside yellow, upper part narrowly lanceolate, 5.8-6.7 cm long with yellow colour on both sides, tip acuminate. Spadix cylindrical, 9.2-12.0 cm long. Female zone 1.0-1.2 cm long, zone of sterile flowers 0.5-0.7 cm long, male zone 1.9-2.3 cm long, appendix 5.8-7.8 × 0.3 cm, rough, narrowed at the base. Male flowers 10-12 androus. Stamens connate into subtruncate synandrium, thecae lateral, oblong-linear, dehiscing by the apical pore. Ovary sub-globose, 1-locular, ovules many, hemiorthotropous on parietal placentation, stigma sessile, disciform, green.

Flowering and fruiting period: July-August.

Chromosome number: Not known.

Habitat: Moist, shady hill slopes at an altitude of 200 m.

Distribution: Bangladesh, Southwest China (Heng and Wei, 1993).

Specimens examined:

Bandarban: Keochia, Chimbuk, 08.09.1999, Boyce, Toha & Rahman 5762 (HCU, K).

Rangamati: Kaptai Lake, Sitapurdah, 03.09.1999, Boyce, Toha & Rahman 5547 (HCU, K); Kaptai Lake, Shubalong, 05.09.1999, Boyce, Toha & Rahman 5652 (HCU, K); Kaptai, Sitapahar, 22.09.2002, Sarder Nasir Uddin N 1442 (DACB); 08.07.2003, Hosne Ara and Sarder Nasir Uddin HA 437 (DACB).

Dhaka: Bangladesh National Herbarium garden 30.07.2004, Hosne Ara HA 1086 (DACB) [Originally collected from Sitapahar under Rangamati district].

Economic uses/values/harmful aspects: It may be cultivated as an ornamental plant because of its variegated leaves and showy inflorescence.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 32 (2): 129-131, 2003).

43. *Colocasia lihengiae* C.L. Long *et* K.M. Liu, Bot. Bull. Acad. Sin. 42: 313-317 (2001). Gogoi and Borah, Gard. Bull. Singapore 65 (1): 33-35 (2013); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 48 (2007). **Photo 34 (Page no. 266).**

Holotype/Type: China. Yunnan Prov.: Mengla, Mengxing. River watershed, in a valley with dense rainforest, 20.06.1998, Long Chun-lin & Li Meilan 9806 (Holotype: KUN); Paratype: 18.07.1998, Long Chun-lin & Li Meilan 9824 (KUN), cultivated in Kunming Botanical Garden.

Bengali / Local name: *Jongle Kachu*.

English: Not known.

Terrestrial perennial herb with stolons, rhizome erect, 4-8 cm long, 2-3 cm in diameter, stolons 6-12, trailing horizontally, non-branching, thin, pale green or pale

purple, 70-80 cm long, c 0.5 cm in diameter, with dark green cataphylls. Leaves 4-6, petiole cylindrical, light green, reddish-purple, 80-120 cm long, blade peltate, sagittate-cordate, membranous, 30-40 cm long, 18-25 cm wide, upper surface glossy green, lower surface pale green, primary lateral veins 6 pairs, pale green, marginal veins inconspicuous. Inflorescence 4-6, peduncle cylindrical, pale green, 40-50 cm long, much shorter than the petiole. Spathe constricted in the middle, lower convolute part (tube) yellowish-green, 4-5 cm long, c 2 cm in diameter, nearly cylindrical, lamina oblong-lanceolate, golden yellow, 11-13 cm long, c 4 cm wide, reflexed. Spadix fragrant, female zone golden yellow, cylindrical, 2.0-2.5 cm long, c 0.7 cm in diameter, male zone cylindrical, yellow, c 3.5 cm long, 0.6-0.8 cm in diameter, neuter flower zone between the female and male zones, cylindrical, c 1 cm long, 0.4-0.5 cm in diameter, appendix absent, female flowers obovoid, carpels 3 or 4, ovary unilocular, placentae 2, parietal, ovules spindle-shaped, nearly erect, numerous, stigma sessile, discoid, synandria 8-10 androus, c 0.1 cm long, yellow.

Flowering and fruiting period: May-July.

Chromosome number: $2n = 28$ (Long and Liu, 2001).

Habitat: Limestone areas in deep forests, shady places of hill slopes and at the foothills.

Distribution: Bangladesh, Yunnan (southern China).

Specimens examined:

Bandarban: Thanchi forest area, 24.09.2004, Hosne Ara HA 1357 (DACB); Pavel Partha 748 (JUH).

Dhaka: Khilgaon, Tilpapara (Cultivated), 05.05.2005, Hosne Ara HA 1465 (DACB) [Originally collected from Thanci under Bandarban district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 34 (2): 115-120, 2005).

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44. *Colocasia mannii* Hook. f., Fl. Brit. India 6: 524 (1893-reprint 1954); Krause in Engler, Pflanzenr. 71 (IV. 23E): 69 (1920); Mitra, Fl. Pl. E. India 1: 78 (1958); Rao and Verma, Bull. Bot. Surv. India 18 (1-4): 27 (1976); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 10 (1989); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 273 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 48-49 (2007). **Photo 35 (Page no. 268).**

Type: Assam (Herb. Kew).

Bengali / Local name: *Jongle Kachu*.

English name: Not known.

A herb, rhizome 5-6 cm long, 3-4 cm in diameter, stolon absent. Leaves several together, petiole purple-green, 50-87 cm long, sheathing in the lower one-third, blades oblong-ovate, 25-41 × 13-25 cm, sagittate with a broad sinus, tip acute, peltate, upper surface glossy green, lower surface pale green, primary lateral veins 6-7 pairs, pale green. Inflorescence produced in both juvenile and adult plants, solitary or paired, peduncles almost completely enclosed in the sheath of the subtending leaf, 30-40 cm long. Spathe 18.0-23.5 cm long, tube 3-5 cm long, light green, limb narrowly oblong-cymbiform, 15.0-18.5 cm long, c 7.7 cm wide, reflexed. Spadix shorter than the spathe, 9-11 cm long, female zone 3.0-3.8 cm long, c 1 cm in diameter, pistils numerous, ovaries globose, green, incompletely 3-5 locular with parietal placentation and numerous oval-shaped ovules, stigma sessile, discoid, whitish, c 1 mm in diameter, sterile interstice c 3 cm long, yellow, male zone 3.0-4.2 cm long, 0.5 cm in diameter, tip rounded, synandria ivory, irregularly rhombo-hexagonal, 8-10 androus, 1 mm in diameter, yellow, appendix absent.

Flowering and fruiting period: June-July.

Chromosome number: Not known.

Habitat: Shady and moist places of hill slopes of rain forests, usually near canals (*Chhara*).

Distribution: Bangladesh, Assam of India.

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Specimens examined:

Moulvibazar: Gazipur beat, Hararganj reserve forest, 21.05.2005, Hosne Ara HA 1737 (DACB); 05.07.2005, Hosne Ara HA 1807 (DACB); Juri forest, 01.12.2014, Hosne Ara HA 2862 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 07.05.2006, Hosne Ara HA 2637 (DACB) [Originally collected from Hararganj reserve forest under Moulvibazar district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 12 (2): 39-48, 2005).

45. *Colocasia oresbia* A. Hay, Sandakania 7: 39-42 (1996). Govaerts & Frodin, World Checkl. Bibliog. Araceae: 273 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 49-50 (2007). **Photo 36 (Page no. 271).**

Type: A. Hay 10046, Malaysia, Borneo (Sabah), 30 March 1995.

Key to the varieties

- | | | |
|----|--|--------------------|
| 1. | Tuber not less than 20 cm long, stolon absent, leaf apex semicircular, leaf blade very broadly ovate-sagittate | oresbia |
| - | Tuber up to 7.0 cm long, stolon present, leaf apex obtuse, leaf blade ovate-sagittate | obtusifolia |

var. **oresbia**

Bengali / Local name: *Sada Kachu*.

English name: Not known.

An evergreen herb, stem condensed, creeping to decumbent, clothed in marcescent leaf bases, 25-40 cm long, 8-12 cm in diameter, stolons absent. Leaves several together, petiole light green, 80-180 cm long, sheathing in the lower one-half to one-third, blades very broadly ovate-sagittate, deeply peltate, 60-84 cm long, 50-65 cm wide, the upper

surface glossy green, the lower surface pale green, primary lateral veins 5-6 pairs, pale green. Inflorescence produced in both juvenile and adult plants, solitary or paired, peduncles almost completely enclosed in the sheath of the subtending leaf, when paired the sequence perpendicular to the circumference of the stem with the younger one further out, 25-60 cm long, much shorter than the petiole. Spathe 20.0-36.5 cm long, tube narrowly ovoid, glaucous green, 4.0-5.5 cm long, limb erect, lanceolate, 11-31 cm long, pale cream-yellow, open only at the base, the rest convolute. Spadix sessile, shorter than the spathe, 10.0-22.5 cm long, female 3.5-4.0 cm long, 1.0-1.5 cm in diameter, slightly tapering distally, pistils numerous (c 150-400), interspersed irregularly with c 2.5 mm long upturned ivory staminodes, ovaries incompletely 3-5 locular with parietal placentation and numerous sub-orthotropous ovules, style distinct but very short, less than 0.5 mm long, stigma whitish, c 2 mm in diameter, sterile interstice 1-2 cm long, male zone 6.0-11.5 cm long, c 1 cm in diameter, synandria ivory, irregularly rhombo-hexagonal, 1.0-1.5 mm in diameter, appendix constricted at the base, 3.0-4.5 cm long, 0.4-0.5 cm in diameter, tapering to a point, surface slightly and irregularly rugose. Fruiting spadix aligned with the peduncle. Fruits numbering hundreds per infructescence, green tinged-brown when ripe. Seeds c 0.7 mm long.

Flowering and fruiting period: June-September.

Chromosome number: $2n = 26$ (Worked out in Cytogenetics Lab., DU).

Habitat: Rain forests, shady places of hill slopes and foothills.

Distribution: Bangladesh, Indonesia.

Specimens examined:

Chittagong: Hazarikhil forest, 27.09.2005, HA 2297, Hosne Ara (DACB); Fatiqchari, 27.09.2005, Hosne Ara HA 2310 (DACB).

Cox's Bazar: Taknaf game reserve, Whykeon range, Kudumgath, 29.09.2005, Hosne Ara HA 2355 (DACB); Upper Rezu range, 29.09.2005, Hosne Ara HA 2406 (DACB); Chota Inani, 30.09.2005, Hosne Ara HA 2433 (DACB); Bara Inani, 30.09.2005, Hosne Ara HA 2460 (DACB); Swankhali, 30.09.2005, Hosne Ara HA 2504 (DACB); Himchari, 30.09.2005, Hosne Ara HA 2520 (DACB).

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Khagrachari: Alutilla, 11.07.2003, Hosne Ara & Sarder Nasir Uddin HA 460 (DACB).

Moulvibazar: Madhabkundo, 05.06.1998, Hosne Ara HA 36 (DACB); 05.07.2002, Hosne Ara & Sarder Nasir Uddin HA 91 (DACB); 20.05.2005, Hosne Ara HA 1710 (DACB); 06.07.2005, Hosne Ara HA 1826 (DACB); Juri forest, 02.12.2014, Hosne Ara HA 2865 (DACB); Madhabkundo, 03.12.2014, Hosne Ara HA 2870 (DACB).

Rangamati: Kaptai, Rampahar, 07.07.2003, Hosne Ara & Sarder Nasir Uddin HA 359 (DACB); Kaptai, Sitapahar, 08.07.2003, Hosne Ara & Sarder Nasir Uddin HA 436 (DACB); Rajbari area, 18.09.2004, Hosne Ara HA 1121 (DACB); Shubalong forest area, 19.09.2004, Hosne Ara HA 1123 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 09.05.2006, Hosne Ara HA 2640 (DACB) [Originally collected from Madhabkundo under Moulvibazar district].

Economic uses/values/harmful aspects: The leaves and plants are used as a vegetable.

Ethnobotanical information: Tribal people use its rhizome in curries.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 12 (1): 25-32 , 2005).

46. Colocasia oresbia A. Hay var. **obtusifolia** H. Ara & M.A. Hassan, **var. nov.**

Photo 37 (Page no. 274).

Colocasia oresbia A. Hay var. *obtusifolia* H. Ara & M.A. Hassan is different from variety proper by (i) tuber size (length and diameter), (ii) stolon production, and (iii) number of inflorescence.

Holotype: Bangladesh, Rangamati district, Rangamati forest area, Hosne Ara HA 1435 (DACB).

Bengali / Local name: *Ban Kachu*.

English name: Not known.

Perennial herb, tuber c 4.5-7.0 cm long and c 1.8-4.0 cm in diameter, stolon small, white. Leaves thin, petiole c 99.5 cm long, light green, sheathing for about 1/3 at the

base; blade peltate, 45-52 cm long, 32-36 cm in wide, ovate-sagittate, acute, base cordate, light green above and beneath, primary lateral veins 5-6 pairs, venation pinnately reticulate, pale green, sinus c 8.0 cm long. Inflorescence solitary or paired, peduncle 30-35 cm long, c 0.7 cm in diameter, light green, shorter than the petiole. Spathe constricted, 19.5-25.0 cm long, tube light green, 2.3-3.5 cm long, c 2.5 cm in diameter, upper part reflexed, golden yellow, 17.0-21.5 cm long, 5-6 cm in diameter at the middle. Spadix sessile, shorter than the spathe, 11.5-13.5 cm long, female zone cylindrical, 2.1-3.0 cm long, 0.8-1.0 cm in diameter, sterile portion 1.0-1.5 cm long, cream, c 0.5 cm in diameter at the middle, male portion 4.7-5.5 cm long, 0.5-0.6 cm in diameter, light yellow, appendix 3.0-3.5 cm long, c 0.4 cm in diameter at the middle, light yellow, tip of the appendix blunt. Ovaries numerous, narrow, green, 1.5-2.0 mm long, 2-3 mm in diameter, style very short, green, stigma c 0.05 cm in diameter, yellow. Ovule numerous. Staminode cream colour, 0.2-0.3 cm long, c 0.15 cm in diameter. Male flower 6-8 androus.

Flowering and fruiting period: August to October.

Chromosome number: $2n = 26$ (Worked out in Cytogenetics Lab., DU).

Habitat: Grows on the hill slopes as under growth.

Distribution: Eastern hilly area of Bangladesh (Rangamati district).

Specimens examined:

Rangamati: Rangamati forest area, 27.09.2004, Hosne Ara HA 1435 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 10.08.2015, Hosne Ara HA 2894 (DACB); 13.09.2015, Hosne Ara HA 2895 (DACB); 17.09.2015, Hosne Ara HA 2896 (DACB) [Originally collected from Rangamati forest area under Rangamati district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Etymology: The variety is named after the shape of leaf apex and posterior lobe.

(Photo 37) 274

The major morphological differences between two taxa of *Colocasia oresbia* A. Hay are outlined in Table-6.5.

Table 6.5. **Morphological and cytological comparison of *Colocasia oresbia* A. Hay var. *obtusifolia* H. Ara & M.A. Hassan, var. nov. with *Colocasia oresbia* A. Hay var. *oresbia***

Characters	<i>Colocasia oresbia</i> A. Hay var. <i>obtusifolia</i> H. Ara & M.A. Hassan	<i>Colocasia oresbia</i> A. Hay var. <i>oresbia</i>
Tuber	up to 7.0 cm long and 4 cm in diameter (4.5-7.0 × 1.8-4.0)	not less than 20 cm long and 8 cm in diameter (25-40 × 8-12)
Stolon	small, white	absent
Leaf shape & texture	apex and posterior lobe obtuse, leaf blades peltate, 45-52 × 32-36 cm, ovate-sagittate	apex and posterior lobe semicircular, leaf blades deeply peltate, 60-84 × 50-65 cm, very broadly ovate-sagittate
Inflorescence	in groups of up to 3	in groups of up to 8, never 3 or less
Spathes tube	2.3-3.5 cm long	4.0-5.5 cm long
Male zone	4.7-5.5 cm long	6.0-11.5 cm long
Female zone	2.1-3.0 cm long	3.5-4.0 cm long
Chromosome number	26	26

47. *Colocasia virosa* Kunth, Enum. Pl. 3: 39 (1841). Schott, Syn. Aroid.: 41 (1856), Prodr. Syst. Aroid: 139 (1860); Hook. f., Fl. Brit. India 6: 524 (1893-reprint 1954); Krause in Engler, Pflanzenr. 71 (IV. 23E): 68-69 (1920); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 10 (1989). **Photo 38 (Page no. 277).**

Calla virosa Roxb., Fl. Ind. 3: 517 (1832) ; Wight, Icon. Pl. Ind.

Or. 3. t. 808 (1844).

Zantedeschia virosa C. Koch, Ind. Seminum. Hort. Berol. App. 9
(1854).

Type: Bengal (Roxburgh).

Bengali / Local name: *Ban Kachu*.

English name: Not known.

Herbs. Caudex 10 cm long, 2-3 cm in diameter, cylindric, stolons absent. Leaves many; petiole green, 40 cm long, smooth; blades oblong-ovate, 24 × 16 cm, peltate, coriaceous, margin slightly wavy, upper surface glossy green, lower surface pale green; primary lateral veins 6-9 pairs. Peduncles clustered, c 17 cm long, green. Spathe nearly straight, c 15.5 cm long, tube c 2.5 cm long, c 1.5 cm wide, oblong, light green, limb narrowly lanceolate, dark yellow, c 12 cm long, c 5 cm wide. Spadix much shorter than the spathe, 6.9-7.5 cm long; the lower third part female zone, 2.3-2.5 cm long, c 0.8 cm in diameter; ovaries broadly ovoid, c 0.4 mm long, c 0.3 mm in diameter, green, 3-4 locular with parietal placentation and numerous ovules; stigma large, peltate, white; male zone 4.5-5.0 cm long, c 0.5 cm in diameter, tip acute; anthers peltate, 8-12 celled, yellow; appendix absent.

Flowering period: May.

Chromosome number: Not known.

Habitat: Grows in shady and moist places of forest.

Distribution: Bangladesh, South and East India.

Specimens examined:

Moulvibazar: Muraichara beat, Ichachara forest, 07.05.2010, Hosne Ara HA 2752 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 17.05.2011, Hosne Ara HA 2779 (DACB) [Originally collected from Ichachara forest under Moulvibazar district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 19 (1): 17-23, 2012).

(Photo 38) 277

8. Genus: *Cryptocoryne* Fischer *ex* Wydler, *Linnaea* 5: 428 (1830).

Type species: *C. spiralis* (Retzius) Fischer *ex* Wydler (*Arum spirale* Retzius).

Small to medium-sized evergreen (except *Cryptocoryne nevillei*) herbs with procumbent to erect rhizome runners, cataphylls present in flowering specimens, sometimes also in nonflowering specimens, sub-2-keeled. Leaves many with elongate sheathing petioles, blades elliptic-ovate to narrowly ovate, lanceolate, linear, mostly glabrous, rarely pubescent, base attenuate to cordate, venation transverse-reticulate. Inflorescence solitary, usually shortly peduncled. Spathe with three parts: (1) basal tube (called kettle) with united margins, (2) upper tube with fused margins, sometimes twisted, and (3) terminal limb which opens and sometimes extends into a tail, a distinctive 'collar' or 'collar zone' is often found inside at the transition between the upper tube and the limb. Spadix slender, small, included in the kettle, with five parts: (1) a basal pistillate part, (2) part with olfactory bodies, (3) a thin, naked interstice, (4) staminate part, and (5) a minute naked appendix, sometimes adnate to the base of the flap at the top of the kettle. Flowers unisexual, perigone absent. Male flowers apparently 1-androus, stamens free, anthers sessile or with short filaments, apex excavated with very prominent, thickened margins, thecae opposite, dehiscing by an apical pore. Female flowers naked, in a single connate whorl, with outcurved styles, stigma ovate-elliptic, sub-vertical, ovaries connate, 1-locular, ovules 5-many, orthotropous, placenta sub-basal to obliquely parietal. Infructescence a sub-ovoid syncarpium, ultimately splitting in the upper adaxial part and becoming star-shaped. Seed ellipsoid-oblong, straight or slightly curved, testa brown, not very thick, rough to slightly costate or smooth.

About 50 species distributed throughout tropical Asia and Malay Archipelago (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 3 species.

Key to the species

- | | |
|---------------------------------------|-----------------|
| 1. Limb strongly twisted | spiralis |
| - Limb not twisted or closely twisted | 2 |

- | | | |
|----|--|----------------------|
| 2. | Limb of spathe closely twisted, margine recurved, glabrous | retrospiralis |
| - | Limb of spathe not twisted, margine densely fimbriate | ciliata |

48. *Cryptocoryne ciliata* (Roxb.) Fischer *ex* Wydler, *Linnaea* 5: 428 (1830). Schott, *Melet.* 1: 26 (1832); *Syn. Aroid.* 2 (1856); *Bonplandia* 5: 222 (1857); *Prodr. Syst. Aroid.* 15 (1860); Hook. f., *Fl. Brit. India* 6: 492 (1893-reprint 1954); Prain, *Beng. Pl.* 2: 1105 (1903-reprint 1981); Engler, *Pflanzenr.* 73 (IV. 23F): 248 (1920); Ridley, *Fl. Malay Peninsula*: 86 (1925); Fischer in Gamble, *Fl. Pres. Madras*: 1575 (1931), repr. ed. 3: 1098 (1967); Blatter & McCann, *J. Bombay Nat. Hist. Soc.* 35: 17-18 (1931); Datta & Mitra, *Bull. Bot. Soc. Beng.* 7 (1 & 2): 100 (1953); Sinclair, *Bull. Bot. Soc. Beng.* 9 (2): 110 (1956); Mitra, *Fl. Pl. E. India* 1: 84 (1958); Rataj, *Studie CSAV* 3: 35-38 (1975); Bennet, *Fl. Howrah Dist.*: 95 (1979); Sharma *et al.*, *Fl. Karnataka*: 297 (1984); Khan & Halim, *Aqua. Angios. Bangladesh*: 64 (1987); Karthikeyan *et al.*, *Fl. India Enum. in Fl. India ser.* 4: 10 (1989); Benerjee & Rao, *Mangroves Orissa Coast*: 104 (1990); A. Hay *et al.*, *Blumea Supplement* 8: 49 (1995); Saxena & Brahmam, *Fl. Orissa* 4: 2043 (1996); Hajra & Rao, *Fl. Gr. Nicobar Island*: 470 (1999); Govaerts & Frodin, *World Checkl. Bibliog. Araceae*: 279 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 50-51 (2007). **Photo 39 (Page no. 286).**

Ambrosina ciliata Roxb., *Pl. Corom.* 7: 90, t. 294 (1820).

Cryptocoryne elata Griff., *Not. Pl. Asiat.* 3: 134 (1851).

Holotype: Roxburgh, Ind. Orient.

Bengali / Local name: *Kerali*.

English name: Water Trumpet.

Aquatic or marsh herb. Roots numerous, sometimes a longer internode present between a series of shorter ones. Rhizome runners 30-40 cm long on which at intervals of 7-10 cm new rooting plants develop. Petioles strong, in the lower third sheathed, green, 10-30 × 0.2-0.8 cm, leaf blades linear-lanceolate or elliptic, abruptly or inconspicuously cordately lobed at the base, 12-33 × 2-14 cm, 4-6 times longer than wide, deep green (except the midrib), acute or acuminate at the apex, primary

lateral nerves several on each side, scarcely prominent, passing away from the midrib at an acute angle. Peduncle short, 1-4 cm in length. Spathe 17-30 cm long, basal tubular part c 2 cm long, scarcely 1 cm wide, upper tube 15-30 cm long, 5-6 mm wide, straight, not twisted, white-yellow or pink, smooth, limb ovate-oblong, 5-8 × 1.5-2.0 cm, purple-red, pink or olive-yellow-green, densely fimbriate. Pistils about 6-8, about 50-80 stamens arranged in 6 irregular spirals, appendix broad-conical, about 3 × 4 mm, thick below, anthers 2-loculed. Ovary c 8 mm long, several seeded, ovules bi-seriate, narrowed into a short outwardly bent style, stigma linear-oblong. Syncarpium globular, 2-3 cm in diameter, cells 6-8 seeded. Seeds oblong.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 22, 33$ (Petersen, 1989).

Habitat: Riverbanks, ditches, canals and loamy-clayey soils on coastal plains.

Distribution: Bangladesh, Malacca and Malay Islands.

Specimens examined:

Barisal: Jalabari, 01.03.1872, C.B. Clarke 16924 (CAL).

Barguna: Amtali, 19.03.1989, Huq, Mahfuz, Matiur & Mia H 9133 (DACB).

Bhola: Patila, 26.02.1989, Huq, Mia & Rahman H 9018 (DACB).

Chittagong: Nijhumdwip. 03.01.1977, Yusuf 56 (CLH); Sandwip, Horispur, 10.02.1988, Mia & Mahfuz M 1501 (DACB).

Cox's Bazar: Shandupara (Bagh Khali river side), 15.09.1944, Sinclair 3762 (E 00079891); Ukhia, Palong Khali, 30.01.1999, Rahman *et al.* 4251 A (HCU).

Dhaka: BNH Office Compound (Cultivated), 20.09.1982, Mahbuba Halim 994 (DACB) [Originally collected from Jessore district]; Dhaka University Botanical garden (Cultivated), 22.04.2008, Hosne Ara HA 2737 (DACB) [Originally collected from Barisal district].

Jessore: Keshabpur, 30.08.1983, Huq, Mia & Mahbuba H 5982 (DACB); Keshabpur Bazar, Horian river Chotoliar Mut, 16.06.1981, Gopen (DACB).

Khulna: Locality unknown, 1896, Shaik Mokim (CAL); Burigualini, 12.02.1976, K. Pasha 265 (DACB); Sundarban, Mongla-Hironpoint, 03.02.1987, Huq & Mia H 8150 (DACB).

Patuakhali: Bauphal Thana, Vill. Indrakool, 16.03.1973, Khan & Huq K 2878 (DACB); Khepupara, 31.12.1979, Khan, Huq, Rahman & Mia K 5832 (DACB); Galachipa Ulania, 13.03.1982, Rahman & Mia R 1322 (DACB); Kalapara, Nilgonj, 11.03.1999, M Sultana 321 (DUSH); Kalapara, Tiakhali, 15.03.1999, M. Sultana 380 (DUSH); Galachipa, Basbunia, 01.03.2005, M Sultana 673 (DUSH); Patuakhali Sadar, Lohalia, 14.05.2005, M Sultana 716 (DUSH); Mirzagonj, Amragasia, 16.05.2005, M. Sultana 808 (DUSH); Kalapara, Gongamoti, 07.01.2006, M. Sultana 960 (DUSH); Galachipa, Rangabali, 24.03.2006, M. Sultana 1181 (DUSH); Dasmina, Rangopaldi, 02.02.2007, M. Sultana 1544 (DUSH).

Satkhira: Satkhira, 01.05.1883, C.B. Clarke 33399 (CAL).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

49. *Cryptocoryne retrospiralis* (Roxb.) Kunth, Enum. Pl. 3: 12 (1841). Wight, Icon. Pl. Ind. Or. 3: 4, t. 772 (1844); Schott, Aroideae: 8 (1853); Syn. Aroid.: 2 (1856); Bonplandia 5: 222 (1857); Prodr. Syst. Aroid.: 18 (1860); Hook f., Fl. Brit. India 6: 493 (1893-reprint 1954); Prain, Beng. Pl. 2: 1106 (1903-reprint 1981); Cooke, Fl. Pres. Bombay 2: 818 (1908); Engler, Pflanzenr. 73 (IV. 23F): 246-247 (1920); Haines, Bot. Bihar and Orissa: 871-872 (1924-reprint 1978); Fischer in Gamble, Fl. Pres. Madras 3: 1575 (1931), repr. ed. 3: 1098 (1967); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 17 (1931); Mitra, Fl. Pl. E. India 1: 84 (1958); Subramanyam, Aquatic Angios.: 76, f. 50 (1961); Rataj, Stud. CSAV 3: 44 (1975); Nicolson in Saldanha & Nicolson, Fl. Hassan Dist.: 786 (1976); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 11 (1976); Sharma *et al.*, Fl. Karnataka: 297 (1984); Verma *et al.*, Fl. Raipur, Durg and Rajnandgaon: 395 (1985); Khan & Halim, Aqua. Angios. Bangladesh: 66 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 10 (1989); Vajravelu, Fl. Palghat Dist.: 533-534 (1990); Matthew, Excursion Fl. Cent. Tamilnadu, Ind. 540 (1991); Parmar in Shetty & Singh, Fl. Rajasthan 3: 866 (1993); Noltie, Fl. Bhutan 3(1): 155 (1994); Govaerts & Frodin, World Checkl. Bibliog.

Araceae: 282 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 51-52 (2007). **Photo 40 (Page no. 286).**

Ambrosinia retrospiralis Roxb., *Hort. Bengal.*: 65 (1814); *Fl. Ind.* 3: 492 (1832).

Ambrosinia unilocularis Roxb., *Fl. Ind.* 3: 493 (1832).

Cryptocoryne unilocularis (Roxb.) Kunth, *Enum. Pl.* 3: 13 (1841); Wight, *Icon. Pl. Ind. Or.* 3: 5, t. 774 (1844); Engler, *Pflanzenr.* 73 (IV. 23F): 237 (1920); Haines, *Bot. Bihar & Orissa*: 872 (1924); Blatter & McCann, *J. Bombay Nat. Hist. Soc.* 35: 15 (1931); Fisher in Gamble, *Fl. Pres. Madras*: 1575 (1931); repr. ed. 3: 1099 (1967).

Lectotype: Roxburgh's unpublished drawing no. 1292 of *Ambrosinia retrospirale* (K) (vide Jacobsen, *Misc. Pap. Landbouwhogeschool* 19: 200. 1980).

Bengali / Local name: Not available.

English name: Not known.

Aquatic herb, submerged or sometimes growing in marsh. Roots strong, usually in a single whorl on a short rhizome, rhizomes 6-10 mm in diameter. Leaves 10-40 cm long, and 3-4 mm broad, always distinctly differentiated into petioles and blades, petioles strong, 1/3-2/3 sheathed at the base, vertically red-lined, mainly on the membranous sheaths, lines 0.2-0.5 mm long, leaf blades green, entire or on the margins inconspicuously undulate, linear-lanceolate, acute or acuminate at the apex, base cuneate, up to 20 cm long and 1.6 cm broad. Inflorescence with peduncle 2.5-3.0 cm long. Spathe 16-18 cm long, with a basal, slightly expanded, tubular portion about 2.0-2.5 cm long, 8 mm in diameter, an upper slightly narrower, tubular portion 10.5-12.5 cm long and flat, linear-lanceolate, long-acuminate, closely twisted, recurved-margined limb, glabrous, inside tube purplish, at the top with white areas of depressions, the limb and the upper tubular portion with dark purplish spots inside. Spadix with pistillate portion 4-6 mm long, a few neuters just above the pistillate flowers, naked interstice about 9-10 mm long, staminate portion c 3 mm long and with a terminal short conical appendix. Pistillate flowers 4-6, ovules orthotropous, placentation axile, stigma orbicular, on a very short, thick, decurved style, neuter

flowers a few, clavate, purplish, staminate flowers crowded together into a sub-cylindric to ellipsoid mass. Syncarp with sub-fusiform, longitudinally ridged seeds.

Flowering and fruiting period: November-March.

Chromosome number: $2n = 72$ (Petersen, 1989).

Habitat: Shallowly tided sandy grounds and banks of streams, ditches, canals, *beels* and *haors*.

Distribution: Bangladesh, from the northern part of the Bay of Bengal (West Bengal in India) to Bangladesh, Myanmar, Thailand and Laos.

Specimens examined:

Dhaka: Savar, 05.05.1968, Mozahar 110 (DUSH).

Faridpur: Faridpur town subur, 07.01.1976, Huq, Rahman & Mia H 2075 (DACB).

Manikganj: Gulipitha near bridge, 12.11.1975, Huq, Rahman & Mia H 1512 (DACB).

Narayanganj: Bandar, 26.12.1963, Abdul Ghani 118 (DUSH).

Khulna: Locality, Collection date & number unknown, 1896, Shaik Mokim (CAL); Locality & Collection number unknown, 01.08.1900, Shaik Mokim (CAL); Collector & Collection date unknown, Dublar Char, 2176 (CAL).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

50. *Cryptocoryne spiralis* (Retz.) Fischer *ex* Wydler, *Linnaea* 5: 428 (1830). Blume, *Rumphia* 1: 84, t. 36c (1836); Kunth, *Enum. Pl.* 3: 12 (1841); Wight, *Icon. Pl. Ind. Or.* 3: 4, t. 773 (1844); Schott, *Aroideae* 8, t. 13 (1853); *Syn. Aroid.* 2 (1856); *Bonplandia* 5: 222 (1857); *Prodr. Syst. Aroid.*: 18 (1960); Hook. f., *Fl. Brit. India* 6: 494 (1893-reprint 1954); Prain, *Beng. Pl.* 2: 1106 (1903-reprint 1981); Cooke, *Fl. Pres. Bombay* 2: 818-819 (1908); Engler, *Pflanzenr.* 73 (IV. 23F): 237 (1920); Haines, *Bot. Bihar and Orissa*: 872 (1924-reprint 1978); Heinig, *List Chittagong*: 74 (1925); Fischer in Gamble, *Fl. Pres. Madras* 3: 1099 (1931-reprint 1967); Blatter & McCann, *J. Bombay*

Nat. Hist. Soc. 35: 15-16 (1931); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 100 (1953); Mitra, Fl. Pl. E. India 1: 84 (1958); Rataj, Stud. CSAV 3: 30-32 (1975); Sharma *et al.*, Fl. Karnataka: 297 (1984); Khan & Halim, Aqua. Angios. Bangladesh: 66 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 10 (1989); Matthew, Excursion Fl. Cent. Tamilnadu, Ind. 540 (1991); Deshpande *et al.*, Fl. Mahabaleshwar Adjoin., Maharashtra: 616-617 (1995); Samvatsar, Fl. W. Tribal Madhya Pradesh: 296 (1996); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 282-283 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 52-53 (2007). **Photo 41 (Page no. 286).**

Arum spiralis Retz. Obs. Bot. 1: 30 (1779).

Ambrosinia spiralis (Retz.) Roxb., Hort. Bengal.: 65 (1814); Fl. Ind. 3: 492 (1832).

Cryptocoryne huegelii Schott, Aroideae 8, t. 12 (1853); Syn. Aroid. 2 (1856); Prodr. Syst. Aroid. 18 (1860); Hook. f., Fl. Brit. India 6: 494 (1893-reprint 1954); Engler, Pflanzenr. 73 (IV. 23F): 236-237 (1920); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 14-15 (1931).

Cryptocoryne tortuosa Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 16, t. 1 (1931).

Holotype: Ind. Orient., Tranquebar, herb. Koenig (BM).

Bengali / Local name: Not available.

English name: Not known.

Rhizomatous aquatic herb, submerged or emergent. Roots up to 1 cm thick and 30 cm long, secondary roots in whorls, internodes 0.6-0.8 cm long, rhizome 1.5 cm in diameter. Petioles 1/2-2/3 sheathed, green, sheaths decorated with 0.3-0.5 mm long longitudinal red lines or dots, leaf blades oblong-lanceolate, broadest in the middle or in the upper third, on both sides narrowed, (7-)12.5-20.0 cm long and (0.5-) 1.2-3.0 cm broad, tip acute, base cuneate, green. Inflorescence with peduncle usually 0.8-2.0 cm long. Spathe 7.5-14.0 cm long with a basal tubular portion 1.5-2.0 (-3) cm long, 8 mm in diameter, brown or red-brown, limb 7.0-8.5 cm long, below 1.0-1.4 cm broad, nearly upright at the beginning of flowering, later 1-2 times spirally strongly twisted,

with long ligules, dull green-brown on the upper side, purple-red inside, obliquely expressively wrinkled, wrinkles and margins warty. Spadix with a basal pistillate portion about 3.5 mm long, a naked slender interstice about 11 mm long, and a staminate portion about 3 mm long terminating in a small appendix. Pistillate flowers 4-6 in number, ovules many in each pistil, orthotropous on axile placenta, style very short, thick, slightly recurved with a broadly elliptic stigma, neuter flowers few, sub-obconic to truncate, dark-purplish, staminate flowers crowded, forming a subcylindrical mass, appendix very short, subconical. Syncarps 1-2 cm long, many-seeded, seeds sub-fusiform, longitudinally many-ridged.

Flowering and fruiting period: October-April.

Chromosome number: $2n = 66, 88$ (Petersen, 1989).

Habitat: Riverbanks, water courses and paddy fields.

Distribution: Bangladesh, India (South India and West Bengal).

Specimens examined:

Dhaka: Nayerhat, 07.01.1973, Khan & Huq K 2623 (DACB).

Khulna: Locality & Collection number unknown, Eastern Bengal, 1896, Shaik Mokim (CAL, K).

Lower Bengal: Locality, Collection date, year & number unknown, S. Kurz (CAL); Locality & Collection number unknown, 08.12.1896, Mr. Daur (CAL) .

Jessore: Locality, Collection date & number unknown, 1896, Shaik Mokim (CAL).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: The rhizome of the plant possesses medicinal value and is used to treat coughs and abdominal diseases and as an antipyretic. The roots are used as a herbal tonic and antiperiodic (Yusuf *et al.*, 1994).

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9. Genus: Dieffenbachia Schott in Wiener Z. Kunst 1829 (3): 803
(1829).

Type species: *D. seguine* (Jacquin) Schott (“*seguinum*”; *Arum seguine* Jacquin).

Evergreen herbs, low or rather tall, terrestrial, stems erect to decumbent and rooting, internodes distinct, green, smooth, the sap milky. Leaves numerous, forming an apical crown, petiolar sheath persistent, more than half as long as the petiole or reaching the blade, blade oblong-ovate, elliptic to oblanceolate, cuneate to subcordate at the base, dark to light green or sometimes variegated with white, silver, yellow or various shades of green, midrib thick, venation striate. Inflorescence 1-2 to several in each floral sympodium, cataphylls short and usually inconspicuous. Peduncle shorter than the petiole. Spathe persistent, slightly or distinctly constricted between the tube and the blade, green, lower part convolute into a usually rather long, persistent tube which splits longitudinally in the fruit, upper part expanded into a short, erect or recurved blade. Spadix slightly shorter than the spathe, the female zone entirely adnate to the spathe, enclosed within the tube, laxly flowered, staminate above and free from the spathe with a transitional zone of scattered clusters of staminodia. Flowers unisexual, perigone absent. Staminate flowers with 4-5 stamens, connate into a subsessile, rhomboid to hexagonal synandrium, truncate at the apex, sulcate laterally, anthers lateral, common connective thick, fleshy, thecae oblong-ellipsoid, dehiscing by short, apical, pore-like slit. Sterile male flowers composed of a whorl of 3-6, flattened, irregularly globose-ellipsoid, or sometimes connate staminodes. Pistillate flowers loosely arranged, each subtended by 4-5 clavate, white staminodia, ovary stout, subglobose to ovoid, thick-walled, 1-3 locular with 1 sub-basal, anatropous ovule per locule, stylar region inconspicuous, stigma massive, almost as broad as or broader than the ovary, 2-3 lobed or subhemispheric (when unilocular), usually yellow. Fruit a berry, globose to 2-3 furrowed, 1-3 seeded, scarlet red to orange. Seed globose to ovoid, testa smooth, green to blackish-green.

About 30 species distributed throughout tropical and subtropical America, West Indies (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 1 species.

51. Dieffenbachia seguine (Jacq.) Schott, Wiener Z. Kunst 1829: 803 (1829). Bailey, Manual Cult. Pl.: 182-183 (1949); Standley & Steyermark, Fl. Guatemala, Fieldiana, Bot. 24 (1): 326-328 (1958); Nasir, Fl. W. Pakistan 120: 5-6 (1978); Walters *et al.*, European Gard. Fl. 2 (2): 96 (1984-reprint 2003); Mayo, Fl. Trop. E. Africa: 6 (1985); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 46-48 (1987); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 403 (1998); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrib. U. S. Nat. Herb. 52: 31 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 53-54 (2007).

Photo xa, xb, xc (Page no. 99).

Arum seguine Jacq., Enum. Syst. Pl. 31 (1760).

Caladium seguine (Jacq.) Vent., Mag. Enc. 4: 461-471. d (1800).

Dieffenbachia picta Schott, Oesterr. Bot. Wochenb. 2: 68 (1852).

Caladium maculatum Lodd., Bot. Cab. 7: 608 (1822).

Dieffenbachia maculatum (Lodd.) G. Don in Sweet, Hort. Brit., ed. 3, 632 (1839).

Type: Caribbean. Illustr. of *Arum seguine* Jacq. (Select. t. 151. 1763).

Bengali / Local name: *Bish Kachu, Bahari Kachu.*

English name: Dumb Cane,
Mother-in-law
Plant.

A perennial herb, usually attaining a length of 1 m and sometimes 3 m, the caudex usually thick and often decumbent, 4-5 cm thick. Leaves petiolate, petioles c 40 cm long, the sheath half as long or longer, leaf blade up to about 40-75 × 10-22 cm, oblong to oblong-ovate, usually variegated (in escaped plants usually dark green with scattered whitish spots), acute to sub-cordate at the base. Spathe 15-18 cm long, the closed portion 10-12 × 2 cm, the upper portion 5-6 cm long. Spadix slightly shorter than the spathe, basal portion of the spadix naked, c 1 cm long, the densely flowered pistillate portion 6-7 cm long, the staminate portion 6-7 cm long, separated from the pistillate by a naked portion of 2 cm long. Female florets club-shaped, staminodes not exceeding the ovary. Fruit a berry, scarlet.

Flowering and fruiting period: May-September.

Chromosome number: $2n = 34$ (Petersen, 1989).

Habitat: Shady, damp or moist places.

Distribution: Bangladesh, throughout the Neotropics.

Specimens examined:

Bandarban: Chimbuk hill, 20.09.2004, Hosne Ara HA 1165 (DACB).

Chittagong: BCSIR Campus, 09.05.1984, Yusuf 558 (CLH); CLH Campus area, 28.09.2005, Hosne Ara HA 2345 (DACB).

Dhaka: Dhaka University Botanical garden, Curzon Hall, 30.11.2001, Hosne Ara HA 50 (DACB); Mirpur Botanical garden, 02.10.2004, Hosne Ara HA 1437 (DACB).

Rangamati: Kaptai, Chitmaram, 09.01.2005, Hosne Ara & Sarder Nasir Uddin HA 1430 (DACB); 09.01.2005, Sarder Nasir Uddin N 2720 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads. It is well known among the toxic aroids. The people of the West Indies use the stem of the plant to poison their enemies and punish slaves. The caustic juice contained within the plant causes severe burning of the skin and mucus membranes of the human body. The plant is scarcely cultivated nowadays because of its harmful effect on the labourers (Plowman, 1969).

Ethnobotanical information: The species is used as a contraceptive by the people of Lesser Antilles, Cuba, Santo Domingo and Puerto Rico. It is also used as a cure for impotence and frigidity. The people of Martinique use the species as an ingredient for preparing an antidote against the bites of pit vipers and the Carib Indians use it in the treatment of yaws. The West Indian people make a solution by boiling the sap of the species with hog's lard and rub the same upon swollen areas of dropsy patients. The species is also used in the treatment of gout. The people of Guatemala apply smashed leaves of the species as poultices for gout, rheumatism and bites of poisonous animals. The people of El Salvador extract oil from the seeds of the species and apply the same to minor inflammations, burns and small wounds. In Brazil, the leaf decoction is gargled to relieve angina (Croat, 1994).

10. Genus: *Epipremnum* Schott in Bonplandia 5: 45 (1857).**Type species: *E. mirabile* Schott (1858).**

Epiphytic, evergreen climbing herbs, stem robust, woody, branched and rooting. Leaves several to many, distichous, petiolate, petiole geniculate apically, sheath prominent, long, marcescent to deciduous, leaf blade large, entire, often oblique, lanceolate, elliptic, elliptic-oblong, or regularly or irregularly pinnatifid, divisions pinnatifid to pinnatisect, with perforations along the midrib or not, primary lateral veins pinnate, running into marginal vein, secondary and often tertiary parallel-pinnate, tertiary and higher order venation often reticulate. Inflorescence solitary to several together and axillary. Peduncle relatively short and robust. Spathe canoe-shaped, stoutly to rather weakly beaked, usually deciduous. Spadix sub-cylindric, conic, often quite thick, sessile, rarely stipitate, bluntly tapering towards the apex, shorter than the spathe. Flowers bisexual, naked. Ovary polygonal-cylindric, apex truncate, 1-locular, ovules 2-8, anatropous, placenta parietal, stylar region prominent to massive, stigma punctate to linear and longitudinal. Stamens 4, free, filaments strap-shaped, anthers much shorter than the filaments, anther cells ellipsoidal, longitudinally dehiscent. Fruit a berry, small, 1-8 seeded, stylar region deciduous at maturity. Seed curved, testa thickish, smooth to ornamented.

About 20 species distributed throughout tropical southeast Asia, Australasia and Pacific (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 1 species.

52. *Epipremnum pinnatum* (L.) Engl. in Engl., Pflanzenr. 37 (IV. 23B): 60-62 (1908). Merr., Interpr. Herb. Amboin. 127 (1917); Graf, Tropica, edn. 5: 105, 109, 999 (1978-reprint 2003); Nicolson, Fl. Vitiensis Nova 1: 441-443 (1979); Walters *et al.*, European Gard. Fl. 2 (2): 86 (1984-reprint 2003); Mayo, Fl. Trop. E. Africa: 6 (1985); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 32-33 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 11 (1989); Liu & Huang, Fl. Taiwan: 807-809 (1996); Boyce, Blumea 43 (1): 201-205 (1998); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrb. U. S. Nat. Herb. 52: 34 -36 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 55 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 15 (2010). **Photo 42 (Page no. 293).**

Pothos pinnata L., Sp. Pl., ed. 2: 1374 (1763); Roxb., Fl. Ind. 1: 456 (1820).

Monstera pinnata Schott in Weiner Z. Kunst 4: 1028 (1830).

Rhaphidophora pinnata (L.) Schott, Bonplandia 5: 45 (1857); Backer & Bakh., Fl. Java 3: 107 (1968).

Epipremnum mirabile Schott, Gen. Aroid. t. 79 (1858); Hook. f., Fl. Brit. Ind. 6: 549 (1893-reprint 1954).

Type: Amboina. Illustr. published as *Adpendix laciniata* Rumph., Herb. Amboin. 5: 489, t. 183, f. 2. (1747).

Bengali / Local name: *Lata Kachu*.

English name: Centipede Tonga-vine,
Devil's Ivy, Iden Pothos,
Taro vine.

A large root-climber, up to 15 m long, pre-adult plants usually forming modest terrestrial colonies, adult plants with stem 2.5-4.0 cm in diameter, internodes 2-25 cm long, branched. Leaves petiolate, petiole 19.5-60.0 cm × 3-13 mm, smooth, dark green, pulvinate at both ends, sheath running to upper pulvinus and soon disintegrating to leave a reticulate network of intertwined venation, leaf blade sub-leathery, oblong, base wide cordate, 10-93 × 5-60 cm, regularly pinnatifid to (rarely) entire, ovate to oblong-elliptic in outline, apex acute to acuminate, base rounded to slightly cordate, divisions pinnatifid to pinnatisect, pinnae 1.2-6.5 cm wide, 12-13 per side, narrowly lanceolate to somewhat falcate, with 1-3 equally strong, parallel costae, apex truncate to acute, the terminal one usually sub-rhomboid, dark green above, paler beneath. Peduncle 5.5-21.5 × 0.4-1.0 cm, stout, terete, pale green, enveloped by sheath, finally withering. Spathe canoe-shaped, 7-18 × 3-10 cm, green outside, yellow inside, apex acuminate. Spadix bisexual, 8.5-19.5 × 1.1-3.5 cm, sessile, cylindrical, bluntly tapering towards the apex, base slightly obliquely inserted, green. Flowers bisexual, 3-7 mm in diameter, ovary 4-12 × 2-7 mm, cylindrical, basal part slightly compressed, ovules 2 or 3, stylar region 3-7 × 1.5-4.0 mm, trapezoid, apex flattened, stigma linear, 2-6 × 0.1-0.5 mm, longitudinal, stamens 4, filaments 5 × 1 mm, anthers

narrowly ellipsoid, 1.5-2.0 × 0.7-1.0 mm. Fruit mid-green. Seeds reniform, smooth, 4.5 × 3.5 mm, pale to mid-brown.

Flowering and fruiting period: April-May.

Chromosome number: 2n = 60 (Petersen, 1989).

Habitat: Creeping on trees or on stone walls in shady and moist situations in the tropical rain or deciduous forests.

Distribution: Bangladesh, Southeastern Asia through Malesia and into Oceania.

Specimens examined:

Sylhet: Sylhet near forest school, 13.03.1956, M.S. Khan 173 (DUSH); Tamabil-Jafflong, 04.06.1998, Hosne Ara 28 (DACB).

Dhaka: Balda Garden, 22.10.1966, Zeyauddin 142 (DUSH); Dhaka University Botanical garden, Curzon Hall, 26.06.2004, Hosne Ara HA 1074 (DACB); Khilgaon, Tilpapara (Cultivated), 30.04.2006, Hosne Ara 2628 (DACB); 30.04.2008, Hosne Ara 2742 (DACB) [Originally collected from Tamabil-Jafflong forest under Sylhet district].

Economic uses/values/harmful aspects: The plant is used as a medicine in China for treating abscesses, traumatic injury and rheumatic anthralgia (Heng, 1979). In Fiji, village people prepare a medicine by mixing crushed leaves and stems of *E. pinnatum* and *Premna taitensis*. The medicine, known as 'tonga', cures 'aches'. *E. pinnatum* is also cultivated as an ornamental plant in the Pacific east of the Fijian region, as well as in other parts of the world (Nicolson, 1979).

Ethnobotanical information: The plant is used to blacken teeth (Boyce, 1998).

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 13 (2): 83-91, 2006).

(Photo 42) 293

11. Genus: *Gonatopus* J.D. Hook. *ex* Engl. in A. & C. De Candolle,
Monogr. Phan. 2: 208 (1879).

Type species: *G. boivinii* (Decaisne) Engler (*Zamioculcas boivinii* Decaisne).

Seasonally dormant herbs. Stem a sub-globose, subterranean tuber or a cylindric horizontal rhizome. Leaf solitary, glabrous, subtended by several basal cataphylls, rarely pilose or scabrous. Petiole pulvinate at the base or in the middle. Blade usually trisect, rarely not (*G. petiolulatus*). Inflorescence 1-4 in each floral sympodium, appearing before or with the emergence of the leaves, subtended by several cataphylls. Peduncle erect, very short to long. Spathe constricted between the tube and the blade. Spadix subequal to spathe, the lower part bearing pistillate flowers, the upper part cylindric to clavate, bearing sterile flowers. Flowers unisexual, perigoniate, tepals 4 (-6), in 2 decussate whorls, fleshy, truncate to cuculate. Fruit a berry, ovoid-ellipsoid, fleshy, 1-2 seeded, red or orange to yellow, or whitish. Seed ovoid-ellipsoid, testa thin and smooth.

About 5 species distributed throughout tropical east and subtropical southeast Africa (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by a single species.

53. *Gonatopus boivinii* (Decne.) Engl., Monogr. Phan. 2: 209 (1879). N.E. Br. in F.T.A. 8: 196 (1901); Engler, Pflanzenr. 21 (IV. 23B): 306-308, fig. 86 (1905); Peter in Nachr. Ges. Wiss. Göttingen, Math.-Phys. Kl. 1929 (3): 207 (1930); U.O.P.Z.: 277 (1949); Vollesen in Opera Bot. 59: 107 (1980); Mayo, Fl. Trop. E. Africa: 10-11 (1985); Mayo *et al.* Genera Araceae: 149-151 (1997); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 57-58 (2007). **Photo 43 (Page no. 296).**

Zamioculcas boivinii Decne. in Bull. Soc. Bot. Fr. 17: 321
(1870); Hook. f. in Bot. Mag. 99, t. 6026 (1873).

Type: Zanzibar, *Boivin* (P, holo.).

Bengali / Local name: *Kushum*. English name: Giraffe's Knees, Sand Forest Arum.

Tuberous herb, tuber sub-globose, c 4 cm long, c 8 cm in diameter. Leaf up to 130 cm long, petiole 50-70 cm long, 0.5-1.5 cm in diameter, with central pulvinus, erect, green, blade tripinnately compound, spreading to 60-70 cm broad, ultimate lobes ovate to elliptic, sometimes lanceolate, 2.5-9.0 × 1.5-4.5 cm, dark green, paler beneath, acuminate, base subacute to obtuse, sessile to petiolulate, not decurrent. Inflorescence 1, appearing with plants. Peduncle 38-42 cm long, 0.8-1.0 cm in diameter, erect. Spathe 18-21 cm long, tube shortly cylindrical, tightly convolute around the pistillate flowers, constricted slightly at the apex, 2.5-3.0 cm long, 1.5-2.0 cm in diameter, outer surface greenish-yellow, lined and speckled maroon or purple, limb oblong, 16-18 × 4.5-5.5 cm, long cuspidate, outer surface similar to tube in colour, inner surface cream, sometimes speckled pink to brown. Spadix 7.0-10.5 cm long, staminate part cylindrical, 5-8 cm long, 0.7-1.0 cm in diameter, with tepals creamy to yellowish-cream in colour, middle sterile part constricted, short about 3 mm, pistillate part cylindrical, 2.0-2.5 cm long, 1.5 cm in diameter. Pistil c 2.5 mm long, ovary 2-locular, placentation axile, stigma discoid, green, about 1.5 mm broad. Fruit a berry, somewhat compressed laterally, obovoid with pronounced septal suture, c 1.3 × 1.4 cm, 2-seeded. Seeds obovoid-cylindrical, subterete, smooth, 1 cm long, 0.6 cm in diameter, raphe 0.8 cm long.

Flowering and fruiting period: April-May.

Chromosome number: Not known.

Habitat: Shady moist areas on forest floor.

Distribution: Bangladesh, South Africa, Mozambique, Zimbabwe, Zambia, Malawi, Tanzania, Zaire and Kenya.

Specimens examined:

Netrakona: Durgapur, 10.12.2001, Golam Samdani (DUSH).

Dhaka: Dhaka University Botanical garden (Cultivated), 28.04.2002, Hosne Ara HA 51 (DACB); 22.04.2008, Hosne Ara HA 2738 (DACB); Bangladesh National Herbarium garden, 27.04.2008, Hosne Ara HA 2740 (DACB) [Originally collected from Durgapur under Netrakona district].

(Photo 43) 296

Economic uses/values/harmful aspects: The rhizome of the plant is known to be poisonous to human beings, dogs and birds (Mayo, 1985).

Ethnobotanical information: In Bangladesh, the Garos in Netrokona district use the paste of the rhizome with honey for the treatment of seminal weakness.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 32 (1): 49-51, 2003).

12. Genus: *Homalomena* Schott in Schott & Endlicher,

Melet. Bot. 20 (1832).

Lectotype species: *H. cordata* Schott (*Dracontium cordatum* Houttuyn 1779,

non Aublet 1775; see Nicolson in Taxon 16: 517. 1967).

Perennial, evergreen, aromatic herbs, usually with creeping, short, erect or ascending stem. Leaves several, petiole long, sheathing below, blade lanceolate, elliptic, oblong, subtriangular or cordate to sagittate, apex acuminate usually with tubular tip, primary lateral veins pinnate, running into marginal veins, secondary and tertiary lateral veins parallel-pinnate. Inflorescence 1-6 or many in each floral sympodium, peduncle shorter than the petiole. Spathe erect, persistent, usually not constricted, ellipsoid to boat-shaped, rarely constricted between the tube and the blade and then tube convolute, blade gaping at anthesis and afterwards closing. Spadix shorter or subequal to the spathe, stipitate or sessile, basal portion occupied by pistillate flowers and upper portion by staminate flowers, usually staminate flowers are contiguous with pistillate flowers, rarely a sub-naked barren portion found between staminodes. Flowers unisexual, perigone absent. Male flowers (fertile) 2-4 (-6) androus, rarely 1-androus, stamens free, minute, truncate apically, filaments absent or distinct, connective thick, thecae ovoid, ellipsoid or oblong, opening by the longitudinal slit, rarely by the transverse slit, sterile male flowers 2-4 androus, sometimes present at the base of male axis of spadix. Female flowers usually mixed with single anterior staminode (rarely 2, very rarely 3), equal to or half the length of the ovary, sometimes staminodes absent, ovary ovoid or globose, incompletely 2-4 (-5) loculed, ovules many, hemianatropous with thin and slender funicle, placentation parietal and axile,

style minute, stigma discoid, sub-hemispheric, sub-capitate or slightly 2-4 lobed. Fruit a berry, ovoid or sub-globose or cylindrical, few or many-seeded. Seeds small, ellipsoid or elongate-ellipsoid, testa thick.

About 110 species distributed throughout tropical southeast Asia, Malay Archipelago and tropical America (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 5 species.

Key to the species

- | | | |
|----|---|---------------------|
| 1. | Leaves with spots | 2 |
| - | Leaves without spots | 3 |
| 2. | Leaf blade dark green with a narrow white margin and bold irregular yellow blotches | wallisii |
| - | Leaf blade usually red-tinged particularly along the margins | pendula |
| 3. | Male flowers 3-4 androus | 4 |
| - | Male flowers 5 androus | gigantea |
| 4. | Basal lobes of leaf usually divaricate, ovate, obtuse | aromatica |
| - | Basal lobes of leaf cordate | coerulescens |

54. Homalomena aromatica (Roxb. *ex* Sim) Schott, Schott & Endl., Melet. Bot.: 20 (1832). Hook. f., Fl. Brit. India 6: 532 (1893-reprint 1954); Engler, Pflanzenr. 55 (IV. 23Da): 59-61 (1912); Heinig, List Chittagong: 75 (1925); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Mitra, Fl. Pl. E. India 1: 76 (1958); Hu, Dansk Bot. Arkiv 23 (4): 425 (1968); Hotta, Mem. Fac. Sci. Kyoto Imp. Univ., Ser. Biol. 4: 90 (1970); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 30 (1976); Deb, Fl. Tripura State 2: 399-400 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 11 (1989); A. Hay, Blumea Supplement 8: 70 (1995); Govaerts & Frodin, World Checkl. Bibliog.

Araceae: 329 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 58-59 (2007); Heng & Boyce in Heng *et al.*, *Fl. China* 23: 18 (2010). **Photo 44 (Page no. 303).**

Calla aromatica Roxb. ex Sim, *Fl. Ind.* 3: 513 (1832); *Bot. Mag.* t. 2279; Wight, *Icon. Pl. Ind. Or.* 3: t. 805 (1844).

Calla occulta Lodd., *Bot. Cab.*: t. 12 (1817).

Zantedeschia occulta Spreng., *Syst. Veg.* 3: 765 (1826).

Zantedeschia aromatica Spreng., *Syst. Veg.* 3: 765 (1826).

Zantedeschia fortida C. Koch, *Ind. Sem. Hort. Berol.* 1854 (APP.): 9 (1854).

Type: Curtis's *Bot. Mag.* 49 (1821) t. 2279.

Bengali / Local name: *Gandho Kachu*.

English name: Not known.

Evergreen, perennial herb, rhizomes aromatic, caudex 10-30 cm long, 2-4 cm thick. Leaves broadly ovate, acuminate, cordate, 15-30 × 10-25 cm, basal lobes usually divaricate, ovate, obtuse, about one-third the length of the apical lobe, primary lateral veins pinnate, running into marginal vein, secondary and tertiary lateral veins parallel pinnate. Petioles longer than the blade and sheathing for about one-third of its length, 30-60 cm long. Peduncles several, shorter than the petiole, 10-15 cm long, elongating to 30 cm in fruits. Spathes green, oblong, convolute, not constricted, apiculate, 5-7 cm long, 1.0-1.5 cm in diameter. Spadix stipitate, equalling or slightly exceeding the spathe, male zone longer than the female zone, 2.5-4.5 cm long, female zone cylindrical, 1-2 cm long. Male flowers 3-4 androus, stamens free. Ovaries ovoid, usually mixed with few narrowly clavate staminodes, equalling and as long as the ovary, ovary 3-loculed, ovules many, hemianatropous, placentation parietal, stigma sessile, discoid. Fruit a berry, ovoid, many-seeded. Seeds small, testa thick.

Flowering and fruiting period: June-September.

Chromosome number: Not known.

Habitat: Shady places of hill slopes and foothills.

Distribution: Bangladesh, India.

Specimens examined:

Bandarban: Hatimatapara, Ruma, 26.02.1988, M.K. Alam, EB 80 (FRIH); Betchari, 23.09.2004, Hosne Ara 1302 (DACB); Near Mangui jheel, 24.09.2004, Hosne Ara 1359 (DACB).

Chittagong: Chunati Reserve Range, 09.06.1997, Rahman, Khan, Toha 1066 (HCU); 02.08.1997, Yusuf 1004 (CLH); 27.03.1998, Rahman & Wilcock *et al.* 2582 (HCU); Dhopachara, Gondamara, 02.09.1999, Boyce, Toha & Rahman 5543 (HCU, K); Chunati, 26.09.2005, Hosne Ara 2220 (DACB); Herbang, 26.09.2005, Hosne Ara 2270 (DACB); Hazarikhil forest, 27.09.2005, Hosne Ara 2298 (DACB); Chattan Chara, Dhopachari, Dohazari, 11.06.2001, Sarder Nasir Uddin N 971 (DACB).

Cox's Bazar: Bhangamura, Baraichara, 27.08.1996, Rahman & Uddin 284 (HCU), Raikeong beat, Whykeong Range, 11.09.1999, Boyce, Toha & Rahman 5879 (HCU, K); Teknaf Game Reserve, Whykeon Range, Rhykong beat, 29.09.2005, Hosne Ara 2353 (DACB); 30.03.2005, Himchari, 30.09.2005, Hosne Ara 2528 (DACB).

Dhaka: Dhaka University Botanical garden, 03.08.1945, Collector & Collection number unknown (DUSH); Jinjira, Keranigonj, 17.01.1978, Huq & Rahman (DACB); Bangladesh National Herbarium garden (Cultivated), 25.06.2004, Hosne Ara HA 1070 (DACB) [Originally collected from Lawachara reserve forest under Moulvibazar district].

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 5966, 5967 (K).

Habiganj: Satchari, 17.05.2005, Hosne Ara 1575 (DACB); Satchari forest area, 07.07.2005, Hosne Ara 1864 (DACB).

Khagrachari: Narikhal Begun College road, 12.07.2003, Hosne Ara & Sarder Nasir Uddin 505 (DACB).

Moulvibazar: Lawachara, 19.08.1939, G.K. Deka 23250 (ASSAM); Madhabkundo, 05.07.2002, Hosne Ara & Sarder Nasir Uddin 87 (DACB); Lawachara reserve forest, 02.05.2003, Hosne Ara 199 (DACB); Adampur beat, 03.05.2003, M. Khatun 268 (DUSH); Gazipur beat, Hararganj reserve forest, 07.05. 2003, Hosne Ara HA 316

(DACB); Adampur beat, Kawargola forest, 16.04.2004, Hosne Ara 720 (DACB); Sreemongal, Lawachara reserve forest, 15.05.2005, Hosne Ara 1470 (DACB); Adampur beat, 18.05.2005, Hosne Ara 1625 (DACB); Muraichara, 19.05.2005, Hosne Ara 1678 (DACB); Madhabkundo, 20.05.2005, Hosne Ara 1713 (DACB); Gazipur beat, Hararganj reserve forest, 21.05.2005, Hosne Ara 1739 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara 1784 (DACB); Gazipur beat, Hararganj reserve forest, 05.07.2005, Hosne Ara 1802 (DACB); Madhabkundo, 06.07.2005, Hosne Ara 1829, 1830 (DACB); Lawachara reserve Park, 18.08.2009, Sarder Nasir Uddin N 3942 (DACB); Muraichara beat, Ichachara forest, 07.05.2010, Hosne Ara 2756 (DACB); Muraichara beat, Awolachara punj, 07.05.2010, Hosne Ara 2756 (DACB); Kamarchara forest beat, Kamalganj, 21.09.2011, Sarder Nasir Uddin N 4818 (DACB); Juri forest, 02.12.2014, Hosne Ara HA 2863 (DACB); Madhabkundo, 03.12.2014, Hosne Ara HA 2873 (DACB).

Rangamati: Chitmarang, Kaptai, 16.08.1987, M.K. Alam 5902 (FRIH); Kaptai, Sitapahar, 17.08.1998, Rahman & Toha 3285 (HCU); Kaptai, Sitapahar, 27.06.1998, Rahman & Toha 3216C, 3233 (HCU); Ghagra, Kaw-khali, Champatali, 30.08.1999, Boyce, Toha & Rahman 5400 (HCU, K); Kaptai, Rampahar, Baluchara, 06.09.1999, Boyce, Toha & Rahman 5758 (HCU, K); Rangamati area, 03.09.2002, Sarder Nasir Uddin 1745 (DACB); Kaptai, Sitapahar, Sapchhari, 23.09.2002, Sarder Nasir Uddin N 1485 (DACB); Kaptai, Bangchori beat, Bangchori, 06.07.2003, Hosne Ara & Sarder Nasir Uddin 350 (DACB); Kaptai, Rampahar, 07.07.2003, Hosne Ara & Sarder Nasir Uddin 352 (DACB); Bangchori, 07.07.2003, Hosne Ara & Sarder Nasir Uddin 383 (DACB); Kaptai, Sitapahar, 18.12.2004, Sarder Nasir Uddin N 2622 (DACB).

Economic uses/values/harmful aspects: The rhizome of the plant is used as an aromatic stimulant by people in different parts of India (Caius, 1986).

Ethnobotanical information: Not known.

55. Homalomena coeruleascens Jungh. in *Schedula ex Miquel*, Fl. Ind. Bat. 3: 212 (1859). Schott, Prodr. Syst. Aroid. 310 (1860); Engler, in DC. Mon. Phan. 2: 38 (1879) *et in Arac. exsicc. et illustr. n. 67*; Hook. f., Fl. Brit. India 6: 533 (1893-reprint 1954); Engler, Pflanzenr. 55 (IV. 23 Da): 64-65 (1912); Ridley, Fl. Malay Peninsula:

104-105 (1925); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 59-60 (2007). **Photo 45 (Page no. 303).**

Homalomena minor Griff., *Notul.* 3: 152 (1851); Schott, *Syn. Aroid.* 119 (1856); *Prodr. Syst. Aroid.* 311 (1860); Engl. in DC. *Mon. Phan.* 2: 343 (1879).

Homalomena major Griff., *Notul.* 3: 153 (1851); Schott, *Syn. Aroid.* 119 (1856), *Prodr. Syst. Aroid.* 312 (1860).

Homalomena wallichii Schott, *Bonplandia* 7: 30 (1859), *Prodr. Syst. Aroid.* 311 (1860); Engl. in DC. *Mon. Phan.* 2: 335 (1879).

Type: Singapore-(Wallich Cat. n. 8951-Herb. Calcutta).

Bengali / Local name: *Gandho Kachu.*

English name: Not known.

Evergreen herb, stem 14 × 4 cm. Leaves several, 38-42 × 25-29 cm, ovate, cordate, tip acute or acuminate, basal lobes cordate with a broad shallow sinus, sinus 7-9 cm long, dark green above, light green beneath, glabrous, primary lateral veins pinnate, running into marginal vein, secondary and tertiary lateral veins parallel pinnate, petiole longer than the blade, 70-90 cm long, sheath about 1/3 its length. Peduncle shorter than the petiole, 10-17 cm long. Spathe oblong-lanceolate, convolute, not constricted, 6.2-9.1 cm long, subacute, outside green and inside pale yellow to white. Spadix shortly stipitate, very stout, 6-9 cm long, shorter or subequal to spathe, male zone longer than the female zone, 4-6 × 1.3-1.5 cm, female zone cylindrical, 2-3 × 1.0-1.2 cm. Male flowers 4- androus, stamens free. Ovaries oblong-obovoid, usually mixed with some narrowly clavate staminodes, equalling as long as the ovary, 3-loculed, ovules many, hemianatropous, placentation parietal, stigma discoid, 3-4 lobed. Fruit a berry, ovoid, many-seeded. Seeds small, testa thick.

Flowering and fruiting period: July-August.

Chromosome number: Not known.

Habitat: Shady and moist areas on hill slopes.

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Distribution: Bangladesh, Myanmar, Malaysia and Indonesia.

Specimens examined:

Moulvibazar: Sreemongal, Lawachara reserve forest, 15.05.2005, Hosne Ara 1471 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara 1746 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara 1782 (DACB); Muraichara beat, Ichachara forest, 07.05.2010, Hosne Ara 2759 (DACB).

Rangamati: Kaptai, Sitapahar, 08.07.2003, Hosne Ara and Sardar Nasir Uddin HA 417 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 25.06.2004, Hosne Ara HA 1071 (DACB) [Originally collected from Lawachara reserve forest under Moulvibazar district].

Economic uses/values/harmful aspects: Some indigenous people of Bangladesh use petioles of the plant as a vegetable.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 10 (2): 81-84, 2003).

56. Homalomena gigantea Engler, Pflanzenr. 55 (IV. 23 Da): 61-63 (1912); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 60 (2007). **Photo 46 (Page no. 307).**

Type: Malayasia (A. Engler, n. 4031-Herb. Berlin).

Bengali / Local name: *Gandho Kachu*.

English name: Not known.

Evergreen herb, stem c 50 cm (or more) long, c 6 cm broad. Leaves several, ovate, cordate or sagittately cordate, basal lobes semi-ovate or rounded, sinus narrow, 45-50 × 32-36 cm, dark green above, light green beneath, glabrous, primary lateral veins pinnate, running into marginal vein, secondary and tertiary lateral veins parallel pinnate, petiole longer than the blade and sheathing for about one-third its length, 80-110 cm long. Peduncle several, shorter than the petiole, c 20 cm long. Spathe green, oblong-lanceolate, convolute, not constricted, shortly acuminate, 10.5-13.0 cm long,

persistent, 2.0-2.5 cm in diameter. Spadix with 5-8 mm long stipe, shorter or subequal to spathe, male zone longer than the female zone, 7.5-8.5 × 1.6 cm, female zone cylindrical, 3.0-4.5 × 1.0-2.0 cm. Male flowers 5- androus, stamens free. Ovaries ovoid, usually mixed with few narrowly clavate staminodes, 3-loculed, ovules many, hemianatropous, placentation parietal, stigma discoid. Fruit a berry, obovoid, many-seeded. Seeds small, testa thick.

Flowering and fruiting period: June-September.

Chromosome number: Not known.

Habitat: Shady and moist areas on hill slopes.

Distribution: Bangladesh, Southwest Malaysian provinces.

Specimens examined:

Moulvibazar: Kulaura, Gazipur beat, Hararganj reserve forest, 06.07.2002, Hosne Ara and Sardar Nasir Uddin HA 94 (DACB); Hararganj reserve forest, 05.07.2005, Hosne Ara 1803 (DACB).

Netrakona: Durgapur thana, Khonafanda, 18.06.2004, Hosne Ara 859 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 25.06.2004, Hosne Ara HA 1072 (DACB) [Originally collected from Hararganj reserve forest under Moulvibazar district].

Economic uses/values/harmful aspects: Young leaves are eaten as a vegetable.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 9 (2): 67-69, 2002).

57. Homalomena pendula (Blume) Bakh. f., Blumea 12: 67 (1963). Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 11 (1989); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 60-61 (2007). **Photo 47 (Page no. 307).**

Caladium pendulum Bl., Cat. 103 (1823).

Calla rubescens Roxb., Fl. Ind. 3: 515 (1832).

Homalomena rubescens (Roxb.) Kunth, Enum. Pl. 3: 57 (1841);
Hook. f., Fl. Brit. India 6: 532 (1893-reprint 1954); Engler,
Pflanzenr. 55 (IV. 23Da): 63 (1912); Heinig, List
Chittagong: 75 (1925); Mitra, Fl. Pl. E. India 1: 76 (1958);
Deb, Fl. Tripura State 2: 400 (1983); Karthikeyan *et al.*, Fl.
India Enum. in Fl. India ser. 4: 11 (1989); Noltie, Fl. Bhutan
3(1): 130-131 (1994).

Type: Himalaya, Sikkim (Hook. f. *et* Thomson).

Bengali / Local name: *Gandho Kachu*.

English name: Not known.

Herb, caudex 8-20 (or more) cm long, 4-5 cm thick. Leaves several, ovate, shortly acuminate, cordate or sagittately cordate, 15-40 × 10-25 cm, usually red-tinged particularly along the margins, basal lobes slightly outwardly directed, rather broadly triangular with rounded tips, half to one-third the length of the apical lobe, primary veins radiating from the petiole apex and secondary veins closely parallel, diverging from the compound midrib, arching towards the marginal vein. Petioles 30-45 cm long, reddish, broadening below into a firm sheath. Peduncles several, 8-15 cm long, reddish. Spathes red, oblong-lanceolate, convolute, not constricted, shortly acuminate, 7-8 cm long, 1.5-2.0 cm in diameter. Spadix with 5-7 mm long stipe, male zone 3-6 × 1.0-1.5 cm, white, female zone 1.5-2.5 × 1.0 cm, reddish, stamens mostly 4 androus. Ovary oblong-obovoid, 3-loculed, ovules many, hemianatropous, placentation parietal, stigma sessile, discoid, staminode 1, clavate, equalling the ovary. Fruit a berry, ovoid, many-seeded. Seeds small, testa thick.

Flowering and fruiting period: May-September.

Chromosome number: 2n = 40 (Petersen, 1989).

Habitat: Shady and moist places of hill slopes and foothills.

Distribution: Bangladesh, India (Sikkim Himalayas and Khasia Hills).

Specimen examined:

Sylhet: Singla reserve, 22.12.1914, U.N. Kanjilal 4906 (ASSAM).

(Photo 46) 307

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: The plant is used to poison water by the Malays (Caius, 1986).

58. Homalomena wallisii Regel in Gartenflora 25: 320 (1876). Engler and Krause, Pflanzenr. 55 (IV. 23Da): 76-77 (1912); Birdsey, Cult. Aroid. 68 (1951); Graf, Exotica, edn. 8: 176 (1976); Graf, Tropica, edn. 5: 106, 1019 (1978-reprint 2003); Walters *et al.*, European Gard. Fl. 2 (2): 90 (1984-reprint 2003); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 21 (1987); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 338 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 61-62 (2007). **Photo xi (Page no. 99).**

Curmeria wallisii Masters, Garden. Chron. New Ser. 4: 108 (1977).

Type: Tropical America.

Bengali / Local name: *Bahari Kachu*.

English name: Not known.

An evergreen herb. Caudex hypogean and aromatic. Leaves crowded on a short, erect stem, petiole 4-5 cm long, leaf blade 13-20 × 6-8 cm, much longer than the petiole, more or less elliptic-oblong, rounded or cordate at the base, upper surface smooth, dark green with a narrow white margin and bold irregular yellow blotches, lower surface rough, glaucous, tinged with red. Inflorescence longer than the petiole. Spathe 8 cm long, pale reddish-purple, glossy within, constricted at the middle. Spadix as long as the spathe, stipe c 5 mm long, male zone longer than the female zone, c 5.5 cm × 6 mm, female zone cylindrical, c 2 cm × 7.5 mm. Ovaries obovoid, 3-loculed, ovules many. Female florets without staminodes

Flowering and fruiting period: June-September.

Chromosome number: 2n = 42 (Petersen, 1989).

Habitat: Shady wet areas.

Distribution: Colombia, planted in Bangladesh.

Specimen examined:

Dhaka: Mirpur Botanical garden, 02.10.2004, Hosne Ara HA 1446 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, this species is commonly grown both in public places and homesteads.

Ethnobotanical information: Not known.

13. Genus: Lagenandra Dalzell in Hooker's Journ.

Bot. Kew Gard. Misc. 4: 289 (1852).

Type species: *L. toxicaria* Dalzell.

Small to medium-sized evergreen herbs with procumbent to erect rhizomes. Leaves several, cataphylls prominent, usually 2-keeled, petiole elongate, shortly sheathing, leaf blade elliptic-ovate to linear, usually glabrous, coriaceous, venation pinnately parallel. Inflorescence solitary, peduncle short, rarely long, erect at anthesis, deflexed in fruit. Spathe with two parts: the kettle (basal tube) with united margins and an apical blade, inside at the juncture of the kettle and blade there is an incrassate protruding collar. Spadix small, slender, sessile, included in the kettle, with four parts: a basal pistillate portion with a few neuter flowers (olfactory bodies) just above and contiguous with it a thin, naked interstice, a staminate portion and a terminal, short subconical appendix. Flowers unisexual, perigone absent. Pistillate flowers numerous, naked, spirally arranged in a globose mass, each pistil with a many-angled, unilocular ovary, ovules 1-12 (-15), orthotropous, placenta basal, stylar region thick, usually short, rarely long, stigma discoid to hemispheric, sometimes oblique, relatively broad. Staminate flowers numerous, clustered in a sub-globose or sub-cylindric mass, stamens two-lobed, sessile, with a tubular beak at the top of each lobe with a rim around the beak, dehiscence through the tube. Infructescences globose, appearing fleshy, but ultimately the fruit walls split longitudinally from the base and coil backwards thereby releasing the seeds. Seeds few, ellipsoid to narrowly ellipsoid or subcylindric, testa longitudinally ridged, dark brown.

About 14 species distributed throughout tropical south Asia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 1 species.

59. *Lagenandra gomezii* (Schott) Bogner & Jacobson, *Aqua Plant.* 1987: 49 (1987). Govaerts & Frodin, *World Checkl. Bibliog. Araceae*: 344 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 62-63 (2007). **Photo 48 (Page no. 311).**

Cryptocoryne gomezii Schott, *Bonplandia* 5: 221 (1857); *Prodr. Syst. Aroid.* 14 (1860); Hook. f., *Fl. Brit. India* 6: 495 (1893); Engl., *Pflanzenr.* 73 (IV. 23F): 234 (1920); Rataj, *Stud. CSAV* 3: 33-34 (1975); Mitra, *Fl. Pl. E. India* 1: 84 (1958); Khan & Halim, *Aqua. Angios. Bangladesh*: 64 (1987); Karthikeyan *et al.*, *Fl. India Enum. in Fl. India ser.* 4: 10 (1989).

Type: Herb, Wallich 8958 (W. GOMEZ 126) K (holotype); K, LE, CAL, CGE, BM (isotypes).

Bengali / Local name: Not available.

English name: Not known.

A small evergreen rhizomatous herb. Leaves several, cataphylls usually 2-keeled, petiole only in the lower one-fourth sheathed, leaf blade 4.5-7.0 × 2.5-3.5 cm, elliptic-ovate to oblong-lanceolate, inconspicuously dentate at the base, not blistered, usually glabrous, tip obtuse, acute or rounded. Inflorescence solitary, up to 11 cm long, peduncle 5-6 cm long. Spathe with two parts: the kettle (basal tube) with united margins, c 1.8 cm long and an apical blade c 3.5 cm long, joining directly to the kettle, basal part constricted, opening through a lateral vertical surface, pale inside on the lower side, upper part deep red. Stamens 40-50, in 5-6 spirals. Pistils 6, naked, spirally arranged, unilocular, ovules many, orthotropous, placentation basal, stylar region thick, stigma horizontal, relatively broad. Seeds few, testa dark brown.

Flowering and fruiting period: No reports available.

Chromosome number: Not known.

Habitat: Shady moist places.

Distribution: This species is endemic to Bangladesh. It was first described by Schott in 1857 based on a collection made in 1828 from Panchara, Sylhet (Khan *et al.*, 2001b). Since then there is no report of its collection from that location or from any other locations inside and outside Bangladesh. Perhaps by now it has become extinct, atleast from its type locality.

(Photo 48) 311

Specimen examined:

Sylhet : Sillhet. Wallich Cat. 8958 (BM).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

14. Genus: *Lasia* Loureiro, Fl. Cochinch. 64, 81 (1790).

Type species: *L. aculeata* Lour. (= *L. spinosa* (L.) Thw.).

Clump and colony-forming, creeping to suberect, perennial, evergreen, marsh or aquatic herbs, stem thick, aculeate or unarmed (*Lasia concinna*), green, internodes relatively long or short. Petioles long, shortly sheathing at the base, with upturned spines, pulvinate at the apex. Leaves several crowded at stem-apex, blade sagittate-hastate, simple or deeply pinnatifid, aculeate on the larger nerves beneath, pinnately nerved above the bifurcate basal nerves, secondary venation reticulate. Inflorescence solitary in leaf-axils. Peduncle elongate, spiny. Spathe dark purple, linear, very long and narrow or broader, very thick and spongy, spirally twisted, much longer than spadix, finally withering. Spadix short, sessile, cylindrical, obtuse. Flowers bisexual, perigoniate, tepals 4-6, free, with vaulted-truncate apex. Stamens 4-6, anthers elliptic, dehiscent by a longitudinal slit, filaments free, flattened, strap-shaped. Gynoecium ovoid to ellipsoid, ovary 1-locular, with a single, pendulous, anatropous ovule, placentation apical, style very short, stout, stigma discoid-hemispheric. Fruit a leathery berry, usually densely warty on top, 1-seeded, green. Seeds large, compressed-obovoid, testa thin, brown, hard, somewhat rugose.

Two species (*Lasia spinosa* (L.) Thw. and *Lasia concinna* Alderw.) distributed throughout tropical southeast Asia and Malay Archipelago (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 2 species.

Key to the species

1. Spathe purple from very inception, retain the same colour at the last stage, spadix pale crimson, ovary ovoid **spinosa**
- Spathe green from very inception but may become purplish at the dying stage, spadix yellow, ovary globose **viridis**

60. *Lasia spinosa* (L.) Thw., Enum. Pl. Zeyl. 336 (1864). Haines, Bot. Bihar and Orissa: 859-860 (1924- reprint 1978); Fischer in Gamble, Fl. Pres. Madras 1589 (1931), repr. ed. 3: 1108-1109 (1967); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Hara, Fl. E. Himalaya: 397 (1966); Hu, Dansk Bot. Arkiv 23 (4): 416-418 (1968); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 32-33 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 91 (1978); Bennet, Fl. Howrah Dist.: 92 (1979); Deb, Fl. Tripura State 2: 400-401 (1983); Balakrishnan, Fl. Jowai 2: 561 (1983); Bakshi, Fl. Murshidabad Dist.: 337-338 (1984); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 35-36 (1987); Khan & Halim, Aqua. Angios. Bangladesh: 66 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 12 (1989); Noltie, Fl. Bhutan 3(1): 129 (1994); A. Hay, Blumea Supplement 8: 93 (1995); Saxena & Brahman, Fl. Orissa 4: 2044 (1996); Hajra & Verma, Fl. Sikkim 1: 192 (1996); Pullaiah, Fl. Andra Pradesh 3: 1025 (1997); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 403 (1998); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 347 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 63-64 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 16 (2010). **Photo 49 (Page no. 316).**

Dracontium spinosum L., Sp. Pl. 967 (1753); Moon, Cat. 30 (1824).

Lasia aculeata Lour., Fl. Cochinch. 81 (1790); ed. Willdenow ed., 1: 103 (1793); Hook. f. in Trimen, Handb. Fl. Ceylon 4: 363 (1898); Ridley, Fl. Malay Peninsula: 125 (1925).

Pothos heterophylla Roxb., Fl. Ind. 1: 457 (1820); *nom. illeg.* ed. 2, 1: 438 (1832).

- Pothos lasia* Roxb., Fl. Ind. 1: 458 (1820); *nom. illeg.* ed. 2, 1: 438 (1832).
- Lasia heterophylla* (Roxb.) Schott, Schott & Endl., Melet. Bot. 21 (1832); Kunth, Enum. Pl. 3: 67 (1841); Wight, Icon. Pl. Ind. Or. 3: 5, t. 777 (1844); Schott, Bonplandia 5: 125 (1857); Gen. Aroid. 82 (1858); Prodr. Syst. Aroid. 402 (1860); Hook. f., Fl. Brit. India 6: 550 (1893-reprint 1954); Prain, Beng. Pl. 2: 1116 (1903-reprint 1981); Burkil in Rec. Bot. Surv. Ind. 4: 135 (1910); Heinig, List Chittagong: 75 (1925); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 101 (1953); Mitra, Fl. Pl. E. India 74 (1958).
- Lasia loureirii* Schott, Schott & Endl., Melet. Bot. 21 (1832), *nom. illeg.*; Bonplandia 5: 125 (1857); Prodr. Syst. Aroid. 400 (1860).
- Lasia roxburghii* Griff., Not. Pl. Asiat. 3: 155 (1851); Schott, Bonplandia 5: 125 (1857); Prodr. Syst. Aroid. 401 (1860).
- Lasia hermanni* Schott, Bonplandia 5: 125 (1857), *nom. illeg.*; Prodr. Syst. Aroid. 400 (1860).
- Lasia zollingeri* Schott, Bonplandia 5: 125 (1857), Prodr. Syst. Aroid. 401 (1860).
- Lasia deciscens* Schott, Ann. Mus. Lugd.-Bat. 1: 127 (1863).
- Lasia spinosa* var. *hermannii* Engler in DC. Monogr. Phan. 2: 274 (1879).
- Lasia crassifolia* Engler, Arac. Exsicc. Illustr. no. 194 (1883); Engler, Bot. Jahrb. Syst. 25: 15 (1898); Engler, Pflanzenr. 48 (IV. 23C): 25 (1911).
- Lasia crassifolia* f. *angustisecta* Engler, Arac. Exsicc. Illustr. no. 194 (1883). Engler, Bot. Jahrb. Syst. 25: 15 (1898); Engler, Pflanzenr. 48 (IV. 23C): 26 (1911).
- Lasia crassifolia* f. *latisecta* Engler, Bot. Jahrb. Syst. 25: 15 (1898); Engler, Pflanzenr. 48 (IV. 23C): 26 (1911).

Lasia spinosa f. *diversifolia* Alderw., Bull. Jard. Bot. Buitenzorg, ser. 3, 1: 379 (1920).

Lasia spinosa f. *simplex* Alderw., Bull. Jard. Bot. Buitenzorg, ser. 3, 1: 379 (1920) ('simpex').

Type: Herb. Hermann, Vol. 5, fol. 291, No 328 (BM).

Bengali / Local name: *Kanta Kachu, Vombarali*. English name: Not known.

Perennial stout herb, rhizome up to 1.5 m long, continued above into a prostrate or ascending stem, stem up to 0.5 m long, 2-6 cm thick, clothed with up to 1 cm long broad-based spines, inside white, turning brown on exposure. Leaves with petioles about 75-150 cm long, sheathing for about 15-20 cm at the base, coriaceous, persistent, aculeate with slightly upturned spines all over, geniculate at the apex, hastate or sagittate, older variously pinnately lobed, the anterior lobe 35-45 × 37-47 cm, posterior lobe 17-18 × 5-10 cm, pinnately lobed leaves with 4-7 pairs of simple, oblong or linear, acute to acuminate lobes and the basal lobes sometimes bi-or tri-lobed, the veins very prominent on the lower surface and often with slightly curved spines. Inflorescence with peduncles about 30-120 cm long, c 1 cm in diameter, solitary, axillary and spiny. Spathes fleshy, tube ovate-oblong, 6-10 cm long when spread, limb linear-lanceolate, 10-30 cm long, convolute and twisted, forming an erect 'tubular' structure which does not spread, dark purplish-green outside, inside yellow-green, finally deciduous. Spadix pale crimson, sessile, cylindrical, 2-6 × 0.8-1 cm, elongating to 10-12 in fruits, reddish, dense-flowered, appendage absent. Flowers compactly arranged, bisexual, perianth segments 4-6, obovate with incurved tips, 1.5-3.0 mm long, stamens 4-6, filaments short, flat, anthers c 0.5 mm long, dehiscing by longitudinal slits, ovaries ovoid, 1.5-2.5 mm long, 1-loculed, ovule solitary, hanging from the apex, style stout, short, 0.5-1.0 mm long, stigma depressed-globose, c 1 mm broad. Fruit a berry, obovoid, hexagonal, top muciculate, about 1 cm long, 1-seeded. Seeds compressed, rugose, exalbuminous.

Flowering and fruiting period: January-November.

Chromosome number: $2n = 26$ (Petersen, 1989).

(Photo 49) 316

Habitat: Shady and moist places in forests growing as undergrowth and in village thickets.

Distribution: Bangladesh, from India through Papua New Guinea.

Specimens examined:

Barisal: Uzirpur thana, East Narayanpur village, 06.02.2008, Hosne Ara HA 2657 (DACB); Dostina village, 22.02.2008, Hosne Ara HA 2658 (DACB); Kashipur, Lakaotta, 23.02.2008, Hosne Ara HA 2721 (DACB).

Bengal: Locality unknown, June 1887, Hook. fil & G. Thomson (CAL.)

Bogra: Beltola-Hindupara, 12.03.2001, B.M. Rezia Khatun RK 2771 (DACB); Beltola, 06.02.2003, Hosne Ara & Rezia Khatun HA 146, 147, 148, 151, 152 (DACB); Shibgonj area, 19.08.2005, Hosne Ara HA 2186 (DACB); Dhunot Upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2794 (DACB).

Bhola: Full-kaisha, Badlipur, 16.12.2004, Hosne Ara HA 1427 (DACB).

Chittagong: Chunati Reserve Range, 27. 03. 1998, Rahman, Wilcock & Toha 2577 (HCU); 04.01.1999, Rahman *et al.* 4070 (HCU); 25.02.1999, Rahman *et al.* 4459 (HCU); Chunati, 26.09.2005, Hosne Ara HA 2225 (DACB); Bara Kumira, 01.10.2005, Hosne Ara HA 2583 (DACB); Sitakundo, 01.10.2005, Hosne Ara HA 2590 (DACB); Mirsarai, 01.10.2005, Hosne Ara HA 2603 (DACB).

Comilla: Jashpur, 26.09.2004, Hosne Ara HA 1393 (DACB).

Cox's Bazar: Signal Hill, 25.11.1944, Sinclair 3802 (E00079899); 25.11.1944, Sinclair 3802 (E 00079900); Kelatoli forest, 09.01.1945, Sinclair 3896 (E 00079898); Himchari National Park, Chainda beat, 29.08.1996, Rahman & Uddin 423 (HCU); Upper Rezu reserve forest, 30.03.1998, Rahman, Wilcock & Toha 2736 (HCU); Ramu, 26.09.2005, Hosne Ara HA 2286 (DACB); Punnagram, 26.09.2005, Hosne Ara HA 2270 (DACB); Teknaf game reserve, Whykeon range, Rhykong beat, 29.09.2005, Hosne Ara HA 2352 (DACB); Himchari, 30.09.2005, Hosne Ara HA 2529 (DACB).

Dhaka: Keranigonj, 17.01.1978, Huq & Rahman H 3751 (DACB); Taraghat, 19.03.1981, Huq, Rahman & Mia H 5009 (DACB); Khilgaon, Tilpapara (Cultivated), 15.01.2005, Hosne Ara HA 1431 (DACB) [originally collected from Bhola district];

Savar, 26.05.2012, Hosne Ara HA 2808a (DACB); Dhaka University Botanical Garden (Cultivated), 15.01.2015, Hosne Ara HA 2877 (DACB) [Originally collected from east Narayanpur village under Barisal district].

Dinajpur: Singra foest, 18.08.2005, Hosne Ara HA 2069 (DACB).

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 5949 (K).

Faridpur: Bagat, 06.01.1976, Huq, Rahman & Mia H. 1997 (DACB).

Gazipur: Burulia village, 25.07.2004, Hosne Ara HA 1082 (DACB).

Habiganj: Rema-Kalenga beat, Rema area, 04.04.1997, Huq & A.I. 10452 (DACB); Kalenga beat, Kalenga, 05.05.2003, Hosne Ara HA 273, 274 (DACB); Kalenga beat, Kalenga, 16.05.2005, Hosne Ara HA 1536 (DACB).

Jessore: Keshabpur Sub-division, 30.08.1983, Huq, Mia & Mahbuba H. 6015 (DACB); Jessore town area, 26.05.2012, Hosne Ara HA 2842 (DACB).

Jhalakati: Kaukhali, 04.03.1985, Huq & Mia H. 6785 (DACB).

Khagrachari: Bhaibonchara, 19.02.1998, M.K. Alam, EB 168 (CFRIH).

Khulna: Sundarban, 06.05.2011, Azam Khan 1940 (DUSH).

Kishoreganj: Kishoreganj, Nogua, 13.01.1979, Mahbuba Halim 346 (DACB); Karimgonj, Jangle Bari Village, 13.03.1988, Mia & Mahfuz M 1654 (DACB).

Kurigram: Rajarhat, 31.10.2007, Bushra, Habib & Mafiz B 415 (DACB); Singhimari village, 20.05.2013, Hosne Ara HA 2849 (DACB); Baruitari village, 24.08.2013, Hosne Ara HA 2856 (DACB).

Magura: Magura area, 26.05.012, Hosne Ara HA 2827 (DACB).

Manikganj: Manikganj area, 26.05.2012, Hosne Ara HA 2816 (DACB).

Moulvibazar: Lawachara, 23.02.1941, R.N. De 20376 (ASSAM); Lawachara reserve forest, 02.05.2003, Hosne Ara HA 204, 205, 206, 207 (DACB); 15.05.2005, Hosne Ara HA 1469 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1725 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1798 (DACB); Gazipur beat, Hararganj forest, 05.07.2005, Hosne Ara HA 1799 (DACB); Madhabkundo,

06.07.2005, Hosne Ara HA 1835 (DACB); Lawachara, Jenkichara, 03.02.2009, Bushra, Momtaz & Nasir B 1350 (DACB); Muraichara beat, Awolachara punji, 07.05.2010, Hosne Ara HA 2763 (DACB); Kamalgonj, Kamarchara forest beat, 21.09.2011, Sarder Nasir Uddin N. 4817 (DACB).

Mymensingh: Haluaghat thana, Koroitoli, 20.06.2004, Hosne Ara HA 906 (DACB).

Narayanganj: Bandar, 31.08.1941, Singh & Acharja (DUSH); Sonargaon, 07.07.2005, Hosne Ara HA 1914 (DACB).

Narsingdi: Sadar, 07.07.2005, Hosne Ara HA 1886 (DACB).

Netrakona: Durgapur, 08.10.2000, M. Khatun 04 (DUSH); Farangpara, 18.06.2004, Hosne Ara HA 866 (DACB).

Noakhali: Sadar, Mohabbatpur, 12.01.1992, M.K. Alam 230 (FRIH).

Patuakhali: Patuakhali Sadar, Santibag, 22.07.1998, M. Sultana 29 (DUSH); Bauphal, Kopai, 26.09.1999, M. Sultana 413 (DUSH); Kalapara, Kuakata, 09.01.2006, M. Sultana 1080 (DUSH).

Rajbari: Rajbari area, 26.05.2012, Hosne Ara HA 2822 (DACB).

Rangamati: Burkul, 29.03.1976, Lister 1876 (E 00079892).

Sherpur: Rangtia range, Gazni beat, 09.10.2003, Hosne Ara HA 631 (DACB); Rangtia range, Samaschura beat, 10.10.2003, Hosne Ara HA 679 (DACB); Rangtia range, Gazni beat, 21.06.2004, Hosne Ara HA 927 (DACB); Zinaigathi thana, Rangtia hill, 22.06.2004, Hosne Ara HA 1032 (DACB).

Sirajganj: Kazipur upazilla to Charkhadah village, 18.03.2011, Hosne Ara HA 2784 (DACB).

Sylhet: Tilagar reserve, 19.04.1947, M.M. Srinivasan 22347 (ASSAM); Sylhet town area, 21.05.1968, Amalendu 121 (DUSH).

Tangail: Modupur, Rasulpur, 06.10.2003, Hosne Ara HA 548 (DACB).

Economic uses/values/harmful aspects: In Bangladesh, stem and tender leaves are used in curries. Leaves and roots of the plant possess medicinal properties to cure piles, colic, rheumatism and intestinal diseases. The root of the plant is a remedy for

affections of the throat (Yusuf *et al.*, 1994). The rhizome of this plant is used in curing lymphotuberculosis, lymphonoditis, stomach ache, injury, rheumatism and insect/snake bites (Heng, 1979).

Ethnobotanical information: The people of Konda Reddis in India use rhizome of *L. spinosa* as cooked food. The Konds and Porjas people massage mildly heated rhizome paste over the body for relief of body pains (Rao and Henry, 1996).

61. *Lasia viridis* H. Ara & M.A. Hassan, sp. nov. Photo 50 (Page no. 322).

Lasia viridis H. Ara & M.A. Hassan *differs from Lasia spinosa* (L.) Thw. by (i) *spadix and perianth colour*, (ii) *shape of the ovary* and (iii) *2n chromosome number*.

Holotype: Bangladesh, Barisal district, Dostani village, 22.02.2008, Hosne Ara HA 2659 (DACB).

Bengali / Local name: Not available.

English name: Not Known.

Stem horizontal, c 7 cm in diameter, green. Petiole 50-140 cm long, adequately or not densely spiny, green; Lamina deeply hastato - sagittate, central (anterior) lobe 20-45 × 30-54 cm, deeply pinnatifid with c 3-6 segments on each side below the terminal one; these 12-34 × 2.5 × 10 cm, acute or acuminate, lanceolate separate lobes at the base, upper ones entire; lateral (posterior) lobes similar to the central one but a little smaller and, on the posterior side, with the segments less divided or entire; primary and secondary venation spiny. Peduncle green, spiny, shorter than petiole. Spathe thick, hard and marcescent, 20-46 cm long; in the young state pale green within and green outside, tip of the spathe c 0.5 mm purple colour; tube ovoid to bottle-shaped, 7-10 cm long, green outside, at matured stage, very few prickles are found here and there, at early stage they are not seen, the open ventricose part 3-5 cm wide, few prickles are there at the middle of the lower spathe; the narrowed part closed, 2.0-2.5 cm in diameter, lamina elongate, 10-36 cm long, straight and gaping or slightly twisted and closed, 2.5-3.0 cm in diameter, few prickles are spread at the lowest part of lamina, the outside of the lamina ± smooth, first green, then yellow and at the last

stage pale purple brown colour; inside of the tube and lamina at young stage light yellowish green and at matured stage yellow in colour. Spadix sessile, cylindrical, 4-5 cm long & 1.5-2.0 cm in diameter, yellow, obtuse, in the fruiting stage c 13 cm long & c 5 cm in diameter. Ovary globose, c 1.5 mm long & c 2 mm in diameter, light yellow colour; style distinct, c 0.5 mm long, c 1.1 mm in diameter, light purple colour; stigma button-like, concave; 1.0-1.8 mm in diameter, c 0.3 mm long, orange colour; ovule one; stamens 4-6, slightly contracted at the base; anther c 0.6 mm long, c 0.1 mm in diameter, filament c 0.5 mm long and c 0.6 mm in diameter, anther and filament light yellow. Berry subobovoid or subobconic, rounded at the top, smooth.

Flowering and fruiting period: Flowering was observed in January to March; Fruiting in April to August.

Chromosome number: $2n = 28$ (Alam *et al.* 2012).

Habitat: Grows on the shady and moist places in village thickets beside the pond.

Distribution: Bangladesh.

Specimens examined:

Barisal: Uzirpur thana, East Narayanpur village, 06.02.2008, Hosne Ara HA 2656 (DACB); Uzirpur thana, East Narayanpur and Dostani village, 22.02.2008, Hosne Ara HA 2659 (DACB).

Dhaka: Dhaka University Botanical Garden (Cultivated), 15.01.2015, Hosne Ara HA 2878 (DACB) [Originally collected from East Narayanpur and Dostani village under Barisal district].

Economic uses/values/harmful aspects: In Bangladesh, stem and tender leaves are used in curries.

Ethnobotanical information: Not known.

Etymology: The specific epithet refers to the green colour of its spathe.

The major morphological and cytological differences between two taxa of *Lasia* Lour. are outlined in Table-6.6.

(Photo 50) 322

Table 6.6. **Morphological and Cytological comparison of *Lasia viridis* H. Ara & M.A. Hassan, sp. nov. with *Lasia spinosa* (L.) Thw.**

Characters	<i>Lasia viridis</i> H. Ara & M.A. Hassan	<i>Lasia spinosa</i> (L.) Thw.
Spathe	spathe green from very inception but may become purplish at the dying stage	purple from very inception, retain the same colour at the last stage
Spadix	yellow	pale crimson
Ovary	globose (c 1.5 mm × c 2.0 mm)	ovoid (c 1 mm × c 1 mm)
Stigma	c 1.8 mm broad	c 1.0 mm broad
Perianth segments	yellow	purple
Chromosome number	28	26

Note : Chromosomal study indicates their difference very strongly. The *L. viridis* has 28 chromosomes, whereas the *L. spinosa* has $2n=26$. Two submetacentric chromosomes are present in the former, which otherwise absent in the latter. *L. spinosa* bears satellites, whereas *L. viridis* does not bear any satellite.

15. Genus: *Monstera* Adanson, Fam. Pl. 2: 470 (1763), *nom. cons.*

Type species: *M. adansonii* Schott (*Dracontium pertusum*), *typ. cons.*

Evergreen climbing herbs, usually with thick and greatly elongate stems, rooting at the nodes. Leaves distichous, ovate or broadly ovate-cordate, short-petiolate, appressed to the tree trunks and covering the stem and roots. Petiole geniculate apically, sheath usually long, persistent or deciduous, blade entire, oblique, oblong to ovate-elliptic, often conspicuously and elaborately perforated with large holes, sometimes pinnatifid, primary lateral veins pinnate, running into marginal veins, secondary laterals often parallel-pinnate, higher order venation reticulate. Inflorescence 1-several in each floral sympodium. Peduncle terminal, shorter than the petiole, spathe ovate or oblong-ovate, cuspidate, boat-shaped and somewhat convolute basally, white to rose-coloured within, remaining open after anthesis, finally

deciduous. Spadix sessile, subcylindric, somewhat shorter than the spathe. Flowers bisexual, perigone absent, lowermost flowers usually sterile, the others perfect, naked. Stamens 4, free, filaments flattened, connective slender, thecae oblong-ellipsoid, dehiscing by longitudinal slit. Sterile flowers with 4 minute, conic staminodia, pistillode 2-locular, prismatic, lacking ovules. Gynoecium obovoid to ellipsoid, prismatic, ovary 2-locular, ovules 2 per locule, anatropous, on very short funicle, placenta axile at the base of the septum, stylar region often massive, broader than the ovary, apex truncate to shortly attenuate, stigma oblong-elliptic to linear and longitudinal or round. Fruit a berry, 1-3 seeded, shedding prismatic stylar region at maturity, pulpy within. Seed obovoid to ellipsoid, compressed, testa smooth.

About 40 species distributed throughout tropical America and West Indies (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 2 species.

Key to the species

- | | | |
|----|---|------------------|
| 1. | Lamina broadly cordate at the base with many symmetrical perforations | deliciosa |
| - | Lamina oblique, unequal at the base with large irregular holes | obliqua |

62. *Monstera deliciosa* Liebm., Kjoeb. Vidensk. Meddel. 19: 9 (1849). Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 111 (1908); Standley, Fl. Panama, Ann. Missouri Bot. Gard. 31 (1): 31 (1944); Bailey, Manual, Cultivat. Pl.: 183 (1949); Standley & Steyermark, Fl. Guatemala, Fieldiana, Bot. 24 (1): 330-331 (1958); Graf, Exotica, edn. 8: 181 (1976); Madison, Contrib. Gray Herb. 207: 94-97 (1977); Graf, Tropica, edn. 5: 110, 457, 1041 (1978-reprint 2003); Nasir, Fl. W. Pakistan 120: 5 (1978); Nicolson, Fl. Vitiensis Nova: 440 (1979); Walters *et al.*, European Gard. Fl. 2 (2): 87 (1984-reprint 2003); Mayo, Fl. Trop. E. Africa: 6 (1985); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 21 (1987); Matthew, Excursion Fl. Cent. Tamilnadu, Ind 540 (1991); Parmar in Shetty & Singh, Fl. Rajasthan 3: 869 (1993); Noltie, Fl. Bhutan 3 (1): 156 (1994); Bhattacharyya & Sarkar, Fl. W.

Champan Dist. Bihar: 403-404 (1998); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 64-65 (2007). **Photo xiia, xiib (Page no. 99).**

Monstera borsigiana Engler, D. C. Monog. Phan. II: 266 (1879).

Monstera tacanaensis Matuda, Ann. Inst. Biol. Univ. Nat. Aut. Mex. 43: Ser. Bot. 1: 55 (1972, published 1974).

Type: Mexico, Oaxaca, Western Cordillera, 5000-7000 fl., Dec. 1842, Liebmann s.n. (c).

Bengali / Local name: *Lata Kachu*.

English name: Swiss Cheese Plant,
Fruit Salad Plant.

Usually a large and coarse, epiphytic vine, often climbing high on trees, stem stout, often greatly elongate, sometimes 6 cm thick or even more in diameter. Juvenile plant a terrestrial creeper. Leaves with erect petioles, about twice the length of the lamina, lamina thickly coriaceous, glossy deep green adaxially, pale abaxially, ovate, cordate at the base, acuminate at the tip. Adult plants smooth, stem 2-8 cm thick, green internodes 4-10 cm long, axillary buds not distinct but represented by a swollen region of the stem above the node. Leaves with petioles 30-100 cm long, 2.0-2.5 cm in diameter, tuberculate or smooth, vaginate for 1/6-9/10 its length, sheath wings marcescent or deciduous, lamina coriaceous, glossy adaxially, pale green abaxially, ovate, 25-90 × 25-75 cm, shorter than the petiole, cordate at the base, acute or mucronate at the apex, regularly pinnatifid, perforate or not, perforations in 1-5 series per side, elliptic, 0.5-8.0 cm long, primary lateral veins prominent abaxially, 6-14 in number per side, the secondary lateral veins reticulate. Peduncle tuberculate or smooth, terete, 10-18 × 1.0-1.8 cm. Spathe coriaceous, broadly ovate, apiculate, 15-25 cm long, pale yellow. Spadix white or green, 10-20 × 2.5-3.0 cm, the pistils truncate, 6-11 mm across. Fruiting spadix green or bluish-green, 15-22 cm long, 4.5-6.0 cm thick, the berries 10-18 mm across. Seeds spheroidal, 16-22 mm long, 10-13 mm across, green within.

Flowering and fruiting period: March-October.

Chromosome number: 2n = 24, 48, 56, 60, 70 (Petersen, 1989).

Habitat: Shady areas.

Distribution: Mexico, Guatemala, Costa Rica and Panama (Madison, 1977), also planted in Bangladesh.

Specimen examined:

Dhaka: Gulshan area, 04.10.2004, Hosne Ara HA 1450 (DACB).

Economic uses/values/harmful aspects: The fruit of *M. deliciosa* is edible when ripe and takes a yellow colour with a detectable aroma. Before full maturation, the outer bluish-green skin of the fruit contains tricho-scleroids which cause irritation to mouth and throat. Taste of the fruit is comparable to banana and pineapple fruit salad. The fruits are sold commercially as Ceriman in Mexico (William, 1991).

The pulp of the fruit is mixed in ice and drinks. In Europe, the pulp is used to flavour champagne. The species is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: The plant possesses medicinal value. In Mexico, a decoction of the plant is used against arthritis. The Mexicans use the aerial roots of the plant for making strong baskets (Plowman, 1969). In South America, juice from crushed leaves is used to cure ear ache, eczema and ulcers. Mosterioa, an alkaloid contained in the leaf of the plant, is an antidote for poison and is used against snake bite (William, 1991).

63. *Monstera obliqua* Miq., *Linnaea* 18: 79 (1844). Engler & Krause in Engler, *Pflanzenr.* 37 (IV. 23Ba): 102-103 (1908); Graf, *Tropica*, edn. 5: 112, 1042 (1978-reprint 2003); Madison, *Contrib. Gray Herb.* 207: 67-72 (1977); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 65-66 (2007). **Photo xiiia, xiiib (Page no. 99).**

Monstera microstachya Schott, *Oest. Bot. Woch.* 5: 274 (1855).

Monstera expilata Schott, *Prodr. Syst. Aroid.* 367 (1860).

Type: Surinam, Vredenburger-Zandrits, October 1842, Focke 719 (U, Photo HB, SEL).

Bengali / Local name: *Lata Kachu*. English names: Window Leaf, Mexican Breadfruit.

Slender climbing epiphyte on trees, saplings or shrubs. Juvenile plant terrestrial creepers. Leaves entire, exserted and erect, lamina membranaceous, ovate to lanceolate. Adult plants with stem smooth, terete, 2-7 mm thick, green, internodes 1-6 cm long, occasionally producing hanging and creeping stolons with internodes 10-30 cm long, petiole 5-15 cm long, vaginate for most of its length, the sheath wings deciduous, lamina membranaceous, quite variable in shape, ranging from lanceolate to ovate, c 35 cm long and c 4 cm wide with an acute to broadly ovate base, c 14 cm long and c 12 cm wide with a truncate to subcordate base, mostly ovate, somewhat falcate, 8-15 cm long and 4-6 cm wide, the base oblique, unequal, with one side about twice as wide as the other, usually entire but sometimes perforated, the holes one to many in a single series on each side of the midrib, primary lateral veins not prominent. Inflorescence produced sympodially in groups of six to eight, rarely fewer. Peduncle terete, 7-15 cm long, 1-2 mm in diameter, elongating throughout the development of the fruit. Spathe green to white when immature, becoming bright yellow at maturity, 4-7 cm long, 3-5 cm in diameter when fully open, acuminate or mucronate for 3-8 mm at the tip. Flowering spadix deep yellow, 2.5-6.0 cm long and 5-10 mm in diameter. Fruiting spadix green to olive-green, tinged with orange when immature, becoming lighter and finally deep orange at maturity, 4-8 cm long and 10-15 mm in diameter. Fruit a berry, globose, 5-8 mm in diameter.

Flowering and fruiting period: May-November.

Chromosome number: Not known.

Habitat: Shady and moist places.

Distribution: Panama, Colombia, Peru, Bolivia, Venezuela, Trinidad, Tobago and the Guyanas and Amazonian Brazil, also planted in Bangladesh.

Specimen examined:

Dhaka: Gulshan area, 04.10.2004, Hosne Ara HA 1451 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, this species is commonly used both in public places and homesteads.

Ethnobotanical information: Not known.

16. Genus: *Philodendron* Schott in Wiener Z. Kunst 1829 (3): 780

(1829), *nom. et orth. cons.* ('*Philodendrum*').

Type (Lectotype) species: *P. grandifolium* (Jacq.) Schott (see Britton &

Wilson 1923).

Evergreen herbs, small to gigantic, stem repent to rhizomatous, climbing, arborescent or plant rosulate and acaulescent, internodes usually long, often short, sometimes producing flagelliform shoots. Leaves numerous, small to gigantic, prophylls of mature stems caducous, marcescent and deciduous or persistent. Petiole sometimes warty or covered with scale-like processes, sometimes swollen, rarely geniculate apically, vaginate for part or all their length, blade variable in shape, simple and linear, cordate, sagittate or hastate, or trifid, trisect, pinnatifid, bipinnatifid, rarely pedatisect, venation striate. Inflorescence 1-11 in each floral sympodium. Peduncle usually much shorter than the petiole. Spathe thick-fleshy, erect, entirely persistent, usually constricted between the tube and the blade, tube convolute, cylindrical to ventricose, often coloured purple or red within, blade usually boat-shaped, widely gaping at anthesis, later closing, usually white within, rarely red. Spadix sessile or short-stipitate, female zone free, rarely basally adnate to the spathe, usually shorter than the male zone and separated from it by an intermediate sterile zone of staminodal flowers, intermediate sterile zone cylindrical or constricted or ellipsoid and thicker, usually shorter than the male zone. Flowers unisexual, perigone absent. Male flowers 2-6 androus, thick, stamens free, anthers sessile to subsessile, connective thick, apically truncate. Staminodes usually prismatic, truncate, sometimes clavate, often somewhat similar to stamens. Ovary ovoid or obovoid, 2-4 to several locular, ovules 1-50 or more per locule, usually hemiorthotropous, rarely hemianatropous to nearly anatropous, funicle long to very short, placenta axile to basal, stylar region usually as broad as the ovary, sometimes slightly broader, sometimes attenuate, rarely elongate, stigma sometimes also lobed or discoid-hemispheric, often as broad as the style. Fruit a sub-cylindrical to obovoid berry, 1 to many-seeded, white, whitish-translucent, red or orange-red. Seed tiny to fairly large, ovoid-oblong to ellipsoid, testa rather thick, striate-costate.

About 500 species distributed throughout tropical and southern subtropical America, West Indies (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 4 species.

Key to the species

- | | | |
|----|--|-----------------------|
| 1. | Leaf blade not below 75 cm long | 2 |
| - | Leaf blade up to 60 cm long | 3 |
| 2. | Leaf blade having 10-12 segments on each side of the midrib | bipinnatifidum |
| - | Leaf blade pinnately lobed less than halfway to midrib; lobes more or less wedge-shaped and obtuse | lacerum |
| 3. | Leaf blade cordate-ovate-shaped, light green to greyish green, marbled with silvery areas | mamei |
| - | Leaf blade heart-shaped, glossy green | scandens |

64. *Philodendron bipinnatifidum* Schott *ex* Endl., Gen. Pl. 1 (3): 237 (1837). Kunth, Enum. Pl. 3: 51 (1841); Schott, Syn. Aroid. 113 (1856) & Prodr. Syst. Aroid. 297 (1860); Krause in Engler, Pflanzenr. 60 (IV. 23Db): 135 (1913); Graf, Exotica, edn. 8: 183, 185, 187 (1976); Tropica, edn. 5: 112, 1061 (1978-reprint 2003); Walters *et al.*, European Gard. Fl. 2 (2): 92 (1984-reprint 2003); Mayo, Kew Bulletin 46 (4): 633-643 (1991); Noltie, Fl. Bhutan 3(1): 157 (1994); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 67-68 (2007). **Photo xiv (Page no. 100).**

Philodendron selloum C. Koch in Index Sem. Hort. Reg. Bot. Berol. 1853, Appendix: 14 (1854) & in Ann. Sci. Nat. 4, Ser. 1: 341 (1854); Schott, Syn. Aroid. 109 (1856) & Prodr. Syst. Aroid. 298 (1860).

Philodendron lundii Warming in Videnskab. Meddelels. Kjöbenhavn 1867 (8-11): 128, t. IV (1867); Krause in Engler, Pflanzenr. 60 (IV. 23Db): 135 (1913).

Type: Plant cultivated at Schoenbrunn Palace Gardens, Vienna, by Schott, originally collected by him in Brazil, probably near Rio de Janeiro; no specimens are known to exist, represented by colour illustrations:-Schott Icones Aroideae nos. 2609, 2610, 2640, 2663-2665 (W, microfiche ! in Schott 1984).

Bengali / Local name: *Bahari Kachu*. English names: Split Leaf Philodendron, Tree Philodendron, Lacy Tree Philodendron, Selloum.

Stem erect, decumbent and semi-erect, branching sparingly in basal parts, up to 3.5 m tall, 5-13 cm in diameter. Leaves petiolate, petiole 70-150 cm long, 1.0-1.7 cm in diameter at the apex, broadly sulcate adaxially with sharply angled margins or flattened or occasionally slightly convex, rounded abaxially, sheath c 12 cm long on leaves subtending inflorescence, leaf blade usually bipinnatifid, either weakly or very strongly, occasionally pinnatifid, very 10-12 segments on each side of the midrib, variable in shapes of lobes and sinuses, broadly cordiform-sagittate in outline, overall length 75-120 cm, overall width 60-120 cm, upper surface glossy dark green, lower surface paler. Peduncle 5-10 cm long, 1.5-5.0 cm in diameter at the apex, green. Spathe 12-33 cm long, 6.5 cm in diameter at the middle, somewhat constricted centrally at anthesis, outer surface of basal half green, maroon-purple or chocolate-brown, apical half paler, greener or more yellowish, inner surface of the spathe entirely cream-white. Spadix 15.0-28.5 cm long, fertile male zone 3.0-8.5 cm long, 1.5-3.2 cm in diameter, ellipsoid to cylindric, apex acute to rounded, white, sterile male zone longer and thicker than the fertile male zone, 5.5-14.5 cm long, 1.5-3.2 cm in diameter near apex, increasing gradually to 2-4 cm in diameter near the base, white, female zone 2.8-5.7 cm long, 1.7-4.0 cm in diameter, tapering upwards, adnate dorsally to the spathe for 1/2-3/4 of length. Stamens 5.0-6.5 mm long, 0.8-1.2 mm wide at the apex, staminodes 2-6 mm long, 1-2 mm wide at the apex, cylindric to clavate, truncate at the apex. Ovary 2.0-3.7 mm in diameter, cylindric to somewhat barrel-shaped, locules 6-15 per ovary, ovules 2-4(-6) per locule, style usually present, as wide as or distinctly narrower than the ovary and style crown, sometimes lacking, stigma 2.0-3.8 mm wide, entirely covering style crown lobes, or absent from their dorsal sides. Fruit a berry, 1.4 × 0.7-0.8 cm, cylindric, white or yellow when ripe,

with edible, sweet-tasting pulp. Seeds 3.5-4.0 mm long, 1.7-1.8 mm in diameter, sub-cylindric.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 36$ (Petersen, 1989).

Habitat: Shady moist areas.

Distribution: Northeast Brazil (Mayo, 1991), also grown in Bangladesh.

Specimen examined:

Dhaka: Bashundhara area, 04.10.2004, Hosne Ara HA 1452 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, this species is commonly planted both in public places and homesteads.

Ethnobotanical information: The plant juice is of medicinal value and cures orchitis, rheumatism and ulcers. It is believed that the seeds of the species are anthelmintic. The people of Brazil use its seeds and roots as a vermifuge (Croat, 1994).

65. *Philodendron lacerum* (Jacq.) Schott, Melet 1: 19 (1832), Syn. Aroid.: 108 (1856), Prodr. Syst. Aroid.: 290 (1860). Krause in Engler, Pflanzenr. 60 (IV. 23Db): 114-115 (1913); Birdsey, Cult. Aroids.: 85 (1951); Graf, Exotica, edn. 8: 193, 221 (1976); Tropica, edn. 5: 115, 119, 1062 (1978-reprint 2003); Walters *et al.*, European Gard. Fl. 2 (2): 92 (1984-reprint 2003). **Photo xv (Page no.100).**

Arum lacerum Jacq., Hort. Schoenbr. 4, t. 468 (1804).

Caladium lacerum Willd., Spec. 4: 491 (1805).

Type: Cuba, Jamaica.

Bengali / Local name: *Bahari lata Kachu*.

English name: Not Known.

Evergreen stout herb, climbing, plant tall, with long internodes. Leaf-blade to c. 75 cm, numerous, ovate-circular in outline, cordate at base, pinnately lobed less than halfway to midrib; lobes more or less wedge-shaped and obtuse; midrib and principal

veins very prominent. Leaf-stalk to 90 cm, terete. Inflorescence 1-11 per node, peduncle shorter than the petiole. Spathe erect, convolute, surrounding the spadix, constricted between the tube and the blade, c 12 cm long, with tube outside dull purple and limb greenish cream. Spadix cylindrical, erect, pistillate zone basal, separated from the staminate zone by a zone of sterile staminate flowers. Flowers unisexual, stamens 2-6, ovary 2- to many-locular, with 1 to many ovules per locule, stigma sessile. Fruit a fleshy berry, seeds ovoid to ellipsoid.

Flowering and fruiting period: July to October.

Chromosome number: Not known.

Habitat: Shady moist places.

Distribution: Cuba, Haiti and Jamaica, planted in Bangladesh.

Specimen examined:

Dhaka: Belly Road, 04.10.2004, Hosne Ara HA 1453 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

66. *Philodendron mamei* Andre', Revue Hortic. 105 (1883); Illustration Horticole 43: 293 (1896). Birdsey, Cultivat. Aroid.: 87 (1951); Graf, Exotica, edn. 8: 217, 223 (1976); Tropica, edn. 5: 114, 118, 1062 (1978-reprint 2003); Walters *et al.*, European Gard. Fl. 2 (2): 94 (1984-reprint 2003). **Photo xvi (Page no. 100).**

Type: Ecuador.

Bengali / Local name: *Bahari lata Kachu*.

English name: Not Known.

Erect, terrestrial or a root-climber to 1m long, stem prostrate, internodes very short. Scale leaves reddish, dying and persistent. Leaf-blade to 60 × 45 cm, reflexed, ovate, sagittate at base with more or less angular basal lobes, irregularly spotted with grey-green between the principal veins, these and lesser veins all furrowed on upper surface, coriaceous, apex acute. Leaf-stalk nearly as long as blade, reddish at apex and

base, flat on upperside and narrowly crinckly-winked near apex. Inflorescence 1-11 per side. Spathe erect, convolute, surrounding the spadix, constricted between the tube and the blade, c 15 cm long, brownish red outside. Spadix cylindrical, erect, pistillate zone basal, separated from the staminate zone by a zone of sterile staminate flowers. Flowers unisexual, stamens 2-6, ovary 2- to many locular, with 1 to many ovules per locule, stigma sessile. Fruit a fleshy berry, seeds ovoid to ellipshoid.

Flowering and fruiting period: June to Octoer.

Chromosome number: Not known.

Habitat: shady moist areas.

Distribution: Ecuador, also grown in Bangladesh.

Specimen examined:

Dhaka: Dhaka University Botanical Garden, Curzon Hall, 04.10.2004, Hosne Ara HA 1454 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

67. *Philodendron scandens* C. Koch & Sello *ex* Koch in Koch & Bouché, Index Sem. Hort. Berol. 1853 (Append.): 14 (p. 4 in separate) (1853). Krause in Engler, Pflanzenr. 60 (IV. 23Db): 56 (1913); Birdsey, Cultivat. Aroid.: 89 (1951); Bunting, Gentes Herb. 10: 160 (1968); Graf, Exotica, edn. 8: 203, 207 (1976); Tropica, edn. 5: 115 (1978-reprint 2003); Walters *et al.*, European Gard. Fl. 2 (2): 93 (1984-reprint 2003); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 44 (1987); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 68 (2007).

Photo xvii (Page no. 100).

Pothos discolor Hort., nom. nud., Alston in Trimen, Handb. Fl. Ceylon 6: 197 (1931).

Type: Unknown, described from cultivation at Berlin.

Bengali / Local name: *Latano Kachu*.

English name: Heart-leaf Philodendron.

A climber of small size, the terminal part of the stem finally pendent and nearly reaching the ground, up to 1.5 cm thick, internodes elongate, 10-15 cm long, nodes with a circular cataphyll scar, subtended by a patch of roots. Leaves petiolate, blade up to 60 cm long, heart-shaped, glossy green. Petioles in the adult stage up to 25 cm long, somewhat geniculate in the outer third sheath without inflorescence open and only c 2 cm long, sheath with inflorescence open and more than half the petiole length, leaf blade in juvenile stage small and softly purple, in the adult stage large, 20-30 × 18-23 cm, green, more or less glossy, reflexed, heart-shaped with about 3 principal veins from each side of the midrib, cordate at the base, margins entire to slightly undulate. Peduncles 7-10 cm long. Spathe green outside, red inside, 14-18 cm long, lower one-third slightly broader (3 cm) than upper two-thirds (2.0-2.5 cm). Spadix c 15 cm long, stipe c 1.5 cm long, lower female portion c 5 cm long and upper male portion c 8 cm long.

Flowering and fruiting period: May-November.

Chromosome number: $2n = 32$ (Petersen, 1989).

Habitat: Partially shady places.

Distribution: Northern Neotropics, planted in Bangladesh.

Specimen examined:

Dhaka: Banani area, 04.10.2004, Hosne Ara HA 1455 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

17. Genus: *Pistia* L., Sp. Pl. 963 (1753).

Type species: *P. stratiotes* L.

Small, free-floating, sub-acaulous, rosulate, evergreen, freshwater, aquatic herbs with pendent fibrous roots. Leaves densely pubescent, sub-sessile, blade very variable in size and shape, usually obovate to obdeltoid, truncate or retuse, midrib absent,

venation flabellately reticulate. Inflorescence solitary, small, hidden among the leaf-bases. Peduncle very short, pubescent. Spathe constricted centrally, basal part slightly inflated, convolute, apical part more or less erect, expanded, acute-acuminate, light yellowish-green to white. Spadix highly reduced, and in three parts: the lower pistillate, the naked portion adnate to the spathe and the upper stipitate staminate portion free from the spathe. Flowers unisexual, perigone absent. Staminate flowers 2-8, connate into a single whorl borne on a short stipe subtended by a shallow basal cup, each flower a synandrium of 2 connate stamens. Pistillate flower solitary, unilocular with many orthotropous ovules on a parietal placenta, attached to the spathe, stylar region short, slender, curved, stigma small, sub-spherical, papillose. Fruit a thin-walled several-seeded berry, ellipsoid, dehiscent by irregular slits. Seeds few, oblong or ovoid, rugose, testa thick.

Only 1 species, pantropical in distribution (Mayo *et al.*, 1997). In Bangladesh, this genus is also represented by 1 species.

68. Pistia stratiotes L., Sp. Pl. 963 (1753). Roxb., Fl. India 3: 131 (ed. 2, 1832); Kunth, Enum. Pl. 3: 8 (1841); Hook. f., Fl. Brit. India 6: 497 (1893-reprint 1954); Prain, Beng. Pl. 1105 (1903-reprint 1981); Cooke, Fl. Pres. Bombay 2: 817 (1908); Engler, Pflanzenr. 73 (IV. 23F): 259-260 (1920); Haines, Bot. Bihar and Orissa: 873 (1924-reprint 1978); Heinig, List Chittagong: 74 (1925); Ridley, Fl. Malay Peninsula: 85-86 (1925); Fischer in Gamble, Fl. Pres. Madras: 1573 (1931), repr. ed. 3: 1097-1098 (1967); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 14 (1931); Standley, Fl. Panama, Ann. Missouri Bot. Gard. 31 (1): 4 (1944); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 101 (1953); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Standley & Steyermark, Fl. Guatemala, Fieldiana, Bot. 24 (1): 347-348 (1958); Mitra, Fl. Pl. E. India 1: 85 (1958); Subramanyam, Aquatic Angios.: 75 (1961); Liu & Huang, Quart. Journ. Taiwan Mus. 16: 139 (1963); Hara, Fl. E. Himalaya: 397 (1966); Hu, Dansk Bot. Arkiv 23 (4): 457 (1968); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 12 (1976); Nicolson in Saldanha & Nicolson, Fl. Hassan Dist. 788 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 91 (1978); Graf, Tropica: 129 (1978); Nasir, Fl. W. Pakistan 120: 2 (1978); Bennet, Fl. Howrah Dist.: 92 (1979); Deb, Fl. Tripura State 2: 401 (1983); Bakshi, Fl. Murshidabad Dist.: 338 (1984); Sharma *et al.*, Fl. Karnataka: 297 (1984); Walters *et al.*, European Gard. Fl. 2 (2): 112 (1984-reprint

2003); Verma *et al.*, Fl. Raipur, Durg and Rajnandgaon: 396 (1985); Mayo, Fl. Trop. E. Africa: 66-68 (1985); Nicolson in Dassanyake & Fosberg, Rev. Handb. Fl. Ceylon 6: 100 (1987); Nair & Nayar, Fl. Courtallum 2: 393 (1987); Khan & Halim, Aqua. Angios. Bangladesh: 67 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 12 (1989); Islam, Fl. Majuli: 337 (1990); Vajravelu, Fl. Palghat Dist. 535 (1990); Ellis, Fl. Nallamalais 2: 403 (1990); Matthew, Excursion Fl. Cent. Tamilnadu, India: 541 (1991); Kothari & Moorthy, Fl. Raigad Dist. Maharashtra State: 418-419 (1993); Parmar in Shetty & Singh, Fl. Rajasthan 3: 867 (1993); Noltie, Fl. Bhutan 3(1): 156 (1994); A. Hay, Blumea Supplement 8: 98 (1995); Liu & Huang, Fl. Taiwan: 810 (1996); Saxena & Brahmam, Fl. Orissa 4: 2064 (1996); Pullaiah, Fl. Andra Pradesh 3: 1025 (1997); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 404 (1998); Matthew, Fl. Palni Hills. S. India 3: 1372 (1999); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 419-421 (2002); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrib. U. S. Nat. Herb. 52: 44-45 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 69 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 79 (2010). **Photo 51 (Page no. 338).**

Zala asiatica Lour., Fl. Cochinch. 405 (1790), *et* Willd. 492 (1793).

Pistia minor Blume, Rumphia 1: 78 (1836).

Pistia occidentalis Blume, Rumphia 1: 79 (1836).

Pistia stratiotes L. var. *linquiformis* Engler in Martius, Fl. Bras. 3 (2): 214 (1878); Pflanzenr. 73 (IV. 23F): 260 (1920).

Pistia stratiotes L. var. *cuneata* Engler in Martius, Fl. Bras. 3 (2): 214 (1878); Pflanzenr. 73 (IV. 23F): 259 (1920).

Pistia stratiotes L. var. *spathulata* Engler in Martius, Fl. Bras. 3 (2): 214 (1878); Pflanzenr. 73 (IV. 23F): 259 (1920).

Pistia stratiotes L. var. *obcordata* Engler in Martius, Fl. Bras. 3 (2): 214 (1878); Pflanzenr. 73 (IV. 23F): 259 (1920).

Lectotype: India, Kerala; 'Kodda Pail', Rheede, Hort. Malab. 11, t. 32 (1692).

Bengali / Local name: *Topa pana*,
Khudi pana.

English names: Water Lettuce, Water
Cabbage, Tropical
Duckweed.

Aquatic, floating, stoloniferous monoecious herb, stem bearing a rosette of leaves and up to 30 cm long, with several adventitious roots clothed with plumosely spreading root-hairs. Leaves up to 14 cm long, 8 cm broad, spatulate, obconic or oblong, apex rounded to truncate, green, paler and more densely pubescent beneath, main veins 5-7, prominently winged beneath. Peduncles 10-15 mm long, tomentose. Spathe 1.0-1.5 cm long, 5 mm broad, light yellowish-green to white-tomentose, margins and exterior fimbriate-pilose, oblong-ovate, acute to acuminate, with a constriction at about the middle lower half, subconvolute, the upper half spreading. Fruit a berry, 0.5 × 0.3 cm, membranous, 8-20 seeded. Seeds c 0.2 cm long, 0.1 cm in diameter, oblong to truncate, reddish-brown.

Flowering and fruiting period: October-March.

Chromosome number: 2n = 28 (Petersen, 1989).

Habitat: Surface of ponds, ditches, slow-running streams and irrigation canals.

Distribution: Bangladesh, tropics and subtropics but rare in Oceania.

Specimens examined:

Barisal: East Narayanpur and Dostani village, 22.02.2008, Hosne Ara HA 2664 (DACB); Kashipur, Lakaotta, 23.02.2008, Hosne Ara HA 2720 (DACB).

Bogra: Beltola, 06.02.2003, Hosne Ara & Rezia Khatun HA 142 (DACB); Shibgonj area, 19.08.2005, Hosne Ara HA 2189 (DACB); Dhunot Upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2792 (DACB).

Chittagong: Locality, Collection date & number unknown, J.D. Hooker & Thomson (K).

Dhaka: Dhaka, 06.05.1943, A.K. Acharja (DUSH); Postugola, Bottala, 16.10.1963, Abdul Ghani 42 (DUSH); Jurain, 15.11.1964, Moula Baksha 16 (DUSH); Zinzira, 11.02.1968, Mozahar 27 (DUSH); Mirpur Sec. 12, 01.08.1970, Zazim 240 (DUSH); Khilgaon area, 15.04.1988, Hosne Ara HA 5 (DACB); Savar, 26.05.2012, Hosne Ara HA 2807 (DACB).

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Dinajpur: Near Birgonj Sal forest, 18.08.2005, Hosne Ara HA 2132 (DACB); Near Nawabgonj Sal forest, 18.08.2005, Hosne Ara HA 2140 (DACB); Ranigonj, 19.08.2005, Hosne Ara HA 2167 (DACB); Fultala, 19.08.2005, Hosne Ara HA 2177 (DACB).

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 2791, 5616 (CAL).

Gaibandha: Palasbari Upazila, Jamalpur, 06.05.1988, Mia, Mahbuba, Rezia, Mahfuz & Bushra M 1837 (DACB).

Gazipur: Joydebpur, 09.08.1970, M.A. Rahman 214 (DUSH); Burulia village, 25.07.2004, Hosne Ara HA 1081 (DACB); Tetupara road, Baropaiha, 25.07.2004, Hosne Ara HA 1086 (DACB); Kaliakair, 19.08.2005, Hosne Ara HA 2208 (DACB).

Jessore: Jessore twon area, 26.05.2012, Hosne Ara HA 2841 (DACB).

Kurigram: Singhimari village, 20.05.2013, Hosne Ara HA 2850 (DACB); Baruitari village, 24.08.2013, Hosne Ara HA 2853 (DACB).

Magura: Magura area, 26.05.2012, Hosne Ara HA 2828 (DACB).

Manikganj: Manikganj area, 26.05.2012, Hosne Ara HA 2813 (DACB).

Moulvibazar: Sreemongal, Lawachara reserve forest, 15.05.2005, Hosne Ara HA 1498 (DACB).

Mymensingh: Main road, 18.09.1980, Mia, Huq & Rahman M 315 (DACB).

Narayanganj: Sonargaon, 07.07.2005, Hosne Ara HA 1915 (DACB).

Narsingdi: Narsingdi Sadar, 07.07.2005, Hosne Ara HA 1885 (DACB).

Patuakhali: Patuakhali Sadar, Sobujbag, 21.07.1998, M. Sultan 27 (DUSH); Dasmina, Ranggopadi, 02.03.2005, M. Sultana 683 (DUSH); Galachipa, Noluabaghi, 01.02.2007, M. Sultana 1491 (DUSH).

Rajbari: Rajbari area, 26.05.2012, Hosne Ara HA 2823 (DACB).

Sirajganj: Kazipur upazilla to Charkhadah village, 18.03.2011, Hosne Ara HA 2783 (DACB).

Sherpur: Bakshigonj, Lawchapra, Dumurtola, 08.10.2003, Hosne Ara HA 596 (DACB); Rangtia Range, Gazni beat, 09.10.2003, Hosne Ara HA 639 (DACB); Rangtia Range, Samaschura beat, 10.10.2003, Hosne Ara HA 677 (DACB); Koshba village, 22.06.2004, Hosne Ara HA 989 (DACB).

Sylhet: Jaintiapur, 30.10.1935, G.K. Deka 12860 (ASSAM).

Tangail: Modupur, Dokhola, 06.10.2003, Hosne Ara HA 552 (DACB); Mirzapur, 19.08.2005, Hosne Ara HA 2198 (DACB).

Economic uses/values/harmful aspects: The plant is used to cure urinary tract infection and swellings (Heng, 1979). The leaves of the plant possess antiseptic, antitubercular, antidyenteric and anthelmintic properties, and are used for the treatment of eczema, leprosy, piles, ulcers, syphilis, cough and asthma. Roots of the plant contain laxative and diuretic properties (Yusuf *et al.*, 1994).

Ethnobotanical information: The plants are cultivated as a feed in China. The juice of the plant is applied to cure diseases of the eye and ear. Ash of the plants is used in curing ringworm infection.

18. Genus: *Pothos* L., Sp. Pl. 968 (1753).

Type species: *P. scandens* L.

Shrubby climbers on trees with the aid of adhesive roots or creeping over rocks. Stem branched. Leaves distichous, petiole conspicuously winged or wingless, petiolar sheath minute or well-developed at the base, leaf blade linear-lanceolate to ovate or elliptic, sometimes oblique with reticulate venation. Inflorescence axillary or infra-axillary, solitary or forming short branching systems of several inflorescences, peduncle sometimes reflexed, partly or entirely enveloped by the cataphylls. Spathe small, cymbiform or elongate, not constricted, at last entirely spreading and either patent or recurved, green to dirty white or yellow or deep purple. Spadix sessile or stipitate, globose, ovoid, cylindrical, ellipsoid or obovoid, densely or laxly flowered. Flowers bisexual, perigoniate, tepals 4-6. Stamens 6, rarely 4, free, filaments oblong, flattened, anthers dehiscing by longitudinal slits. Ovary ovoid-oblong or depressed, 3-

locular, ovules 1 per locule, anatropous, placenta axile at the base of the septum, stylar region sometimes as broad as the ovary, stigma discoid-hemispheric. Fruit a berry, ellipsoid to ovoid, red. Seed 1-3, ellipsoid, testa smooth.

About 70 species distributed throughout south and southeast Asia, Australasia, Malagasy region and Malay Archipelago (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 3 species.

Key to the species

- | | | |
|----|---|-------------------|
| 1. | Peduncle green | 2 |
| - | Peduncle dark purple | junghuhnii |
| 2. | Inflorescence bent, spathe purple, fertile
spadix cream | scandens |
| - | Inflorescence straight, spathe green, fertile
spadix white to yellow | chinensis |

69. *Pothos chinensis* (Raf.) Merr., J. Arn. Arb. 29: 210 (1948). Benth., F.C. How, Fl. Kwangchow [Canton=Guangzhou] 693-694 (1956); Chun, Fl. Hainan 4: 130 (1977); Wu & Li, Fl. Yunnan. 2: 742-744 (1979), pl. 208, 8; Li in Wu & Li, Fl. Reip. Pop. Sin., 13(2): 19-20 (1979), pl. 3, 10; Sai in Li *et al.*, Fl. Guizhou. 6: 546-548 (1987); Liu & Huang, Fl. Taiwan: 812 (1996); Boyce, Blumea 45 (1): 155-160 (2000); Govaerts & Frodin, World Checkl. Bibliogr. Araceae: 427 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 71-72 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 7 (2010). **Photo 52 (Page no. 348).**

Tapanava chinensis Raf., Fl. Tellur. 4: 14 (1837).

Pothos seemannii Schott, Bonplandia 5: 45 (1857); Liu & Huang,
Quart. Journ. Taiwan Mus. 16: 140 (1963).

Pothos cathcartii Schott, Aroid. 1: 22 (1858), t. 44-45 (as '*cathcartii*');
Hook. f., Fl. Brit. India 6: 552 (1893-reprint 1954); Engler,
Pflanzenr. 21 (IV. 23B): 27 (1905); Haines, Bot. Bihar and
Orissa: 858 (1924-reprint 1978); Mitra, Fl. Pl. E. India 1: 72

(1958); Hara, Fl. E. Himalaya: 397 (1966); Hu, Dansk Bot. Arkiv 23 (4): 413 (1968); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 33-34 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 91 (1978); Deb, Fl. Tripura State 2: 402 (1983); Pant, Fl. Corbett Nat. Park: 159 (1986); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 12 (1989); Noltie, Fl. Bhutan 3(1): 125 (1994); Hajra & Verma, Fl. Sikkim 1: 192 (1996); Chauhan *et al.* in Hajra, Contrib. Fl. Namdapha, Arunachal Pradesh: 339 (1996).

Pothos warburgii Engl., Bot. Jahrb. Syst. 25: 2(1898).

Pothos balansae Engl., Bot. Jahrb. Syst. 25: 3 (1898).

Pothos yunnanensis Engl, Pflanzenr. 21 (IV. 23B): 28 (1905).

Pothos chinensis (Raf.) Merr. var. *lotienensis* C.Y. Wu & H. Li, Acta Phytotax. Sin. 15(2): 101 (1977).

Type: Bot. Reg. 16, Pl. 1337 (1830).

Bengali / Local name: *Bahari lata*.

English name: Rock Vine.

A large shrubby climber, stem midgreen, becoming greyish-brown with age, internodes 2.0-3.5 cm long, free or occasionally rooting at the base, arising from mature sterile stem as side branches, often branching to three or more orders. Leaves coriaceous, ovate-oblong or lanceolate, acute or acuminate, base rounded to acute, apex attenuate-mucronate to acute or attenuate, 1.8-18.0 × 0.6-5.5 cm, 2-3 times longer than the petiole, petiole wings oblanceolate, 0.5-10.0 × 0.3-2.5 cm, apex auricled. Inflorescence straight, solitary, peduncles sheathed, very stout, 0.8-1.5 cm long, sheaths imbricate, coriaceous, ovate, 1.0-1.5 cm long, acute. Spathe orbicular, 1.0-1.6 (-2.5) cm, broad, cuspidate, green. Spadix stipitate, the fertile portion of the spadix globose to ovoid, sometimes sub-globose, 5-10 × 1.0-1.2 mm, green, usually erect or suberect stipe. Flowers c 1-2 mm across. Stamens 1-4 × 0.5 mm, filaments strap-shaped, c 0.2 mm broad, dehiscing longitudinally in slits, yellow. Ovary 1.0-1.5 × 0.2-0.7 mm, yellowish-green to dirty white, stigma punctate. Fruit obclavate to

ovoid or ellipsoid, 1.0-1.7 × 1.0-1.4 cm. Seeds 1-3, ellipsoid to compressed, globose, c 3-6 mm in diameter, testa smooth.

Flowering and fruiting period: December-June (Noltie, 1994).

Chromosome number: Not known.

Habitat: Tropical humid forests, usually primary or secondary forests.

Distribution: Bangladesh, Northeastern India, Nepal, Bhutan, China, Myanmar, Thailand, Cambodia, Vietnam and Taiwan.

Specimens examined:

Chittagong: Jungle Chunati, 30.12.1989, Khan, Huq & Alam K 8171 (FRIH).

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 5946 (K).

Rangamati: Burkul, Collection date unknown, 1876, J.L. Lister 127 (CAL, K).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: The people of Lakhimpur (India) take the leaves of this plant, after frying them in ghee, as a pain-killer (Caius, 1986).

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 5 (1): 97-100, 1998).

70. *Pothos junghuhnii* de Vriese in F.A.W. Miquel, Pl. Jungh.: 104 (1851). Govaerts & Frodin, World Checkl. Bibliog. Araceae: 428 (2002). **Photo 53 (Page no. 348).**

Pothos macrophyllus de Vriese in F.A.W. Miquel, Pl.
Jungh.: 104 (1851), *nom. illeg.*

Pothos scandens var. *javanicus* de vriese in F.A.W.
Miquel, Pl. Jungh.: 103 (1851).

Pothos roxburghii Schott, Aroideae: 22 (1856), pro syn.

Pothos vrieseanus Schott, Aroideae: 22 (1856); Hook. f.,
Fl. Brit. India 6: 552 (1893).

Pothos junghuhnianus Schott, Prodr. Syst. Aroid.: 567
(1860), orth. var.

Bengali / Local name: Not known.

English name: Not known.

Slender to moderately robust, root-climbing herbs. Leaves petiolate, bright to mid-green adaxially, paler abaxially, petiole 3.5-8.0 × 0.5-2.0 cm, broadly winged, oblong to obovate-oblong, base decurrent to clawed, apex truncate, rounded or weakly auriculate, blade 3-13 × 1.5-6.0 cm, ovate to elliptic or oblong-lanceolate, base rounded to acute, apex attenuate-mucronate to acute or attenuate. Inflorescence solitary, arising from the distal leaf axils of fertile shoots, peduncle slender, 2.5-5.0 cm × 1.0-1.2 mm, erect, dark purple. Spathe 6-20 × 4-15 mm, ovate, flat to convex, base cordate, clasping the peduncle, apex slightly raised, acute to subacute with a small mucro, dull green to purple. Spadix stipitate, stipe slender, 2.5-3.5 × 1.0-1.5 mm, erect, straight, dark purple; fertile portion 6-20 × 3.5-10 mm, globose to ovate-ellipsoid or ovoid-clavate, cream to yellow. Flowers 0.6-1.2 mm in diameter, with 6 free tepals and 6 stamens. Infructescence with 1-8 berries, fruit c 4-7 mm in diameter, ovoid or ellipsoid, ripening scarlet, seeds c 3-6 mm in diameter, ellipsoid.

Flowering and fruiting period: April-October.

Chromosome number: Not known.

Habitat: Primary to disturbed secondary forest, often on limestone.

Distribution: Bangladesh, Malesia.

Specimen examined: Not collected by the author. Wallich collected specimen of this species from Silhet (Sylhet) as noted by Hook. f. (1893, pp. 552).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

71. *Pothos scandens* L., Sp. Pl.: 698 (1753); ed. 2 (1763) 1373-1374, 1675. Lour., Fl. Cochin. 532 (1790); Roxburgh, Fl. Ind. 1: 451 (1820); ed. 2, 1: 430 (1832); Schott, Schott & Endl., Melet. Bot. 21 (1832); Endl., Gen. Pl. 3: 239 (1837); Kunth, Enum. Pl. 3: 65-66 (1841); Wight, Icon. Pl. Ind. Or. 3: 5, t. 776 (1844); Schott, Aroideae 22

(1856-1857), t. 33; Gen. Aroid. (1858) t. 95 & Prodr. Syst. Aroid. 563 (1860); Engl. in DC, Monogr. Phanerogam. 2: 84 (1879); Engler, Pflanzenr. 21 (IV. 23B): 26-27 (1905); Hook. f., Fl. Brit. India 6: 551 (1893); Prain, Beng. Pl. 2 : 1115 (1903-reprint 1981); Cooke, Fl. Pres. Bombay 2: 828-829 (1908); Haines, Bot. Bihar and Orissa: 857-858 (1924-reprint 1978); Ridley, Fl. Malay Peninsula: 127-128 (1925); Heinig, List Chittagong: 75 (1925); Blatter & McCann, J. Bombay Nat. Hist. Soc. 25: 31 (1931); Fischer in Gamble, Fl. Pres. Madras 1592 (1931), repr. ed. 3: 1110 (1967); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 101 (1953); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 111 (1956); Mitra, Fl. Pl. E. India 1: 72 (1958); Hu, Dansk Bot. Arkiv 23(4): 413-414 (1968); Nicolson in Saldanha & Nicolson, Fl. Hassan Dist.: 788 (1976); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 33 (1976); Balakrishnan, Fl. Jowai: 550-560 (1983); Deb, Fl. Tripura State 2: 402 (1983); Sharma *et al.*, Fl. Karnataka 298 (1984); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 25-26 (1987); Nair & Nayar, Fl. Courtallum 2: 394 (1987); Henry *et al.*, Fl. Tamil Nadu 3: 58 (1989); Vajravelu, Fl. Palghat Dist.: 535 (1990); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 12 (1989); Kothari & Moorthy, Fl. Raigad Dist. Maharashtra State: 418 (1993); Noltie, Fl. Bhutan 3 (1): 125 (1994); A. Hay, Blumea Supplement 8: 109 (1995); Chauhan *et al.* in Hajra, Contrib. Fl. Namdapha, Arunachal Pradesh: 339 (1996); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 404 (1998); Boyce, Blumea 45 (1): 180-186 (2000); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 430 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 72 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 6-7 (2010).

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Batis hermaphrodita Blanco, Fl. Filip. ed. 1, 791 (1837). *Pothos*

hermaphroditus (Blanco) Merr., Sp. Blancoan.: 90 (1918).

Pothos longifolius Presl, Epimel. Bot. 242 (1849); Schott,

Aroideae 22, t. 34 (1855); Prodr. Syst. Aroid. 563 (1860);

Engler, Pflanzenr. 21 (IV. 23B): 23 (1905).

Pothos angustifolius Presl, Epimel. Bot. 243 (1849); Schott,

Aroideae 21, t. 31 (1853); Prodr. Syst. Aroid. 559 (1860);

Engler, Pflanzenr. 21 (IV. 23B): 23 (1905).

- Pothos microphyllus* Presl, Epimel. Bot. 243 (1849). Schott, Aroideae 23, t. 408 (1853).
- Pothos scandens* L. var. *javanica* de Vriese, Pl. Junghuhn. 1: 103 (1851).
- Pothos scandens* L. var. *zeylanica* de Vriese, Pl. Junghuhn. 1: 103 (1851).
- Pothos scandens* L. var. *sumatrana* de Vriese, Pl. Junghuhn. 1: 103 (1851).
- Pothos leptospadix* de Vriese, Pl. Junghuhn. 1: 105 (1851).
- Pothos zollingerianus* Schott, Oesterr. Bot. Wochenbl. 5: 19 (1855).
- Pothos scandens* L. var. *zollingerianus* (Schott) Engler, Pflanzenr. 21 (IV. 23B): 26 (1905).
- Pothos horsfieldii* Miq., Fl. Ned. India 3: 178 (1856).
- Pothos exiguiflorus* Schott, Aroideae 21, t. 41 (1856-1857).
- Pothos vrieseanus* Schott, Aroideae 22, t. 26 (1853); Prodr. Syst. Aroid. 565 (1860); Hook. f., Fl. Brit. India 6: 552 (1893-reprint 1954); Engler, Pflanzenr. 21 (IV. 23B): 24 (1905).
- Pothos chapelieri* Schott, Aroideae 22, t. 35 (1856-1857).
- Pothos cognatus* Schott, Aroideae 22, t. 42 (1856-1857).
- Pothos scandens* L. var. *cognatus* (Schott) Engler in DC. Monogr. Phanerogam. 2: 84 (1879).
- Pothos decipiens* Schott, Bonplandia 7: 165 (1859); Prodr. Syst. Aroid. 562 (1860).
- Pothos fallax* Schott, Prodr. Syst. Aroid. 560 (1860).
- Pothos scandens* L. forma. *angustior* Engl., Bot. Tidsskr. 24: 272 (1902).
- Pothos scandens* L. var. *helferianus* Engler, Pflanzenr. 21 (IV. 23B): 26 (1905).

Type: Herb. Hermann 4: 39, No. 329 [lecto BM; designated by Suresh *et al.* Taxon 32: 127 (1983)].

Bengali / Local name: *Sunat, Sundad,*
Batilata, Hatilata.

English name: Not known.

Epiphytic creeping liana, stem 4-13 m long, branches cylindrical, 2-5 mm in diameter, densely clothed with leaves. Leaves petiolate, petiole 20-140 × 5-20 mm, broadly winged, obovate-oblong to linear-oblong, many-nerved, lamina 2-10 × 3-14 cm, ovate to elliptic or lanceolate, base rounded to acute, apex attenuate-mucronate, 3-nerved on each side. Inflorescence beat, solitary, small, axillary, peduncle slender, 3-10 × 0.5-2.0 mm, erect to spreading, green to purple-tinged, with 6-8 cataphylls at the base, cataphylls green, imbricate, ovate, small, upper ones 4 mm long. Spathe very small, cymbiform margins variously inrolled, purple, 4-6 × 3-4 mm, base short or somewhat long-clawed. Spadix sub-globose or ellipsoid, 5-6 × 4-5 mm in diameter on a short stipe, stipe 4-5 mm long, erect in bud, fertile spadix cream in colour. Flowers c 1-2 mm in diameter, tepals 1.0 × 0.3 mm, oblong-cymbiform, yellow-green to dirty white, stamens 1-4 × 0.5 mm, filaments strap-shaped, thecae elongate-globose, dehiscing by longitudinal slits, ovary 1.6 × 0.2 mm, yellow-green to dirty white, stylar region truncate, stigma prominent, punctate. Fruit a berry, oblong-ovate, yellow or red, less than 10 mm long, 5-6 mm in diameter. Seeds c 3-6 mm in diameter, ellipsoid to compressed-globose.

Flowering and fruiting period: January-December.

Chromosome number: 2n = 24 (Petersen, 1989).

Habitat: Trees or rocks in evergreen tropical to subtropical forests, occasionally hedges or scrubs.

Distribution: Bangladesh, Madagascar to New Guinea.

Specimens examined:

Barisal: Barisal, 10.02.1973, Syed Zafar Sadeque 4 (DUSH); Kashipur, Lakaotta, Hosne Ara HA 2719 (DACB).

Bandarban: Locality unknown, 03.05.1977, A.M. Huq 3349 (DACB).

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Bogra: Beltola-Hindupara, 12.03.2001, B.M. Rezia Khatun RK 2775 (DACB); Dhosthika, Fakir para, 04.02.2003, Hosne Ara & Rezia Khatun HA 138 (DACB); 04.02.2003, Rezia Khatun & Hosne Ara, RK 4061 (DACB); Mohastangarh, 05.02.2003, Hosne Ara & Rezia Khatun HA 139 (DACB); Mohastangarh near Borhanuddin Mazar, 05.02.2003, Rezia Khatun & Hosne Ara RK 4125 (DACB); Beltola, 06.02.2003, Hosne Ara & Rezia Khatun HA 141, 157 (DACB).

Chittagong : Locality, Collection date & number unknown, J.D. Hooker & Thomson (K); Hazarikhil, 30.01.1962, Amjed Ali Khan 61 (DUSH); 01.02.1962, Md. Shamsur Rahman, Locality, Collection date, year & number unknown (DUSH); Dhalikchara, 19.02.1971, A.M. Huq 348 (DACB); FRI Campus (East Hill), 05.03.1979, Monir *et al.* 627 (FRIH); Chunnati forest range, Harbhang, 09.06.1979, Khan, Huq & Rahman K 5468 (DACB); Dhurong, 22.04.1980, Das & Alam 3825 (FRIH); 23.04.1980, Das & Alam 3879 (FRIH); Fatiqchari, 20.01.1989, Huq, Rahman & Mahfuz H 8989 (DACB); Jungle Chunnati, 30.12.1989, Khan, Huq & Alam K 8171 (DACB); Banskhal, Sadhanpur, 27.05.1996, Rahman *et al.* 213 (HCU); Baniarchara, 28.03.1998, Rahman, Wilcock and others 2608 (HCU); Dhopachari, 16.09.1998, Rahman's collector's: Huda & Dey *et al.* 3384B (HCU); Dhopachari, Chamachari, 16.09.1998, Rahman *et al.* 3384a & 3384b (HCU); Laliarhat, 05.05.2002, Yusuf 1503 (CLH); Chunnati forest area, 26.09.2005, Hosne Ara HA 2224 (DACB); Fatiqchari, 27.09.2005, Hosne Ara HA 2306 (DACB); Sitakundo, 01.10.2005, Hosne Ara HA 2589 (DACB); Mirsarai, 01.10.2005, Hosne Ara HA 2606 (DACB).

Comilla: Comilla, Aug. 1952, Md. Arshad Ali, Collection number unknown (DUSH); Sultanpur, 12.02.1976, Huq & Rahman H 2236 (DACB).

Cox's Bazar: Jilamja, 12.09.1944, James Sinclair 3742 (CAL); Ramu, Dhalikchara, 19.02.1971, Huq 348 (DACB); Teknaf, Nyttong Hill, 29.03.1978, Gani 2098 (FRIH); Ukhia, Upper Rezu reserve forest, 12.12.1984, Khan, Huq & Mia K 6830 (DACB); Goalmara beat, 09.10.1989, Khan & Huq K 8145 (DACB); Teknaf range, Mathabhanga beat, 06.10.1991, Khan, Huq, Mia & Rahman K 8603 (DACB); Baniarchara, 28.03.1998, Rahman & Wilcock *et al.* 2608 (HCU); Chakaria, Katakhal, 13.12.1998, Jahangir 8114 (FRIH); Baniarchara, 10.09.1999, Boyce, Toha & Rahman 5878 (HCU & K); Dulahazra Safari Park, 16.02.2004, Sarder Nasir Uddin N 2184 (DACB); Himchari, 30.09.2005, Hosne Ara HA 2530 (DACB).

Dhaka: Shahbag, February 1938, N.K. Chatterji (DUSH); 15.04.1940, Atul, Collection number unknown (DUSH); Ramna, 02.08.1940, A.K. Acharja, Collection number unknown (DUSH); 28.04.1949, Atul, Collection number unknown (DUSH); Ramna area, 22.08.1950, G. Hossain, Collection number unknown (DUSH); Shahbag, 22.08.1950, Kayesuddin Ahmed, Collection number unknown (DUSH); 23.08.1950, Kayesuddin Ahmed, Collection number unknown (DUSH); Shahbag road, 23.08.1950, A.K.M. Nurul Islam, Collection number unknown (DUSH); Ramna area, 29.08.1950, G. Hossain, Collection number unknown (DUSH); Shahbag, 02.08.1951, Md. Waseque, Collection number unknown (DUSH); Dhaka, July 1952, P. Sensarma, Collection number unknown (DUSH); July 1952, Md. Akhtar Hossain, Collection number unknown (DUSH); Oct. 1952, M.A. Zabbar, Collection number unknown (DUSH); Chandra forest, 16.09.1960, S.M. Zahurul Huq 58 (DUSH); Dhaka University Botanical garden, 01.12.1965, Zeyauddin 49 (DUSH); 06.02.1968, Mozaher 26 (DUSH); Mirpur, Road No. 12, 04.04.1969, Moiz 11 (DUSH); 04.04.1969, M.H. Rahman 114 (DUSH); Mohammadpur, 12.07.1969, Noorjahan, Collection number unknown (DUSH); Savar, 05.04.1970, Nazim 80, 81 (DUSH); 19.04.1970, M.A. Rahman 85 (DUSH); D.U. Bot. garden, 30.06.1970, A.M. Huq 75 (DACB); 02.12.1970, Momtaz 200 (DUSH); Mirpur, 02.11.1977, Huq & Rahman H 3548 (DACB); Mirpur Botanical garden, 15.12.1979, Huq, Mia & Momtaz M 211 (DACB).

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 5945 (BM, K).

Habiganj: Kalenga beat, Kalenga, 16.05.2005, Hosne Ara HA 1538 (DACB); Satchari, 17.05.2005, Hosne Ara HA 1586 (DACB); Satchari forest, 07.07.2005, Hosne Ara HA 1867 (DACB).

Hill Tracts District: Locality unknown, July 1885, Dr. King's Collector 6 (CAL); Locality unknown, January 1887, Dr. King's Collector 216 (CAL, K); Locality & Collection number unknown, 1890, J.J. Wood (CAL); Locality unknown, Feb. 1940, Dr. S.K. Mukerjee 143 (CAL).

Khagrachari: Halfchari, 17.09.2006, Rafiqul Islam 388 (DUSH).

Comilla: Comilla, Auq. 1952, Arshad Ali, Collection number unknown (DUSH).

Kurigram: Hingon, 05.05.1988, Mia, Mahbuba, Rezia, Mahfuz & Bushra M 1763 (DACB); Rajarhat, 31.10.2007, Bushra, Habib & Mofiz B 429 (DACB).

Moulvibazar: Sreemangal, 22.04.1979, Sh-202 (DACB); Maulvibazar to Gobindagati, 06.10.1979, Khan & Mia K 5644 (DACB); Sreemongal, Lawachara reserve forest, 15.05.2005, Hosne Ara HA 1497 (DACB); Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1618 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1705 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1753 (DACB); Lawachara, Jenkichara, Sreemangal, 03.02.2009, Bushra, Momtaz & Nasir B 1351 (DACB); Lawachara National park, 12.05.2009, Sarder Nasir Uddin N 3669 (DACB); Adampur Forest beat, Kamalganj, 20.09.2011, Sarder Nasir Uddin N 4702 (1), 4702(2), 4702 (3) (DACB).

Netrakona: Bijoypur, Durgapur thana, 16.06.2004, Hosne Ara HA 724 (DACB).

Noakhali: Momarijpur, 18.11.1981, Huq, Rahman, Halim & Begum H 5277 (DACB); Sadar, Ram Senker Gopai, 13.01.1992, Akram Hossain 235 (FRIH); Tonirhat, 01.07.1998, Mia *et al.* M 3947 (DACB).

Pachagarh: Pachagarh-Joidherhat, 04.06.1989, Huq, Rahman, Mahbuba & Mahfuz H 9212 (DACB); Dhamur near river side, 24.05.1998, SK. Harun, Zashim, Nasir SHR 235 (DACB); Tonirhat, 01.07.1998, Mia *et al.* M 3947 (DACB).

Rangamati: Rangamati town, 06.06.1969, M.M. Rahman 84 (DUSH); Burkul, Collection date unnown, 1876, J.L. Lister 127 (CAL); Kaptai, Sitapahar, 27.06.1998, Rahman, Toha & others 3234 (HCU); Kaptai, Sitapahar, 03.09.1999, Boyce, Toha & Rahman 5546 (HCU & K); 2005, Snigdha Roy R 36 (DACB).

Sylhet: Sylhet, October 1935, C.S. Purkayastha 12443 (ASSAM); Sylhet station, 28.05.1868, C.B. Clarke 7180 (K); Near forest School, 13.03.1956, M.S. Khan 163 (DUSH); Sylhet, 19.01.1963, Pranash Ch. Dab 73 (DUSH); Jaypur, 16.12.1966, P. Bhattacharjee 8 (DUSH); Chatal, 12.06.1968, Sudhangshu 203 (DUSH); Shalitkar, 14.10.1973, Khan, Huq & Hassan K 3375 (DACB); Chattak, 05.01.1978, Huq & Rahman H 3635 (DACB); Vonobir, 17.01.1979, Alam & Womesley 3359 (CFRIH); Monir & Others 627 (FRIH); Salutikor, 01.05.1981, Mia, Huq & Rahman M 508 (DACB); Sarighat-Jainta, 03.10.1983, Huq, Rahman, Mia & Mahbuba H 6343 (DACB); Salutikar Airport area, 08.04.1988, Mahfuz, Huq, Momtaz & Hosne Ara

MZ 164 (DACB); Tulabagan, Panerchara, 15.10.1998, Rahman *et al.* 3838 (HCU); Boraikandi, 10.03.2009, B.M. Rezia Khatun RK 5876 (DACB); Goin hat, 08.02.2008, Bushra *et al.* B 777 (DACB).

Economic uses/values/harmful aspects: The root is useful in curing abscess, also applied on the body after bruising and frying in oil. Infusion of leaves is a helpful medicine for curing convulsions and epilepsy. Stem, when inhaled after processing like tobacco, cures asthma (Yusuf *et al.*, 1994).

Ethnobotanical information: The people of Yunnan province in China use this plant as a medicine for traumatic injury and rheumatic arthralgia (Heng, 1979).

19. Genus: Remusetia Schott in Schott & Endlicher,
Melet. Bot. 18 (1832).

Type species: *R. vivipara* (Roxburgh) Schott (*Arum viviparum* Roxburgh,
“*viviparium*”).

Small to medium-sized, seasonally dormant herbs with cormous tuber, tuber sub-globose, bulbil bearing stolons arising from the apex of the corm, stolons erect, pendulous, or creeping, simple or densely branched, bulbils scaly, with hooked filiform bristles. Leaves 1-2, petiole sometimes slender, sheath relatively short, leaf blade peltate, cordate-lanceolate to cordate-ovate, acuminate, venation reticulate. Inflorescence solitary, appearing with or without leaf, peduncle shorter than the petiole. Spathe strongly constricted between the tube and the blade, sometimes with a secondary constriction above the spadix, tube convolute, persistent, ovoid, closed, green, enclosing female zone and sterile zone of the spadix, limb longer than the tube, broad or narrow, yellowish to cream, erect, spreading and convolute, deciduous or marcescent. Spadix much shorter than the spathe, sessile, female zone subcylindric, about half as long as the spathe tube, separated from the male zone by much narrower zone of sterile male flowers, male zone ellipsoid or subclavate, obtuse. Flowers unisexual, perigone absent. Male flowers 2-3 androus, anthers attached basally to a short, common filament, locules 4-6, each opening by a single apical, circular pore. Ovaries sub-globose, 1-locular, many sub-orthotropous ovules on 2-4 parietal

placentae, styler region lacking, stigma sessile, discoid or slightly 3-4 lobed. Fruit an ovoid to globose berry, many-seeded. Seeds ellipsoid to sub-globose, testa verruculose to irregularly costate.

About 4 species distributed throughout tropical Africa, tropical Asia, Malay Archipelago and Australasia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 2 species.

Key to the species

- | | | |
|----|--|-----------------|
| 1. | Flowering before leaves, bulbiferous shoots few, stout, erect, simple, placenta parietal | vivipara |
| - | Flowering with leaves, bulbiferous shoots several, branched, placenta basal | pumila |

72. Remusatia pumila (D. Don) Li & Hay, Acta Bot. Yunnan., Suppl. 5: 32 (1992). Noltie, Fl. Bhutan 3(1): 134-136 (1994); Hajra & Verma, Fl. Sikim 1: 193 (1996); Heng & Boyce in Heng *et al.*, Fl. China 23: 72 (2010). **Photo 55 (Page no. 357).**

Gonatanthus pumilus (D. Don) Engler & Krause, Krause in Engler, Pflanzenr. 71 (IV-23E): 19-21, t. 5iA-M (1920); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Mitra, Fl. Pl. E. India 1: 78 (1958); Hara, Fl. E. Himalaya: 397 (1966); Hu, Dansk Bot. Arkiv 23 (4): 427 (1968); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 25 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 91 (1978); Chowdhery & Wadhwa, Fl. Himachal Pradesh 3: 729 (1984); Naithani, Fl. Chamoli 2: 671-672 (1985); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 56-57 (2007).

Caladium pumilum D. Don, Prodr. Fl. Nepal: 21 (1825).

Colocasia pumila (D. Don) Kunth, Enum. Pl. 3: 40 (1841).

Gonatanthus sermentosus Klotzsch. & Otto in Link & Klotzsch., Icon. Pl. Rar. Hort. Roy. Bot. Berol. 1: 33, t. 14 (1841); Hook. f.,

Fl. Brit. India 6: 522 (1893-reprint 1954); Balakrishnan, Fl. Jowai 2: 565 (1983).

Type: Himalaya: Sikkim (Hook. f. - Herb. Kew).

Bengali / Local name: *Bahari Kachu*.

English: Shrew-Khlaw.

Terrestrial or epiphytic tuberous herb, tuber 0.5-3.0 cm in diameter, pale brown, cataphyll usually 1, slender, acute, 3-13 cm long, bulbiferous shoots several, branched, more profusely in the terminal part, 20-40 cm long, c 2 mm in diameter, reddish-brown, bearing few to clusters of bulbils at the nodes, bulbils c 1 × 1 mm, its scales ending in 3-12 mm long filiform processes. Leaves 1-4, peltate, ovate or oblong-ovate, acute or slightly acuminate, base shallowly cordate, 6-25 × 4-15 cm, sinus 0.5-4.5 cm long, dull on both surfaces, yellowish-green, areas between primary veins purple when young, petiole 9-50 cm long, sheathing for lower one-fourth. Flowering with leaves, peduncle 1-2, suberect, 3-18 cm long. Spathe tube globose-ovoid, 0.8-2.0 cm long, 5-10 mm in diameter, elongating to 2-4 cm in fruit, green, blade in two parts, separated by a constriction, lower 1.2-2.5 cm long, opening to reveal male part of spadix, upper held at an angle, narrowly lanceolate, finely acuminate, 11.5-21.0 × 0.6-1.5 cm, green when young, yellow afterwards. Spadix sessile, female part 5.5-10.0 × 3.5-4.5 mm, with a whorl of sterile ovaries at the base and sometimes also at the apex, stipe 5-8 mm long, purple, male part 9.0-12.5 × 4.5-5.0 mm, purplish. Synandria 0.6-2.0 mm in diameter, filaments 0.7 mm long. Ovaries 1.0-1.5 mm in diameter, green, ovules many, placentation basal, stigma disciform. Fruit a berry, yellow. Seeds on long funicles, ovoid, testa rough, with a fleshy yellow coat.

Flowering and fruiting period: May-August.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Shady damp mossy rocks and on trees in the forest.

Distribution: Bangladesh, India (Sikkim and Khasia Hills), northern Thailand and western China.

Specimen examined:

Cox's Bazar: Kelatuli forest, 10.05.1945, J. Sinclair (Collection number unknown).

Sinclair (1956) reported this species from Cox's Bazar district in the Bull. Botanical Society of Bengal, Vol. 9 No. 2. But I have not seen any specimen in BM. K. CAL. and in the herbaria of Bangladesh, also I could not collect any specimen of this species from any locality of Bangladesh.

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

73. *Remusatia vivipara* (Roxb.) Schott, Schott & Endlicher, Melet. Bot.: 18 (1832). Kunth, Enum. Pl. 3: 36 (1841); Schott, Syn. Aroid. 43 (1856); Gen. Aroid. t. 36 (1858); Prodr. Syst. Aroid. 137 (1860); Hook. f., Fl. Brit. India 6: 521-522 (1893-reprint 1954); Cooke, Fl. Pres. Bombay 2: 828 (1908); Krause in Engler, Pflanzenr. 71 (IV. 23E): 16-18 (1920); Haines, Bot. Bihar and Orissa: 865-866 (1924-reprint 1978); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 30 (1931); Fischer in Gamble, Fl. Pres. Madras: 1583 (1931), repr. ed. 3: 1104 (1967); Prain, Beng. Pl. 2: 1113 (1903-reprint 1981); Mitra, Fl. Pl. E. India 1: 77 (1958); Hara, Fl. E. Himalaya: 398 (1966); Hu, Dansk Bot. Arkiv 23(4): 427-428 (1968); Nicolson in Saldanha and Nicolson, Fl. Hassan Dist. 788-789 (1976); Rao and Verma, Bull. Bot. Surv. India 18 (1-4): 24 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 92 (1978); Deb, Fl. Tripura State 2: 403 (1983); Balakrishnan, Fl. Jowai 2: 565-566 (1983); Sharma *et al.*, Fl. Karnataka: 298 (1984); Mukherjee, Fl. Pachmarhi & Bori Reserves: 313 (1984); Chowdhery & Wadhwa, Fl. Himachal Pradesh 3: 729-730 (1984); Mayo, Fl. Trop. E. Africa: 40-42 (1985); Naithani, Fl. Chamoli 2: 672 (1985); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 50 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 12 (1989); Vajravelu, Fl. Palghat Dist.: 535-536 (1990); Matthew, Excursion Fl. Cent. Tamilnadu, Ind. 541 (1991); Kothari & Moorthy, Fl. Raigad Dist. Maharashtra State: 421 (1993); Parmar in Shetty & Singh, Fl. Rajasthan 3: 868 (1993); Noltie, Fl. Bhutan 3(1): 134-135 (1994); A. Hay, Blumea Supplement 8: 111 (1995); Deshpande *et al.*, Fl. Mahabaleshwar Adjoin., Maharashtra: 617 (1995); Pullaiah, Fl. Andhra Pradesh 3: 1026-1027 (1997); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 404 (1998); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna

Bangladesh 11: 73 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 71 (2010).

Photo 56 (Page no. 357).

Arum viviparum Roxb., Hort. Beng. 65 (1814), as '*viviparium*';
Fl. Ind. 3: 496 (1832); Wight, Icon. Pl. Ind. Or. 3: 6, t. 798
(1844).

Caladium viviparum (Roxb.) Loddiges, Bot. Cab. 3: t. 281
(1818).

Colocasia vivipara (Roxb.) Thw., Enum. Pl. Zeyl. 336 (1864).

Type: India, Kerala; illustration in Rheede, Hort. Malab. 12, t. 9 (1693).

Bengali / Local name: *Bahari Kachu*. English name: Hitchhiker Elephant Ear.

A cormous herb, corm 2.5-5.0 cm in diameter, 1.5-4.0 cm thick, pink-red outside, pinkish-white within, bulbiferous shoots few, stout, erect, simple, appearing in the vegetative phase but persisting in a more or less decayed state till the next flowering phase, 10-30 cm long, 5-7 mm thick, bulbils clustered, 4-5 mm long. Leaves petiolate, petioles up to 30 cm long, very shortly sheathing at the base, leaf blade broadly ovate, peltate 12-42 × 8-30 cm, acuminate, cordate, nerves 3-4 on either side of the midrib and 2-3 from the basal costae. Flowering very rare and usually produced before the leaf. Peduncle 6-20 cm long, 5-8 mm in diameter, surrounded by about 7 cataphylls, cataphylls exceeding the peduncle. Spathe about 17 cm long, tube ovoid, green, 3-5 cm long, limb at first erect, later reflexed and ultimately deciduous, yellow, broadly obovate, abruptly apiculate, about 5.5-13.0 cm long, 9.5 cm wide, the tube and the limb separated by a constriction. Spadix slightly exceeding the spathe tube, sessile, 5-7 cm long, male and female floriferous zones separated by a 1.5-2.0 cm long neuter zone, male zone clavate, 1.0-1.5 cm long, 0.5 cm in diameter, female zone subcylindric, green, 2 cm long, 0.8 cm in diameter. Staminate flowers represented by short-stalked synandria of 4-6 anthers, cream coloured, dehiscing by apical pores. Ovary ovoid, unilocular with numerous, orthotropous ovules on 3-4 parietal placentae, stigma sessile, discoid.

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Flowering and fruiting period: March-May.

Chromosome number: Not known.

Habitat: Subtropical forests and in moist clefts of trees or rocks (Nicolson, 1987).

Distribution: Bangladesh, Africa, Madagascar, Indo-Malesia and Australia.

Specimens examined:

Moulvibazar: Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1770 (DACB); 07.09.2005, Hosne Ara HA 2214 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 07.09.2005, Hosne Ara HA 2214 (DACB); (Cultivated), 06.10.2005, Hosne Ara 2623 (DACB) [Originally Collected from Kawargola forest under Moulbivazar district].

Economic uses/values/harmful aspects: The corms of this plant are extremely poisonous.

Ethnobotanical information: Corms are used externally for the treatment of breast mastitis, traumatic injury, abscesses and swellings (Heng, 1979).

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 12 (2): 39-48, 2005).

20. Genus: *Rhaphidophora* Hasskarl in Flora 25 (2) Beibl. 1: 11 (1842).

Type species: *R. lacera* Hasskarl, *nom. illeg.*

(*Pothos pertusa* Roxburgh, *R. pertusa* (Roxburgh) Schott).

Medium-sized to very large, slender to robust, evergreen, usually climbing herbs, more rarely repent, climbing branches often thick, producing anchor and feeder roots, stem thick, rooting. Leaves many, distichous, petiole with pulvinus at the junction with the blade, geniculate apically, blade coriaceous, lanceolate or oblong, more or less oblique, base decurrent to unequal or cordate, apex acute to acuminate, entire to regularly pinnatifid or perforated, primary venation pinnate, secondary venation striate to reticulate and tertiary venation where visible reticulate. Inflorescence

solitary to several together, peduncle relatively short. Spathe boat-shaped, deciduous, coriaceous, dirty-white, greenish, creamy or yellow. Spadix sessile to stipitate, subglobose to clavate-cylindrical, often extremely thick, shorter than the spathe. Flowers bisexual, lacking perianth. Stamens 4-6, free, filaments oblong-linear, flat, anthers much shorter than the filaments, dehiscing by longitudinal slit. Ovary 1-partially 2-locular, ovules few-many, anatropous, funicle long, placentae parietal to basal, stylar region well-developed, usually broader than the ovary, usually truncate apically, rarely elongate-conic, stigma broadly elliptic or oblong. Fruit a berry, usually many-seeded. Seeds oblong, testa thin and smooth.

About 120 species distributed throughout tropical Africa, tropical southeast Asia, Malay Archipelago, Melanesia and Australasia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 10 species.

Key to the species

- | | | |
|----|--------------------------------|------------------|
| 1. | Leaves pinnatifid | 2 |
| - | Leaves entire | 5 |
| 2. | Pinnae 2-5 per side | glauca |
| - | Pinnae 6 or more per side | 3 |
| 3. | Pinnae up to 10 (-12) per side | grandis |
| - | Pinnae more than 12 per side | 4 |
| 4. | Spathe violet purple | affinis |
| - | Spathe bright yellow | decursiva |
| 5 | Leaves variegated | aurea |
| - | Leaves not variegated | 6 |

- | | | |
|----|--|--------------------|
| 6. | Leaves perforate | pertusa |
| - | Leaves not perforate | 7 |
| 7. | Petiole sheath formed into terminal
legule and extended above the lamina,
falling quickly and forming horseshoe
shaped scar at petiole apex | schotti |
| - | Petiole and petiole sheath not as
above | 8 |
| 8. | Spathe long beaked, stigmas pulvinate | 9 |
| - | Spathe not long beaked, stigmas
raised | peepla |
| 9. | Leaf blade oblong-elliptic, cuspidate,
membranous, one side shallowly
cordate at base | hookeri |
| - | Leaf blade lanceolate, abruptly
acuminate, coriaceous, both side
rounded to cuneate at base | calophyllum |

74. *Rhaphidophora affinis* Schott, Bonplandia 5: 45 (1857); Prodr. Syst. Aroid. 385 (1860). Hook. f., Fl. Brit. India 6: 548 (1893-reprint 1954); Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 53 (1908); Mitra, Fl. Pl. E. India 1: 74 (1958); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 32 (1976); Balakrishnan, Fl. Jowai 2: 561 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 13 (1989); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 74 (2007). **Photo 57 (Page no. 364).**

Type: Khasia, India, J.D. Hooker & Thomson (K)

Bengali / Local name: Not available.

English name: Not known.

An evergreen climbing herb, 7-10 m long, stem thick, rooting. Leaves many, petioles with pulvinus at the junction with the blade, and geniculate at the tip, blade 30-60 cm

long, coriaceous, oblong, base broadly cordate, pinnatisect or pinnate, bright green on both surfaces, segments many, pairs falcately ensiform, acuminate, narrowed at the base, unicostate with very slender lateral nerves. Peduncles c 12 cm long. Spathe leathery, 12-15 cm long, 8-10 cm broad, cymbiform, cuspidate, deep purple on both the surfaces. Spadix sessile, subequalling the spathe. Flowers bisexual. Stamens 4, filaments flat, locules 2, free at the apex, attached basally, dehiscing laterally. Ovaries hexagonal-cylindric, apex domed, 1-loculed, ovules many, placentation parietal, stigma raised on the conical top of the ovary. Seeds many, small and oblong, testa thin and smooth.

Flowering and fruiting period: July-October.

Chromosome number: Not known.

Habitat: Climbing hemiepiphytes, in rain forests.

Distribution: Bangladesh, Khasia Hills in India.

Specimen examined:

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 5952 (K).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 5 (1): 97-100, 1998).

75. *Rhaphidophora aurea* (Linden & André) Birdsey, Illustration Horticole 27: 69 (1880); Cultivat. Aroid.: 113 (1951); Bailey 10: 156, 158 (1962). Hu, Dansk Bot. Arkiv 23 (4): 421 (1968); Graf, Exotica, edn. 8: 228 (1976); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 404-405 (1998); Walters *et al.*, European Gard. Fl. 2 (2): 86 (1984-reprint 2003); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 75 (2007). **Photo xviii, xviiiia (Page no. 100).**

Scindapsus aureus (Linden & André) Engl., Engler & Krause in
Engler, Pflanzenr. 37 (IV. 23Ba): 80 (1908); Bailey, Manual

Cultivat. Pl.: 183 (1949); Graf, Tropica, edn. 5: 125, 1086 (1978-reprint 2003).

Pothos aureus Linden & André, L, Illustr. Horticole: 69 (1880).
Bailey, Manual Cultivat. Pl.: 183 (1949).

Type: Solomon Islands.

Bengali / Local name: *Money Plant*. English name: Money Plant, Silver Vine.

A very long climber, up to 30 m long or more, stem striate-yellow-variegated, 4 cm in diameter. Leaves petiolate, petiole geniculate, also striate-variegated, 30-40 cm long, sheath semi-deciduous, blade ovate, waxy, small at the juvenile stage, becoming large, lobed or slashed when mature, deep green or splashed or blotched with cream-yellow, 32-45 × 20-35 cm, primary venation white beneath, tiny dots observed at the lower surface. Inflorescence pedunculate and axillary, 8-10 cm long. Spathe yellowish at maturity, boat-shaped, shortly acuminate, up to 14-16 cm long. Spadix shorter than the spathe, sub-cylindric, 12-14 cm long, 1.5-2.0 cm thick. Stamens 4, with flattened filaments. Pistils with a subpunctiform stigma, ovary unilocular, ovules many, anatropous, placentation parietal. Fruit rarely produced. Seeds many, narrowly oblong, testa thin and smooth.

Flowering and fruiting period: Flowering of the plant is not annual, there is an interval of several years between two flowering. There are two records of flowering of this plant, one in Rio Piedras, Puerto Rico, on May 25, 1956, and the other in Miami, Florida on May 4, 1962 (Birdsey, 1962).

Chromosome number: Not known.

Habitat: Partial shady damp places.

Distribution: Bangladesh, Solomon Islands.

Specimens examined:

Patuakhali: Patuakhali Sadar, Lebukhali, 22.07.2010, M. Sultana 1796 (DUSH).

Dhaka: Banani area, 04.10.2004, Hosne Ara HA 1456 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

76. *Rhaphidophora calophyllum* Schott, Bonplandia 5: 45 (1857); Prodr. Syst. Aroid. 380 (1860). Furtado, Gard. Bull. Straites Settle. 8: 150 (1935); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 31 (1976); Balakrishnan, Fl. Jowai 2: 560 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 13 (1989); Hajra & Verma, Fl. Sikkim 1: 193 (1996); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 75-76 (2007). **Photo 58 (Page no. 364).**

Rhaphidophora lancifolia Schott, Bonplandia 5: 45 (1857) *et in* Prodr. Syst. Aroid. 380 (1860); Hook. f., Fl. Brit. India 6: 545 (1893-reprint 1954); Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 26-27 (1908); Mitra, Fl. Pl. E. India 1: 74 (1958); Deb, Fl. Tripura State 2: 404-405 (1983).

Type: Sikkim, India, J.D. Hooker (K).

Key to the varieties

- | | | |
|----|---|--------------------|
| 1. | Outside of the spathe orange and inside of the spathe pale or dark red | calophyllum |
| - | Outside of the spathe dark violet and inside of the spathe light creamy pinkish | violaceus |

var. **calophyllum**

Bengali / Local name: Not available.

English name: Not Known.

A perennial, sub-parasitic climber, rooting on trees, stem 6-8 mm thick. Leaves petiolate, entire, petiole slender, 8.5-20.0 cm long, channelled up to the base, blades

(Photo 57) 364

15-25 × 4-8 cm with 1-2 cm long acumen, herbaceous or sub-coriaceous, falcately lanceolate or lanceolate, abruptly acuminate, coraceous, both side rounded to cuneate at base, brownish-green or brownish-yellow on drying, nerves with anastomosing nervules and usually all similar, rarely 3-5 primary nerves are more prominent towards the base. Peduncle 3-5 cm long, round, smooth, elongating to 10 cm in fruits. Spathes thickly coriaceous, ovate, orange outside, pale or dark-red within, 8-11 × 3.5-6.0 cm, long-beaked. Spadix narrower, 5-6 cm long, elongating to 10 cm in fruits. Flowers bisexual. Stamens 4, anthers linear, filaments flat, locules 2, free at the apex, dehiscing by longitudinal slit. Ovary smooth, creamy, 1-loculed, ovules many, anatropous, placentation parietal, stigma pulvinate on a very short conical style. Fruit a berry, many-seeded. Seed small and oblong, testa thin and smooth.

Flowering and fruiting period: August-June.

Chromosome number: $2n = 56$ (Petersen, 1989).

Habitat: Subtropical and tropical rain forests.

Distribution: Bangladesh, India (Sikkim Himalayas and Khasia Hills) and Myanmar.

Specimens examined:

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 5958, 5960 (K, CAL).

Sherpur: Rangtia forest, 17.05.2007, Ershad Tutul 43 (DUSH).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 5 (1): 97-100, 1998).

77. *Rhaphidophora calophyllum* Schott var. *violaceus* H. Ara & M.A. Hassan, var. nov. Photo 59 (Page no. 367).

Rhaphidophora calophyllum Schott var. *violaceus* H. Ara & M.A. Hassan differs from its closely related variety proper by (i) shorter petiole, peduncle, spathe and spadix, and (ii) violet colour on spathe outside (not orange).

Holotype: Bangladesh, Moulvibazar district, Madhabkundo reserve forest, 20.05.2014, Sarder Nasir Uddin N 5242 (DACB).

Bengali / Local name: Not available.

English name: Not known.

A perennial climber, rooting on trees, stem 5-6 mm thick. Leaves petiolate, entire, petiole 3.5-6.0 cm long, channelled up to the base, blade 11-23 × 3.5-5.0 cm with 1-2 cm long acumens, coriaceous, falcately lanceolate or lanceolate, abruptly acuminate, both sides rounded or cuneate at base, brownish-green on drying, nerves with anastomosing nervules and usually all similar, rarely 3-5 primary nerves are more prominent towards the base. Peduncle short, 1.5 cm long, round, smooth, light greenish. Spathes thickly coriaceous, ovate, dark violet outside, light creamy pinkish within, 5.5 × 2.5 cm, long-beaked, tip of the beak light greenish. Spadix narrower, 3.5-4.0 cm long, light yellowish. Flowers bisexual. Stamens 4, anthers linear, filament flat, free at the apex, dehiscing by longitudinal slit. Ovary smooth, creamy, unilocular, ovules many, anatropous, placentation parietal, stigma raised on the conical top of the ovary. Fruit not seen.

Flowering and fruiting period: April-September.

Chromosome number: Not known.

Habitat: Subtropical and tropical rain forests.

Distribution: North-Eastern part of Bangladesh, Moulvibazar district (within greater Sylhet).

Specimen examined:

Moulvibazar: Adampur forest beat, Kamalganj, 19.05.2014, Sarder Nasir Uddin N 5172 (DACB); Madhabkundo reserve forest, 20.05.2014, Sarder Nasir Uddin N 5242 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Etymology: The variety is named after violet colour of its spathe.

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The major morphological differences between two varieties of *Rhaphidophora* Hasskarl. are outlined in Table-6.7.

Table-6.7. **Morphological comparison of *Rhaphidophora calophyllum* Schott var. *violaceus* H. Ara & M.A. Hassan, var. nov. with *Rhaphidophora calophyllum* Schott var. *calophyllum***

Characters	<i>Rhaphidophora calophyllum</i> Schott var. <i>violaceus</i> H. Ara & M.A. Hassan, var. nov.	<i>Rhaphidophora calophyllum</i> Schott var. <i>calophyllum</i>
Petiole	3.5-6.0 cm long	8.5-20.0 long
Peduncle	1.5 cm long	3-5 cm long
Spathe blade	5.5 cm long, outside of the spathe dark violet and inside of the spathe light creamy pinkish	8-11 cm long, outside of the spathe orange and inside of the spathe pale or dark red
Spadix	3.5-4.0 cm long	5-6 cm long

78. *Rhaphidophora decursiva* (Roxb.) Schott in Bonplandia 5: 45 (1857); Prodr. Syst. Aroid. 385 (1860). Hook. f. in Curtis, Bot. Mag. 99: t. 7282 (1893); Fl. Brit. India 6: 547-548 (1893-reprint 1954); Engler & Krause in Engler, Pflanzenr. 37 (IV-23Ba): 52 (1908); Haines, Bot. Bihar & Orissa: 858-859 (1924-reprint 1978); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Mitra, Fl. Pl. E. India 1: 74 (1958); Spring, Fl. Sikim Himal., f. 187 (1963); Hara, Fl. E. Himalaya: 398 (1966); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 32 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 92 (1978); Deb, Fl. Tripura State 2: 404 (1983); Balakrishnan, Fl. Jowai 2: 561 (1983); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 30 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 13 (1989); Noltie, Fl. Bhutan 3(1): 128 (1994); Hajra & Verma, Fl. Sikim 1: 193-194 (1996); Pullaiah, Fl. Andra Pradesh 3: 1027 (1997); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 76-77 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 14 (2010). **Photo 60 (Page no. 377).**

Pothos decursivus Roxb., Fl. Ind. 1: 456 (1820); Roxburgh, Fl.

Ind. ed. 2. 1: 436 (1832); Wallich, Pl. Asiat. Rarior. 2: 83, t.

192 (1831); Wight, Icon. Pl. Ind. Or. 3: 5, t. 779 (1844).

Scindapsus decursivus (Roxb.) Schott in Schott & Endl., Melet, Bot. 21 (1832); Kunth, Enum. Pl. 3: 62 (1841); Wight, Icon. Pl. Ind. Or. 3: t. 779 (1844).

Rhaphidophora eximia Schott in Bonplandia 5: 45 (1857); Hook. f., Fl. Brit. India 6: 547 (1893-reprint 1954).

Type: India, Silhet, Roxburgh drawing 2118 (K).

Bengali / Local name: *Lata Kachu*.

English name: Not known.

Large epiphytic climber, stem stout, 3-5 cm in diameter, green at the back, rooting, internodes 1-2 cm long. Leaves petiolate, petioles stout, 45-55 cm long, pulvinate at each end, sheath deciduous, 10-15 cm long, juvenile leaf blade rotund, entire, apex abruptly acute, 16 × 13 cm, adult leaf blade oblong-ovate or ovate in outline, green above, pale green beneath, 60-70 × 40-50 cm, apex acute, base sub-cordate, irregularly and asymmetrically pinnately cut, pinnae more than 12 per side, apex truncate with ascending falcate tip, base narrowed, 20-30 × 2-5 cm, primary lateral nerves 1-3, prominent beneath. Inflorescence axillary, solitary. Peduncles stout, erect, cylindrical, 8-15 cm long, c 15 mm thick. Spathes leathery, cymbiform, 12-18 × 8-10 cm, beaked, bright yellow along both the surfaces, oblong-ovate, deciduous. Spadix shorter than the spathe, narrowly oblong, sessile, greyish-green, 10-20 cm long, 2-3 cm thick. Stamens 4 per flower, filaments flat, anthers much shorter than filaments, yellow, oblong, less than 1 mm, thecae dehiscing by longitudinal slits. Ovaries hexagonal, unilocular, ovules many, anatropous, placentation parietal, stigma raised on the conical top of the ovary. Fruit a berry, obconical, greenish-white, many-seeded. Seeds small, oblong, testa thin and smooth.

Flowering and fruiting period: May-November.

Chromosome number: 2n = 26, 54, 56 (Petersen, 1989).

Habitat: Scrambling or climbing on trees in shady and moist areas in the forests.

Distribution: Bangladesh, Eastern Himalayas (Sikkim, Assam, etc.) and Sri Lanka.

Specimens examined:

Chittagong: Gondamara, Dhopachara, 02.09.1999, Boyce, Toha & Rahman 5542 (HCU & K).

Cox's Bazar: Barachara, Himchari, 28.06.1997, Rahman Sn ii (FRIH); 29.06.1997, Rahman *et al.* 1424 (HCU).

Rangamati: Kaptai lake, Pablakhali, 24.09.1999, Boyce, Toha & Rahman 5644 (HCU & K); Kaptai, Ram pahar, Baluchara, 06.09.1999, Boyce, Toha & Rahman 5761 (HCU & K).

Sylhet: Islachara Burmmehat beat, 18.01.1979, Alam & Womersley 3378 (FRIH); Boromchal beat, Islachara rubber Plantation, 18.01.1979, Khan & Rahman K. 5367 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Stem and leaves of the plant are used against traumatic injury, fracture, swelling, cold, lumbago, cough, bronchitis and snake bite (Heng, 1979).

79. *Rhaphidophora glauca* (Wall.) Schott, Bonplandia 5: 45 (1857); Prodr. Syst. Aroid. 382 (1860). Hook. f., Fl. Brit. India 6: 547 (1893-reprint 1954); Engler & Krause in Engler, Pflanzenr. 37 (IV-23Ba): 47 (1908); Burkill in Rec. Bot. Sur. Ind. 4: 135 (1910); Mitra, Fl. Pl. E. India 1: 74 (1958); Hara, Fl. E. Himalaya: 398 (1966); Hu, Dansk Bot. Arkiv 23 (4): 422 (1968); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 32 (1976); Noltie, Fl. Bhutan 3(1): 127-128 (1994); Saxena & Brahmam, Fl. Orissa: 4: 2050 (1996); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 92 (1978); Balakrishnan, Fl. Jowai 2: 560 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 13 (1989); Hajra & Verma, Fl. Sikim 1: 193-194 (1996); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 77 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 13 (2010). **Photo 61 (Page no. 377).**

Pothos glaucus Wall., Pl. Asiat. Rarior. 2: 45, t. 156 (1831).
(*'glauca'*).

Pothos wallichii Steud., Nom. Bot. 2: 391 (ed. 2, 1841), *nom illeg.*

based on same type as *Pothos glaucas* (Wall.) Schott.

Scindapsus glaucus (Wall.) Schott in Schott & Endl., Melet. Bot.

121 (1832); Kunth, Enum. Pl. 3: 61 (1844).

Monstera glauca (Wall.) Koch *ex* Ender, Index Aroid. 54 (1864).

Rhaphidophora glauca (Wall.) Schott var. *khasiana* Hook. f., Fl.

Brit. India 6: 547 (1893-reprint 1954).

Type: Nepal, 1820, *Wallich* 4440 (holotype K!).

Bengali / Local name: Not available.

English name: Not known.

A green, climbing herb, rooting on the trunks and branches of trees, stem 9-30 cm long, 0.7-1.0 cm thick, geniculate apically. Leaves petiolate, petiole with pulvinus at junction, sub-coriaceous, blade elliptic-ovate, falcate, 13-32 × 9-20 cm, irregularly and asymmetrically pinnately cut, glaucous beneath, pinnae 2-5 per side, unequal, falcately linear-lanceolate, base narrowed, apex caudate-acuminate, 2-7 nerved. Spathe coriaceous, ovate-oblong or oblong-lanceolate, acuminate, 8-14 × 3-9 cm with 1.5-2.0 cm long beak, pale yellow on both surfaces. Spadix pale yellow, 4.5-10.0 cm long, 1.5-2.0 cm thick. Flowers bisexual. Filaments flat, 2.7-3.0 × 0.8-1.5 mm, anthers 0.9-1.0 × 1.0-1.4 mm. Ovary smooth, truncate, 3-5 mm long, apex c 3-4 mm long, walls not fibrous, ovules many, anatropous, placentation parietal, stigma raised, flat, sessile, circular or elliptic, 0.5-1.0 mm. Seeds many, small, oblong, testa thin and smooth.

Flowering and fruiting period: September-May.

Chromosome number: 2n = 56 (Petersen, 1989).

Habitat: Subtropical and tropical humid or rain or deciduous forests.

Distribution: Bangladesh, Tropical and subtropical Himalayas, from Nepal eastwards to the Khasia, Naga and Manipur Hills, ascending up to an altitude of 2100 m.

Specimens examined:

East Bengal: Bangladesh, Locality, Collection date & year unknown, Herbarium of the East India Company, Griffith 5955 (K, CAL).

Moulvibazar: Madhabkundo, 05.07.2002, Hosne Ara & Sarder Nasir Uddin HA 86 (DACB); Muraichara, 19.05.2005, Hosne Ara 1669 (DACB); Madhabkundo, 20.05.2005, Hosne Ara 1704 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara 1765 (DACB); Madhabkundo, 06.07.2005, Hosne Ara 1838 (DACB); Madhabkundo, 03.12.2014, Hosne Ara HA 2874 (DACB).

Rangamati: Debarmatha, 09.10.1998, Rahman, David, Khan and others 3608a (HCU).

Economic uses/values/harmful aspects: This species is used as an ornamental plant.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 5(1): 97-100, 1998).

80. *Rhaphidophora grandis* Schott in Oestr. Bot. Zeitschr. 349 (1858), *et* Prodr. Syst. Aroid.: 386 (1860). Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 51 (1908); Balakrishnan, Fl. Jowai 2: 560 (1983); Deb, Fl. Tripura State 2: 561 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 13 (1989); Noltie, Fl. Bhutan 3(1): 128 (1994); Hajra & Verma, Fl. Sikkim 1: 194 (1996); Chauhan *et al.* in Hajra, Contrib. Fl. Namdapha, Arunachal Pradesh: 339 (1996); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 78 (2007). **Photo 62 (Page no. 377).**

Rhaphidophora eximia Hook. f., Fl. Brit. India 6: 547 (1893-reprint 1954).

Type: Himalaya (Griffith n. 5953-Herb. Kew).

Bengali / Local name: *Not available.*

English name: Not known.

A perennial evergreen herb, up to 12 m long, stem 4 cm in diameter, internodes elongated. Leaves scattered, with one foliage leaf at each node, petiole very stout, 15-50 cm long, geniculate at the apex, pulvinate at the leaf blade, blade large, 40-100 ×

39-64 cm, oblong, not glaucous below, bright green on both surfaces, pinnae up to 10 (-12) per side, obliquely truncate, acute, unicostate and many-nerved segments. Peduncle stout, 15-25 cm long. Spathe 20-30 × 5-10 cm, oblong-ovate, acuminate, widely open, orange-yellow on both surfaces. Spadix large, 17-23 × 3-5 cm, cylindrical, sessile, apex truncate-rounded, base slightly tapering, dull cream in colour. Flowers bisexual. Stamens four per flower, filaments flat, anthers much shorter than the filaments, thecae dehiscent by a longitudinal slit. Ovaries long, fibrous, apex up to 6 mm in diameter, unilocular, ovules many, anatropous, placentation parietal, Fruit a berry, many-seeded. Seeds small and oblong, testa thin and smooth.

Flowering and fruiting period: May-February.

Chromosome number: Not known.

Habitat: Shady and moist places in the subtropical and tropical humid or rain or deciduous forests.

Distribution: Bangladesh, Bhutan and India.

Specimens examined:

Khagrachari: Alutila, 11.07.2003, Hosne Ara & Sardar Nasir Uddin HA 463 (DACB).

Moulvibazar: Lawachara reserve forest, 02.05.2003, Hosne Ara HA 201 (DACB); Madhabkundo, 20.05.2005, Hosne Ara 1702 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara 1764 (DACB); Madhabkundo, 06.07.2005, Hosne Ara 1836 (DACB); Muraichara beat, Ichachara forest, 07.05.2010, Hosne Ara 2755 (DACB); Madhabkundo, 03.12.2014, Hosne Ara HA 2874 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 20.09.2015, Hosne Ara HA 2897 (DACB) [Originally collected from Lawachara reserve forest under Moulvibazar district].

Economic uses/values/harmful aspects: It is used as an ornamental plant.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 12 (1): 25-32, 2005).

81. *Rhaphidophora hookeri* Schott, *Bonplandia* 5: 45 (1857) *et in* Prodr. Syst. Aroid.: 381 (1860). Hook. f., *Fl. Brit. India* 6: 546 (1893-reprint 1954); Prain, *Beng. Pl.* 2: 1115 (1903-reprint 1981); Engler & Krause in Engler, *Pflanzenr.* 37 (IV. 23Ba): 32-33 (1908); Heinig, *List Chittagong*: 75 (1925); Datta & Mitra, *Bull. Bot. Soc. Beng.* 7 (1 & 2): 101 (1953); Mitra, *Fl. Pl. E. India* 1: 73 (1958); Hara, *Fl. E. Himalaya*: 398 (1966); Hu, *Dansk Bot. Arkiv* 23 (4): 422-423 (1968); Rao & Verma, *Bull. Bot. Surv. India* 18 (1-4): 31-32 (1976); Karthikeyan *et al.*, *Fl. India Enum. in Fl. India ser.* 4: 13 (1989); Noltie, *Fl. Bhutan* 3(1): 126-127 (1994); Saxena & Brahmam in *Fl. Orissa*: 4: 2051 (1996); Hajra & Verma in *Fl. Sikim* 1: 194 (1996); Chauhan *et al.*, in Hajra, *Contrib. Fl. Namdapha, Arunachal Pradesh*: 339-340 (1996); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 79-80 (2007); Heng & Boyce in Heng *et al.*, *Fl. China* 23: 12 (2010). **Photo 63 (Page no. 377).**

Type: Sikkim, India, J.D Hooker & Thomson (K).

Bengali / Local name: *Lata Kachu*.

English name: Not known.

A climbing herb, stem 1.0-1.5 cm thick. Leaves petiolate, petioles 12-23 cm long, usually shorter than, rarely equalling the length of the lamina, shallowly channelled up to the knee, leaves many, entire, usually crowded at the tips of the branches, blade usually oblong-elliptic, falcate, sometimes lanceolate, cuspidately acuminate, base asymmetric with one side rounded to oblique, the other side very shallowly cordate, 15-47 × 8-20 cm, sides and base of the midrib on the underside shortly hairy, lateral veins all diverging at wide angle from the midrib, of two distinct thicknesses. Peduncles suberect, apex straight, 3-8 cm long, elongating to 15 cm in fruits. Spathe cylindrical, ovate-oblong, 5.0-8.5 × 2-3 cm, beaked, green outside, yellow or orange-yellow inside, obliquely deciduous. Spadix stoutly cylindrical, 4.5-5.5 × 1.8-2.0 cm, yellow, elongating to 15 cm in fruits. Filaments 6.0 × 1.2 mm, anthers 2.0 × 0.8 mm. Ovaries hexagonal-cylindrical, apex granular, depressed, walls densely fibrous, c 3 mm across, 1-loculed, ovules many, placentation parietal, stigma sub-sessile, orbicular, c 1-3 mm broad. Seeds orange-red.

Flowering and fruiting period: March-February.

Chromosome number: Not known.

Habitat: Climber on trees in shady and moist places in the forests.

Distribution: Bangladesh, India (Sikkim Himalayas, Upper Assam and Khasia Hills), central China, northern Thailand and Vietnam.

Specimens examined:

Bandarban: Ruma P.C., near Pransa, 25.01.1965, M.S. Khan 1140 (DUSH).

Chittagong Hill Tracts: Locality unknown, 18.03.1876, J.L. Lister 237 (CAL).

East Bengal: Bangladesh, Locality, Collection date & year unknown, Herbarium of the late East India Company, Griffith 5963 (K, CAL).

Sylhet: Sillet, Collection date & year unknown, Wallich 4441 (BM).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

82. *Rhaphidophora peepla* Schott in Bonplandia 5: 45 (1857) *et* in Prodr. Syst Aroid.: 380 (1860). Bentham, Fl. Hongkongensis 344 (1861); Hook. f., Fl. Brit. India 6: 545 (1893-reprint 1954); Engler & Krause in Engler, Pflanzenr. 37 (IV. 23 Ba): 41-42 (1908); Furtado, Gard. Bull., Straits Settle. 8: 154-155 (1935). Mitra, Fl. Pl. E. India 1: 74 (1958); Hu, Dansk Bot. Arkiv 23 (4): 423 (1968); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 31 (1976); Deb, Fl. Tripura State 2: 404-405 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 13 (1989); Heng & Boyce in Heng *et al.*, Fl. China 23: 12-13 (2010). **Photo 64 (Page no. 377).**

Scindapsus peepla Schott, Melet. Bot. 1: 21 (1832); Wight, Icon. Pl. Ind. Or. 3: 5, t. 780 (1844).

Pothos peepla Roxb., Fl. Ind. 1: (1820) 454 *et* (1832) 433; Wall. Cat. (1828) n. 4441.

Monstera peepla Schott (*ex* Linnaea), 6 (1831), Litterat. Ber. 52.

Type: Himalaya (Griffith no. 5958, 5959-Herb. Kew, Calcutta).

Bengali / Local name: *Lata Kachu*.

English name: Not Known.

An evergreen climbing herb, stem stout, smooth, green, terete, rooting and attaching themselves to trees or rock. Leaves entire, 10-25 × 5-10 cm, obliquely ovate-oblong, acuminate, coriaceous, base rounded or cuneate with numerous parallel veins diverging from the midrib. Petiole 10-20 cm long, inserted in long sheathing bracts. Peduncles 6-11 cm long, with persistent sheaths at the base. Spathe about 8 cm, greenish yellow to orange, erect, lanceolate, narrowed into a straight beak, convolute, deciduous, scarcely longer than the spadix. Spadix as long as the spathe or scarcely longer than the spadix, pale yellow. Flowers bisexual. Stamens 4, free, filaments oblong-linear, anthers much shorter than the filaments, thecae dehiscent by a longitudinal slit. Ovaries wedge-shaped, truncate, unilocular, ovules many, anatropous, placentation parietal, stylar region well-developed, usually broader than the ovary, stigma raised. Fruit a berry, usually many-seeded. Seeds small and oblong, testa thin and smooth.

Flowering and fruiting period: April-August.

Chromosome number: Not known.

Habitat and ecology: Tropical humid, rain forest, deciduous forest. Climbing hemiepiphytes.

Distribution: Bangladesh, Bhutan, North India, Myanmar, Nepal, north Thailand, north Laos, north Vietnam and south China.

Specimens examined:

Chittagong: Dhopachari, Chamachari, 04.06.1998, Rahman *et al.* 3064, 3067 (HCU); Dhopachari, 02.06.2001, Sarder Nasir Uddin N 976 (DACB).

Rangamati: Kaptai, Sitapahar, 27.06.1998, Rahman & Toha 3231 (HCU); 17.08.1998, Rahman & Toha 3291(HCU); 03.09.1999, Boyce, Toha & Rahman, 5545 (DACB); Shubalong, Kaptai Lake, 05.09.1999, Boyce, Toha & Rahman 5649 (DACB); Kaptai, Chitmaram, 09.01.2005, Hosne Ara & Sarder Nasir Uddin HA 1429 (DACB); Fring Kheong beat, Karnaphuli forest, 15.12.2010, Sarder Nasir Uddin N 4431 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

(Photo 60) 377

Note: It is a new record for Bangladesh (Toha *et al.*, 2004). However, it was previously mistakenly identified by the present author as *Rhaphidophora hongkongensis* Schott (Ara *et al.*, 2001).

83. *Rhaphidophora pertusa* (Roxb.) Schott, Bonplandia 5: 45 (1857) *et in* Prodr. Syst. Aroid.: 382 (1860). Hook. f., Fl. Brit. India 6: 546-547 (1893-reprint 1954); Hook. f. in Trimen, Handb. Fl. Ceylon 4: 361 (1898); Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 47-48 (1908); Fischer in Gamble, Fl. Pres. Madras: 1590 (1931), repr. ed. 3: 1109 (1967); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 31 (1931); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 31-32 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 13 (1989); Vajravelu, Fl. Palghat Dist.: 536 (1990); Matthew, Excursion Fl. Cent. Tamilnadu, Ind.: 541 (1991); Pullaiah, Fl. Andra Pradesh 3: 1027 (1997); Matthew, Fl. Palni Hills 3: 1372 (1999); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 80 (2007). **Photo 65 (Page no. 381).**

Pothos pertusa Roxb. Hort. Beng. 83 (1814), Fl. Ind. 1: 455 (1820); Roxb., Fl. Ind. 1: 434 (1832).

Monstera pertusa (Roxb.) Schott, Wiener Z. Kunst 1830: 1028 (1830).

Scindapsus pertusus (Roxb.) Schott in Schott & Endl., Melet. Bot. 21 (1832); Wight, Icon. Pl. Ind. Or. 3: 5, t. 781 (1844).

Type: India, Coromandel (Tamil Nadu) mountains. Roxburgh drawing 983 (K) of *Pothos pertusa* Roxb., see Sealy (Kew Bull. 11: 373. 1957); published as *Scindapsus pertusus* by Wight (Ic. Pl. Ind. Or. 3: 5, t. 781. 1844).

Bengali / Local name: *Patakata Kachu*.

English name: Not known.

Usually a large, evergreen, epiphytic climber with stem up to 3.5 cm thick, internodes 5-10 cm long. Leaves petiolate, petioles of adult leaves 20-35 cm long with a withering sheath, blades of juvenile leaves ovate, oblong-ovate or oblong-elliptic, entire and not perforated, geniculate at the apex, pulvinate at the base; blades of adult

leaves broadly ovate-oblong to almost rounded-ovate, 20-50 × 15-25 cm, acute or usually cuspidate-acuminate and rounded or subcordate at the base simple, unequal sided, entire or irregularly and shallowly lobed, occasionally with large holes and some of the perforations usually extending to the margin. Peduncles 5-18 cm long. Spathe coriaceous, oblong, acuminate, 15-20 cm long, 10 cm wide when expanded, greenish at first, becoming whitish or yellowish, soon withering and deciduous. Spadix cylindric, 10-15 cm long and 1.5-2.5 cm in diameter. Flowers naked, bisexual. Stamens 4, free, filaments oblong-linear, 0.3 cm long, anthers much shorter than the filaments, 0.15 cm long, dehiscing by a longitudinal slit. Ovary unilocular, 0.4 cm long, ovules many, anatropous, placentation parietal, stigma punctate, subimmersed in the truncate style. Fruit a berry, many-seeded. Seeds oblong.

Flowering and fruiting period: August-September.

Chromosome number: Not known.

Habitat: Wet lowland forests.

Distribution: Bangladesh, southern India, Sri Lanka, southern Mexico to the West Indies and southern Brazil.

Specimens examined:

Moulvibazar: Madhabkundo, 05.06.1998, Hosne Ara HA 29 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 07.09.2004, Hosne Ara HA 1090 (DACB) [Originally collected from Madhabkundo forest under Moulvibazar district].

Economic uses/values/harmful aspects: It is widely used as an ornamental plant. The fruits are edible.

Ethnobotanical information: The aerial roots and leaves are made into a paste and plastered over fractured bones by the tribal people in India. The paste is also used for healing cuts and wounds (Rao and Henry, 1996).

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 12 (1): 25-32, 2005).

84. *Rhaphidophara schottii* Hook. f., Fl. Brit. India 6: 544 (1893-reprint 1954); Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 42-43 (1908); Mitra, Fl. Pl. E. India 1: 73 (1958). **Photo 66. (Page no. 381).**

Type: Himalaya: Khasia (Hook. f., Sept. 1850-Herb. Kew).

Bengali / Local name: *Lata Kachu*.

English name: Not known.

Slender to robust, evergreen, root-climbing liane to 10 m. Stems very slightly glossy, dull green, rectangular in cross section, the narrow sides slightly sulcate. Leaves many, thick, fleshy, semi glossy, dull, dark green above, very pale green below, falcately lanceolate or ovate lanceolate or oblanceolate, caudate, acuminate, coriaceous; veins more or less invisible due to leaf thickness. Petioles 3-7 cm, stout, shallowly channelled, dull dark green, petiolar sheath very conspicuous, formed into terminal legule and extended above the lamina, falling quickly and forming horseshoe shaped scar at petiole apex, pale greenish white, ligules extending to 2-3 cm beyond the apical geniculum, sheath soon drying into papery wings and then rapidly falling to leave a continuous scar from the basal geniculum, around the top of the apical geniculum and back to the base. Inflorescence solitary. Spathe c 8 cm, ovoid, acuminate, not constricted, initially inrolled and tubular, afterwards spreading, firm, early cauduous. Spadix peduncled, very stout, cylindrical, shorter than the spathe. Flowers bisexual, lacking perianth. Stamens 4-6, free, filaments oblong-linear, anthers much shorter than the filaments, dehiscing by longitudinal slit. Ovary 1-partially 2 locular, anatropous; stylar region well-developed; stigma broadly raised pulvinate. Fruit a berry, many-seeded. Seeds oblong, testa thin and smooth.

Flowering and fruiting period: August-September.

Chromosome number: Not known.

Habitat: *Dipterocarpus* & bamboo forests; disturbed undulating hilly land with waterfall and mudstone.

Distribution: Bangladesh, North India.

Specimens examined:

Habiganj: Rema-Kalenga forest area, 06.08.2000, Md. Zashim Uddin 1091 (DACB).

(Photo 65) 381

Rangamati: Kaptai, Ram pahar, Balichara, 06.09.1999, Boyce, Toha & Rahman 5760 (HCU & K); Kaptai Lake, Sitapahar, 03.09.1999, Boyce, Toha & Rahman 5545 (HCU & K); Kaptai Lake, Shubalong, 05.09.1999, Boyce, Toha & Rahman 5649 (HCU, K).

Economic uses/values/harmful aspects: Not Known.

Ethnobotanical information: Not Known.

Note: This plant has been reported as a new record for Bangladesh by Toha *et al.* (2004).

21. Genus: *Schismatoglottis* Zollinger & Moritzi in Moritzi,

Syst. Verzeichnis Zollinger, 83 (1846).

Type species: *S. calyptrata* (Roxburgh) Zollinger & Moritzi (*Calla calyptrata* Roxburgh).

Small to large, perennial, evergreen, terrestrial herbs, rarely pubescent with short or long dense hairs, stem rhizomatous or epigeal, short, erect. Leaves numerous, crowded, rarely distichous, petiolar sheath less than half the petiole length, sometimes with long apical ligule, leaf blade herbaceous, green above, pale green to glaucous below, narrow-elliptic, elliptic, lanceolate, oblanceolate, ovate, obovate, cordate or cordate-sagittate in shape, sometimes variegated with pale or silvery green, white or yellow, (primary, secondary and tertiary) lateral nerves all reaching near the margin into a marginal vein. Inflorescence at or near the apex of the leafy plant, usually several together. Peduncle shorter than the petiole. Spathe constricted between the tube and the blade, sometimes only slightly so, rarely not at all, tube convolute, persistent, blade thinner, erect, broadly boat-shaped, deciduous, usually white to cream, sometimes greenish-yellow, very rarely pink, cuspidate to acuminate. Spadix shorter than or equalling the spathe, lower portion female, free or partially adnate to the spathe, upper portion male and whether or not separated from the female by a naked interstice, male portion usually clubbed, fertile below, upwards sterile, the lowermost sterile zone sometimes very laxly flowered, often constricted. Flowers unisexual, perigone absent. Fertile male flowers 2-3 androus, stamens very short or

fairly long, mostly free, filaments strap-shaped, anthers adnate, connective thick, dehiscent by apical pore, sterile male flowers subclavate, short to long. Ovary 1-locular, ovules rather few to very numerous, anatropous to hemianatropous, parietal to sub-basal placentation, style inconspicuous or shortly conoid, stigma sessile, discoid, staminodes sometimes present. Fruit a berry, oblong to globose, few or many-seeded. Seeds ellipsoid, longitudinally grooved.

About 120 species is distributed throughout tropical Asia, Malay Archipelago and tropical South America (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by a single species.

85. *Schismatoglottis picta* Schott in Osterr. Bot. Zeitschr. 8: 317 (1858). Engler and Krause in Engler, Pflanzenr. 55 (IV. 23 Da): 114 (1912); Bailey, Manual Cult. Pl.: 183 (1949); Graf, Exotica, edn. 8: 229-230 (1976); Walters *et al.*, European Gard. Fl. 2 (2): 91 (1984-reprint 2003); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 21 (1987); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 81-82 (2007). **Photo xix (Page no. 100).**

Schismatoglottis calyptrata (Roxb.) Zoll. et Moritzi var. *picta*
(Schott) Hallier f. in Annual. Buitenzorg 14 (2): 260 (1897).

Type: West Java (Herb. Leiden).

Bengali / Local name: *Bahari pata*.

English name: Not known.

Small, evergreen and terrestrial herb, stem an underground rhizome. Leaves petiolate, petiole 20-30 cm long, or sometimes up to 60 cm long, flattened on the upper side towards the apex, green, blade 15-20 × 7.5-13.0 cm, sometimes to 35 × 26 cm, narrowly ovate or oblong-ovate, base cordate, thin, upper surface bright green and usually marked with a ragged, pale, glaucous band running along each side about half-way between the midrib and the margin. Peduncle shorter than the petiole, 5-8 cm long. Spathe 5-6 cm long, tube green, limb greenish-yellow. Spadix shorter than the spathe, female zone 2 cm and male zone 1.5 cm long, adjacent to the female, pale yellow, appendix 5.0-7.5 mm long. Ovary 1-locular, anatropous, style shortly conoid,

stigma sessile, discoid. Male flowers 2-3 androus, stamens very short, filaments strap-shaped, anthers adnate. Fruit a berry, oblong to globose, few-many seeded. Seeds ellipsoid, longitudinally grooved.

Flowering and fruiting period: August-September.

Chromosome number: Not known.

Habitat: Shady moist areas.

Distribution: Bangladesh, Singapore, Malaysia, Indonesia (Sumatra, Java, Borneo and Celebes) and China.

Specimen examined:

Dhaka: Mirpur Botanical Garden, 06.10.2004, Hosne Ara HA 1458 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

22. Genus: *Scindapsus* Schott in Schott & Endlicher,

Melet. Bot. 21 (1832).

Type (Lectotype) species: *S. officinalis* (Roxburgh) Schott (*Pothos officinalis* Roxburgh);

see Schott, Prodr. Syst. Aroid. 395-397 (1860).

Evergreen climbing herbs, creeping against trees with the aid of adhesive roots, stem robust, branched. Leaves many, spirally arranged, petiole usually sheathing or winged throughout its length, sheath usually broad. Blade always entire, undivided, lanceolate, elliptic or ovate to obovate, acuminate, rarely variegated, pinnately nerved with numerous, parallel, lateral nerves. Inflorescence near stem-apices, solitary. Peduncle shorter than the petiole. Spathe not constricted, boat-shaped, caducous to deciduous. Spadix sessile to shortly stipitate, much thicker than the peduncle, slightly shorter than the spathe. Flowers bisexual, naked, perigone absent. Stamens 4, free,

filaments strap-shaped, connective slender, thecae oblong-ellipsoid, dehiscing by an apical slit. Ovary sometimes short, sub-rhomboid or compressed-cylindric, 1-locular, ovules 1 (-2), anatropous, funicle short, placenta basal, stylar region well-developed, stigma globose, elongate-globose, elliptic, linear or punctiform. Fruits usually 1-seeded berries. Seed rounded, sub-reniform, testa thick, sparsely verruculose or smooth.

About 36 species distributed throughout tropical Asia, Malay Archipelago, Melanesia and Pacific (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 4 species.

Key to the species

- | | | |
|----|--|---------------------|
| 1. | Leaves green, without blotched with white | 2 |
| - | Leaves green, blotched with white | pictus |
| 2. | Base of the leaves thinly coriaceous, peduncle 5-10 cm long | 3 |
| - | Base of the leaves thickly coriaceous, peduncle 2.5-3.5 cm long | scortechinii |
| 3. | Leaves broadly elliptic-ovate to nearly orbicular, sometimes oblique, spadix as long as the spathe | officinalis |
| - | Leaves broadly of narrowly oblong, rarely ovate or sub-lanceolate, spadix longer than the spathe | perakensis |

86. *Scindapsus officinalis* (Roxb.) Schott, Schott & Endl., Melet. Bot. 1: 21 (1832). Wight, Icon. Pl. Ind. Or. t. 778 (1844); Hook. f., Fl. Brit. India 6: 541 (1893-reprint 1954); Prain, Beng. Pl. 2: 1114 (1903-reprint 1981); Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 73, t. 30 A-G (1908); Heinig, List Chittagong: 75 (1925); Haines, Bot. Bihar and Orissa: 859 (1924-reprint 1978); Fischer in Gamble, Fl. Pres. Madras 3: 1590 (1931), repr. ed. 3: 1109 (1967); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 101 (1953); Mitra, Fl. Pl. E. India 1: 73 (1958); Hara, Fl. E. Himal. 398 (1966); Hu, Dansk Bot. Arkiv 23 (4): 420-421 (1968); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 30 (1976); Hara *et al.*, Enum. Fl. Pl. Nepal 1: 92 (1978); Deb, Fl.

Tripura State 2: 405 (1983); Bakshi, Fl. Murshidabad Dist.: 338 (1984); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 14 (1989); Noltie, Fl. Bhutan 3(1): 129 (1994); Saxena & Brahmin, Fl. Orissa 4: 2052 (1996); Hajra & Verma, Fl. Sikkim 1: 194 (1996); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 405 (1998); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 476 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 82-83 (2007). **Photo 67 (Page no. 392).**

Pothos officinalis Roxb., Fl. Ind. 1: 431 (1832).

Type: Wall. Cat. 4436 (Herb. Calcutta).

Bengali / Local name: *Gaj-pipul*.

English name: Not known.

Robust, branched, shrubby climber on trees, 10-20 m high, stem 3-5 cm thick, stout, with adhesive roots on the nodes, almost woody when old. Leaves several, simple, spiral, thinly coriaceous, broadly elliptic-ovate to nearly orbicular, sometimes oblique, 10-30 × 6-15 cm, caudate-acuminate, base rounded or slightly cordate, nerves pinnate, ascending, dark-green above, light-green below, petioles 8-18 cm long, winged to the knee, geniculate near the apex. Peduncles 5-10 cm long, stout. Spathes oblong, not constricted, 10-15 cm long, fully convolute when young, later slightly opening like a slit, with slender, c 1.5 cm long tip, yellowish-brown within, coriaceous, ultimately caducous. Spadix sessile, sub-cylindric, about as long as the spathe, enlarging in fruits, greenish-yellow, dense-flowered, appendage absent. Flowers bisexual, perianth absent. Stamens 4, free, filaments flattened, anthers 2-loculed, ovaries with flattened tetragonal tops, 6-8 mm long, 1-loculed, dehiscing by lateral slits, ovule solitary, basal, anatropous, stigma sessile, discoid. Fruit a berry, only few ripening, fleshy, c 1 cm long, seeds reniform.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 56$ (Petersen, 1989).

Habitat: Scrambling or climbing on trees in shady and moist places in the forests.

Distribution: Bangladesh, India (Sikkim and the Himalayas) and Myanmar.

Specimens examined:

Bengal: Locality, Collection date, year & number unknown, J.D. Hooker & Thomson (K).

Chittagong: Near Chittagong, 05.01.1857, Collection number unknown, J.D. Hooker & Thomson (K); Chunati, Harbhang, 10.06.1979, Khan, Huq & Rahman K 5552 (DACB); Bariadhala to Hazarikhil, 24.10.1985, Khan & Mia K 7301 (DACB); Dhopachari, Gandamara, 15.09.1998, Rahman & Toha 3355 (HCU); Sitakunda, Chandranath Hill, 31.08.1999, Boyce, Toha & Rahman 5403 (HCU & K); Dhopachari, Gandamara, 02.09.1999, Boyce, Toha & Rahman 5537 (HCU & K); Chunati, 26.09.2005, Hosne Ara 2221 (DACB).

Chittagong Hill Tracts: Locality & Collection date unknown, 1886, Dr. King's Collector 147 (K, CAL).

Dhaka: Gulshan, 25.12.1965, Zeyauddin 84 (DUSH); Airport area, 19.09.1970, A.M. Huq 182 (DACB); Bangladesh National Herbarium garden (Cultivated), 22.09.2015, Hosne Ara HA 2898 (DACB) [Originally collected from Gazni beat under Sherpur district].

Dinajpur: Singra forest, 14.05.1965, D.K. Das SN (FRIH); 12.10.1980, Huq, Rahman, Mia & Mahbuba H 4792(a) (DACB); 11.06.1982, D.K. Das 4351 (FRIH); 12.04.1991, M.K. Guha 6970 (FRIH); Biral, 27.08.1998, Mia, Harun, Nasir & Mosharaf M. 4375 (DACB); Singra forest, 18.08.2005, Hosne Ara HA 2068 (DACB).

Gazipur: Tetupara Road, Baropaiha, 25.07.2004, Hosne Ara HA 1076, 1077 (DACB); Burulia village, 25.07.2004, Hosne Ara HA 1078 (DACB).

Habiganj: Satchari, 17.05.2005, Hosne Ara HA 1573 (DACB); 07.07.2005, Hosne Ara HA 1866 (DACB).

Mymensingh: Dhubaura thana, Madhupara, 16.06.2004, Hosne Ara HA 744 (DACB); Haluaghat thana, koroitoli, 20.06.2004, Hosne Ara HA 905 (DACB).

Moulvibazar: Madhabkundo, 20.05.2005, Hosne Ara HA 1724 (DACB).

Netrakona: Dhahapara, 18.06.2004, Hosne Ara HA 860 (DACB).

Rangamati: Kaptai, Sitapahar, 17.08.1998, Rahman & Toha 3292 (HCU); Kaptai, Sitarghat, Sitapahar, 24.09.2002, Sarder Nasir Uddin N 1541 (DACB); Rangamati area, 03.10.2002, Sarder Nasir Uddin 1871 (DACB); Kaptai, Sita Pahar, 08.07.2003, Hosne Ara & Sarder Nasir Uddin HA 438 (DACB).

Sherpur: Rangtia range, Gazni beat, 09.10.2003, Hosne Ara HA 632 (DACB); Rangtia range, Samaschura beat, 10.10.2003, Hosne Ara HA 669 (DACB); Gopalpur beat, Maya Ghashi, Ghenaigati thana, Monshapara, 20.06.2004, Hosne Ara HA 872 (DACB); Rangtia rang, Ghenaigati thana, Gazni beat, 21.06.2004, Hosne Ara HA 918 (DACB).

Tangail: Madhupur forest, 28.10.1972, A.M. Huq 458 (DACB); Madhupur forest beat office to National Park, 30.05.1979, Khan & Sahjahan K. 5438 (DACB); Modupur, Rasulpur, 06.10.2003, Hosne Ara HA 549 (DACB).

Economic uses/values/harmful aspects: Sliced and dried parts of the fruit have stimulant, diaphoretic, aphrodisiac, carminative, anthelmintic and antidiarrhoeal properties. Pulp of the fruit is applied externally on the human body to cure rheumatism. Decoction of the fruit serves as a useful medicine in asthma as an expectorant because of its hypoglycaemic and antiprotozoal effects (Ghani, 2003).

Ethnobotanical information: Not known.

87. *Scindapsus perakensis* Hook. f., Fl. Brit. India 6: 542 (1893-reprint 1954). Engler and Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 75-76 (1908); Ridley, Fl. Malay Peninsula: 116-118 (1925); A. Hay *et al.*, Blumea Supplement 8: 153 (1995); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 476 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 83 (2007). **Photo 68 (Page no. 392).**

Type: Scortechini (BM), Kunstler 5306 (K), 10692 (K) (both as 'Dr. King's collector').

Bengali / Local name: *Banlata*.

English name: Not known.

A climbing herb, stem 10-12 m long, 5-7 cm broad, very stout, branched. Leaves many, spirally arranged, 21-30 × 6-9 cm, broadly or narrowly oblong, rarely ovate or

sub-lanceolate, acuminate, elliptic or nearly ovate, thinly coriaceous, base acute or rounded, primary and secondary nerves indistinguishable above, primary nerves distinct beneath, nervules trabeculate, dark green above, light green beneath, petioles 10-15 cm long, broadly winged at the base. Inflorescence near stem-apices, solitary. Peduncle shorter than the petiole, 8-10 cm long, very stout. Spathe not constricted, boat-shaped, cream-white, ovate, cuspidate, leathery, 8 cm long. Spadix longer than the spathe, cylindric or sub-clavate. Flowers bisexual, stamens 4, free, filaments strap-shaped, connective slender, thecae oblong-ellipsoid, dehiscing by an apical slit, naked, perigone absent. Ovary 1-locular, anatropous, placentation basal, stylar region well-developed, stigma linear. Fruit usually a berry and slaty-blue, 1-seeded. Seed lenticular, black, testa thick.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 60$ (Petersen, 1989).

Habitat: Trees in shady and moist places in the forests where this species grows as a climber.

Distribution: Bangladesh, Malaysia.

Specimens examined:

Moulvibazar: Madhabkundo, 05.06.1998, Hosne Ara HA 39 (DACB); 06.07.2005, Hosne Ara HA 1845 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 07.05.2006, Hosne Ara HA 2629 (DACB) [Originally collected from Madhabkundo forest under Moulvibazar district].

Sherpur: Jhenaigati thana, Rangtia hill, 22.06.2004, Hosne Ara HA 1031 (DACB).

Economic uses/values/harmful aspects: The plant, being a climber on walls or big trees, bears ornamental value for its oblong-lanceolate leaves and broad, strong petioles.

Ethnobotanical information: Not known.

Note: It is a new record for the Flora of Bangladesh (Bangladesh J. Plant Taxon. 13 (2): 83-91, 2006).

88. *Scindapsus pictus* Hassk., Tijdschr. Natuurl. Gesch. Physiol. 9: 164 (1842); Cat. Hort. Bogor. 58 (1844). Hook. f., Fl. Brit. India 6: 541 (1893); Ridley, Fl. Maylay Peninsula: 117 (1925); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 476 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 84 (2007). **Photo 69 (Page no. 392).**

Scindapsus pothoides Schott, Prodr. Syst. Aroid.: 394 (1860), *nom. illeg.*

Pothos argyraeus Engl. in A.L.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 2: 255 (1879), pro syn.

Scindapsus argyraeus Engl. in A.L.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 2: 255 (1879). *Scindapsus pictus* var. *argyraeus* (Engl.) Engl., Bot. Jahrb. Syst. 25: 13 (1898).

Pothos argenteus W. Bull, Cat. 1887: 11 (1887).

Scindapsus pictus var. *oblongifolius* Engl., Bot. Jahrb. Syst. 25: 13 (1898).

Type: Zollinger 1825 (Bo, L, LE, P).

Bengali / Local name: Not available.

English name: Not known.

A very long, evergreen, slender climbing herb, up to 20 m or more long, stem branched. Leaves many, 7.5 × 5.0 cm, spirally arranged, young leaves thick, glaucous, entire, ovate or orbicular or falcate-cordate, green, blotched with white, petioles slender, sheathing throughout its length, stout, 4 cm long, adult leaves lanceolate, falcate or ovate-cordate, 13-18 × 4-14 cm, dull green, nerves very close and slender, primary or secondary hardly distinct. Peduncle equalling the petiole, very stout. Spathe not constricted, boat-shaped, white, ovate-oblong, prominently pointed, 5 cm long. Spadix stout, shorter than the spathe, 3.5 cm long, green. Flowers bisexual, naked. Stamens 4, free, filaments very short, dehiscing by an apical slit. Ovary 1-locular, ovule 1, anatropous, placentation basal, stylar region well-developed, stigma globose. Fruits usually 1-seeded berries. Seed rounded, testa thick.

Flowering and fruiting period: June-October.

Chromosome number: $2n = 112$ (Petersen, 1989).

Habitat: Tropical semi-evergreen forests.

Distribution: Bangladesh, Tropical Asia, extending up to Indonesia.

Specimens examined:

Chittagong Hill Tracts: Locality unknown, Feb. 1940, Dr. S.K. Mukerjee 91 (CAL).

Rangamati: Mynimukh, 24.12.1956, M.S. Khan 223 (CAL, DUSH).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: The species was identified on the basis of a diagnostic character, spotted leaves, and also varified at Central National Herbarium, Kolkata. However P.C. Boyce of Kew Herbarium thought that this species might not be present in Bangladesh (Toha 2000).

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 5 (1): 97-100, 1998).

89. *Scindapsus scortechinii* Hook. f., Fl. Brit. India 6: 541 (1893-reprint 1954). Engler and Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 73-74 (1908); Ridley, Fl. Malay Peninsula: 116-117 (1925); A. Hay *et al.*, Blumea Supplement 8: 154 (1995); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 477 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 84-85 (2007). **Photo 70 (Page no. 392).**

Type: Scortechini 370 (BM, K), 3306 (K), Wray 661 (K).

Bengali / Local name: *Banno lata*.

English name: Not known.

An evergreen climbing herb, stem slender, branched, creeping over trees. Leaves many, spirally arranged, 1-15 × 3-9 cm, ovate, acute or falcately lanceolate, base

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rounded or subcordate, entire, thickly coriaceous, dark green, very close nerved, petiole 5-14 cm long, thick, broadly winged. Inflorescence solitary, peduncle much shorter than the petiole, 2.5-3.5 cm × 8 mm. Spathe not constricted, boat-shaped, ovate, acute, 4-6 cm long, yellowish on both surfaces, deciduous. Spadix much shorter, 3.0-3.5 cm long. Flowers bisexual, naked. Stamens 4, free, filaments oblong, dehiscing by an apical slit. Ovary compressed, cylindric, c 3.5 × 2.0 mm, 1-locular, ovule 1, anatropous, funicle short, placentation basal, stylar region well-developed, stigma elliptic-rounded. Fruits of berries in clusters, ultimately separating. Seed one, subreniform, testa thick.

Flowering and fruiting period: May-October.

Chromosome number: Not known.

Habitat: Shady and moist places in forests.

Distribution: Bangladesh, Malaysia.

Specimens examined:

Sherpur: Rangtia range, Gazni beat, 09.10.2003, Hosne Ara HA 633 (DACB); 21.06.2004, Hosne Ara HA 919 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 11(1): 91-94, 2004).

23. Genus: *Spathiphyllum* Schott in Schott & Endlicher,

Melet. Bot. 22 (1832).

Type species: *S. lanceifolium* (Jacquin) Schott

(“*lancaefolium*”; *Dracontium lanceaefolium* Jacquin)

Evergreen terrestrial herbs usually with short, erect to creeping stem, appearing acaulescent, sometimes stoloniferous. Leaves several, petiole geniculate near the

apex, sheath long, blade mostly oblong to elliptic or narrowly elliptic, cuspidate-acuminate, the primary and secondary lateral nerves sub-parallel, approximate, ascending chiefly at a narrow angle, not united into a collective nerve. Inflorescence solitary, peduncle equalling or longer than the leaves. Spathe oblong, elliptic, ovate or obovate, cuspidate-acuminate, decurrent upon the peduncle, membranaceous to sub-coriaceous, convolute in bud, fully expanded, persistent, with distinct midrib and pinnate primary lateral veins, usually white, rarely green, turning green in fruit. Spadix stipitate or sessile, stipe often partially adnate to the spathe, cylindric, erect, shorter than the spathe. Flowers bisexual, perigoniate. Tepals 4-6, free. Stamens 4-6, free, filaments short, oblong, flattened, connective slender, thecae oblong-ellipsoid to ovoid, dehiscing by a longitudinal slit. Gynoecium ovoid, sub-cylindric, obovoid or flask-shaped, ovary 3-locular, ovules 2, 4, 6 or 8 per locule, anatropous to hemianatropous, placentation axile, stylar region usually long, conic and long exserted beyond perigone or almost none, stigma 2-3 lobed, sessile. Fruit a berry, rounded, ovoid to obovoid, or conic at the apex, 1-8 seeded, greenish. Seed oblong, ellipsoid to ovoid or slightly curved, somewhat reniform, pale yellow to brown, testa sparsely striate-verrucose.

About 41 species distributed throughout tropical America, West Indies, eastern Malay Archipelago and Melanesia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 2 species.

Key to the species

- | | | |
|----|---|--------------------|
| 1. | Leaf blade conspicuously oblique,
oblanceolate, petiole c 28 cm long | floribundum |
| - | Leaf blade lanceolate to oblong-elliptic,
petiole c 45 cm long | wallisii |

90. *Spathiphyllum floribundum* (Lind. *et* Andre') N.E. Br., Gard. Chron. 11 (10): 783 (1878). Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 129-130 (1908); Bailey, Manual Cultivat. Pl.: 184 (1949); Birdsey, Cultivat. Aroid.: 116 (1951); Bunting, Mem. New York Bot. Gard. 10 (3): 25-27 (1960); Graf, Tropica, edn. 5: 126,

1092 (1978-reprint 2003); Everett, Encycl. Horticult. 9: 3194 (1982); Walters *et al.*, European Gard. Fl. 2 (2): 88 (1984-reprint 2003). **Photo xx (Page no. 100).**

Anthurium floribundum Linden *et* Andre', III Horticult. 21: 24, Pl. 159 (1874).

Amomophyllum floribundum (Linden *et* Andre') Engl., Gard. Chron. II. 7: 139-140 (1877).

Type: Pl. 159, L' Illustration Horticole 21: 24 (1874).

Bengali / Local name: *Bahari Kachu*.

English name: White Sails, Spathe Flower.

Leaf-blade conspicuously oblique, elliptic to oblong or oblanceolate, widest at or just above the middle, 13-20(-26) cm long and 5.5-9(-10.5) cm wide, the apex cuspidate, the base obtuse or acute, marginally undulate, dark green above with a velvety lustre, the primary lateral veins c 9 pairs arising at an angle of c 65-75°; petiole (6.5-) 10-22 (-28) cm long, often alate nearly to the geniculum, vaginate below or the wings expanded and free; geniculum 0.5-1.3 cm long. Peduncle (16-)20-37 cm long; spathe white, reflexed, lanceolate or oblong-elliptic, 4-8(-9.8) cm long and 1.2-3 cm wide, the apex attenuate to cuspidate, the base acute to subtruncate and clasping the peduncle; spadix 2.5-5.5 cm long, on a stipe 0.3-0.8 cm long; perianth green, the segments separate or sometimes conglutinate in age; pistil white, obpyramidal, apically truncate, the stigma elevated and shortly exceeding the perianth; ovary 3-locular, the ovules affixed at or near the base of the locules, varying from (3-)2 to 1 in each of the 3 locules, totaling (7-)6-4 ovules per ovary; fruiting spadix smooth; fruit spheroid, the apex truncate; seeds 1 or 2 per locule, the surface vertically furrowed and foveolate between the verrucose ridges.

Flowering and fruiting period: April-September.

Chromosome number: Not known.

Habitat: Shady places.

Distribution: Colombia.

Specimens examined:

Dhaka: Dhaka University Botanical Garden, Curzon Hall, 20.02.1980, Mahbuba Halim 744 (DACB); 06.10.2004, Hosne Ara HA 1459 (DACB); Mirpur Botanical Garden, 06.10.2004, Hosne Ara HA 1460 (DACB).

Economic uses/values/harmful aspects: The plant is widely planted for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

91. *Spathiphyllum wallisii* Regel, Gartenflora 26: 323, t. 920 (1877). Engler & Krause in Engler, Pflanzenr. 37 (IV. 23Ba): 125 (1908); Bunting, Mem. New York Bot. Gard. 10 (3): 40-41 (1960); Graf, Tropica, edn. 5: 126, 1092 (1978-reprint 2003); Walters *et al.*, European Gard. Fl. 2 (2): 88 (1984-reprint 2003); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrib. U. S. Nat. Herb. 52: 46 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 85-86 (2007).

Photo xxi, xxia (Page no. 101).

Bengali / Local name: *Bahari Kachu*.

English name: Peace Lily, White Sails, Spathe Flower.

Lectotype: Venezuela. Regel, Gartenflora 26: t. 920 (1877), here designated.

Terrestrial small evergreen herb, stem short. Leaf blade lanceolate to oblong-elliptic, 14-36 × 5-10 cm, marginally undulate or wavy, apex long-acuminate, recurved at the tip, base acute, midrib nude in the lowermost 2 cm above the geniculum, dark green above, light green beneath, primary lateral veins c 8-10 pairs arising at an angle of 45-50°, petiole sub-equalling the blade or a little longer, 45 cm long, commonly adnate in the lower part or nearly to the geniculum, geniculum 1.4-2.3 cm long. Peduncle longer than the petiole, c 20-64 cm long. Spathe cucullate, ovate to oblong-elliptic, 7-17 × 2.5-7.5 cm, apex long acuminate (up to 2.5 cm long), base commonly obtuse or sub-rotund, sometimes acute, decurrent to the peduncle, 1.5-4.0 cm or more, white, becoming green with age. Flowers fragrant. Spadix 1.5-8.0 cm long, on a stipe 0.5-1.2 cm long, perianth white, of separate segments, style conic, white, prominently exserted beyond the perianth, ovary 3-locular, ovules 6-12.

Flowering and fruiting period: May-September.

Chromosome number: $2n = 30$ (Petersen, 1989).

Habitat: Shady moist areas.

Distribution: Colombia, also grown in Bangladesh.

Specimen examined:

Dhaka: Banani area, 04.10.2004, Hosne Ara HA 1457 (DACB).

Economic uses/values/harmful aspects: The plant is widely grown for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

24. Genus: Steudnera K. Koch in Wochenschr.

Gärtnererei Pflanzenk. 5: 114 (1862).

Type species: *S. colocasiifolia* K. Koch (“colocasiaefolia”).

Medium-sized to robust herbs, usually evergreen, terrestrial, sometimes seasonally dormant. Stem creeping or erect, epigeal, stout, with persistent cataphylls. Leaves solitary or few to several, petiolar sheath very short, blade peltate, with well-developed reticulate venation, ovate, ovate-oblong, apex acuminate, basal ribs short. Inflorescence axillary, solitary, peduncle shorter than the petiole. Spathe not constricted but shortly convolute at the base, yellowish or dark purple inside, lower part persistent to the fruiting stage, upper part ovate or ovate-lanceolate, expanded, reflexed, marcescent. Spadix much shorter than the spathe, dense-flowered female portion of the spadix cylindrical, often longer than male portion, mostly adnate to the spathe at its base, male zone contiguous with the female zone, clavate or capitate. Flowers unisexual, naked, perigone absent. Male flowers 3-6 androus, stamens connate, synandrium strongly lobed, anther-cells globose, dehiscent by an apical pore. Female flowers with sub-globose to ovoid ovaries mixed with a few clavate staminodes, more rarely staminode absent, ovary 1-locular, ovules numerous, hemiorthotropous, placentation parietal, stylar region lacking, stigma strongly 2-5 lobed. Fruit an ovoid berry, many-seeded. Seeds ovoid to ellipsoid, testa costate.

About 8 species distributed throughout tropical south and southeast Asia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 4 species.

Key to the species

- | | | |
|----|--|-----------------------|
| 1. | Spathe not reflexed, limb of spathe narrowly lanceolate | colocasioides |
| - | Spathe reflexed, limb of spathe ovate or ovate-lanceolate | 2 |
| 2. | Leaves with a large purple brown blotch between each pair of nerves beneath | discolor |
| - | Leaves without a large purple brown blotch between each pair of nerves beneath | 3 |
| 3. | Spathe yellow outside, rich purple brown inside | colocasiifolia |
| - | Spathe light purple outside, purple-red inside | gagei |

92. *Stuednera colocasiifolia* K. Koch ("*colocasiaefolia*") in Wochenschr., Gärtnerei Pflanzenk. 5: 114 (1862). Schott in Bonplandia 222 (1862); Regel, Gartenflora. 18: 323 (1869), t. 633; Andre' in Illustr. Hortic. 19: 33, t. 90 (1872); Engl. in DC. Monogr. Phan. 2: 452 (1879); Hook. f. in Bot. Mag.: t. 6762 (1884) *et* in Fl. Brit. India 6: 520 (1893-reprint 1954); Krause in Engler, Pflanzenr. 71 (IV. 23E): 13-15 (1920); Hu, Dansk Bot. Arkiv 23 (4): 426 (1968); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 494 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 86-87 (2007); Heng & Boyce in Heng *et al.*, Fl. China 23: 70 (2010). **Photo 71 (Page no. 400).**

Gonatanthus peltatus Hort. ex Van Houtte, Fl. des Serres, Paris 21: 83 (1875).

Type: Burma (Myanmar), Martaban, Karen hills.

Bengali / Local name: *Ban Kachu*.

English name: Not known.

A robust herb with a stout, up to 4 cm thick caudex and a solitary leaf. Leaves petiolate, petiole up to 40 cm long, c 8 mm broad, petiolar sheath very short, pale green, lamina up to 40 cm long, and up to 27 cm broad, ovate, peltate, acuminate, base retuse, sinus very shallow, membranaceous, deep green above, paler beneath. Peduncle shorter than the petiole, terete, pale green, up to 15 cm long and up to 4 cm broad. Spathe up to c 15.5 × 7 cm, ovate-lanceolate, acuminate, not constricted, reflexed, marcescent, yellow outside and fih purple-brown inside. Spadix lacking appendix, much shorter than the spathe, up to 4.5 cm long and up to 7 mm broad. Male flowers adjoining the female, clavate or capitate, free, c 1.5 cm long. Stamens connate, anthers 5-7, thecae dehiscing by apical pores. Female flowers c 3 cm long, cylindric and fused on back to the spathe. Ovary sub-globose, 5 loculate, ovules numerous, anatropous, placentation parietal, style very short, stigma 4-5 lobed. Fruit an ovoid berry, many-seeded.

Flowering and fruiting period: April-May.

Chromosome number: $2n = 28$ (Petersen, 1989).

Habitat: Shady forest floors.

Distribution: Bangladesh, Myanmar.

Specimens examined:

Bandarban: Thanci road, Alikadam, Guishapjiri, 03.05.1998, Rahman *et al.* 2860 (HCU).

Chittagong: C.U. Botanic garden, 29.06.1998, Rahman *et al.* 3241 (HCU).

Cox's Bazar: Signal Hill, 29.08.1943, Sinclair 3198 (E 00079897).

Moulvibazar: Adampur beat, Mullawia, 23.03.2008, Hosne Ara HA 2734 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 22.04.2008, Hosne Ara HA 2739 (DACB) [Originally collected from Adampur beat under Moulvibazar district].

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Rangamati: Manikchari, 25.04.1976, Huq, Rahman & Mia H 2524 (DACB); Pablakhali forest area, 29.04.1977, Huq & Rahman H 3274 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: The poisonous stem is used to treat injuries, cuts, bleeding, snake or insect bites, vasculitis and skin ulcers (Heng, 1979).

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 8 (2): 99-102, 2001).

93. *Steudnera colocasioides* Hook. f., Fl. Brit. India 6: 520 (1893-reprint 1954). Krause in Engler, Pflanzenr. 71 (IV. 23E): 11-13 (1920); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 23 (1976); Balakrishnan, Fl. Jowai 2: 565 (1983); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 14 (1989); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 494 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 87-88 (2007). **Photo 72 (Page no. 403).**

Steudnera virosa Prain, Beng. Pl. 2: 1113 (1903-reprint 1981); Heinig, List Chittagong: 74 (1925); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 110 (1956); Mitra, Fl. Pl. E. India 1: 77 (1958).

Type: Assam, Wallich 1849-Herb. Calcutta; No. 8947, 8944 (K).

Bengali / Local name: *Bish kachu*.

English name: Not known.

A perennial herb, caudex c 3.5 cm thick, elongate, fibrous above, yellow inside. Leaves petiolate, petiole 30-45 cm long, green, leaf blade 25-60 × 15-50 cm, thin, broadly ovate, acute, emarginate or broadly retuse at the base, light green above and glaucous beneath, purplish when young, veins 5-8 on either side of the midrib. Peduncle shorter than the petiole, pale green, 12-18 cm long, 4-5 mm thick. Spathe up to 22 cm long, not reflexed, tube 2.0-2.5 cm long, ovoid, green, c 8 mm wide, convolute, limb narrowly lanceolate, acuminate, yellow on both surfaces. Spadix much shorter than the spathe, lacking appendix, cylindrical, c 5 cm long, yellowish-white, male and female floriferous zones equal, female zone fused with the spathe towards the base for about half way up. Male flowers 3-6 androus, stamens connate,

anther-cells globose, dehiscent by apical pores. Ovaries globose, staminodes very minute, ovules numerous, anatropous, placentation parietal. Fruit a berry, ovoid, many-seeded.

Flowering and fruiting period: April-September.

Chromosome number: Not known.

Habitat: Shady moist hill slopes in rain forests.

Distribution: Bangladesh, Sikkim, the Himalayas and Cachhar regions of India.

Specimens examined:

Bandarban: Alikadam, Thanci road, Guishapjhiri, 03.05.1998, Rahman *et al.* 2858 & 2859 (HCU); On the way of Betchari, 22.09.2004, Hosne Ara HA 1214 (DACB).

Chittagong: Locality & Collector unknown, 07.05.1875, No. 11367 (CAL); Locality unknown, March 1898, Mokim (CAL); Bariadhala to Hazarikhil, 30.10.1978, Huq, Rahman & Mia H 3987 (DACB); Barabakund, 23.06.1979, Mia & Rahman M 121 (DACB); Dhurong, 23.04.1980, Das & Alam 3882 (FRIH); Sitakundo, 01.10.2005, Hosne Ara HA 2592 (DACB); Mirsarai, 01.10.2005, Hosne Ara HA 2602 (DACB); Town area, 01.10.2005, Hosne Ara HA 2609 (DACB); Foyage Lake area, 01.10.2005, Hosne Ara HA 2614 (DACB).

Cox's Bazar: Kelatuli, 12.03.1945, Sinclair 4056 (E 00079896); Himchari, Lalutia, 10.06.2001, Sarder Nasir Uddin N 966 (DACB); Teknaf Game Reserve, Whykeon Range, Rhykong beat, 29.09.2005, Hosne Ara HA 2350 (DACB); Bara Inani, 30.09.2005, Hosne Ara HA 2467 (DACB); Himchari, 30.09.2005, Hosne Ara HA 2523 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 22.09.2015, Hosne Ara HA 2899 (DACB) [Originally collected from Madhabkundo under Moulvibazar district].

Habiganj: Near Satchari forest, 19.04.1985, Huq & Mia H 7016 (DACB); Kalenga beat, Kalenga, 16.05.2005, Hosne Ara HA 1541, 1542 (DACB); Satchari forest, 17.05.2005, Hosne Ara HA 1583, 1584 (DACB); 07.07.2005, Hosne Ara HA 1869 (DACB).

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Khagrachari: Betcharipara, 20.02.1998, Alam, EB 246 (FRIH); Alutila, 11.07.2003, Hosne Ara & Sarder Nasir Uddin HA 460 (DACB).

Kushtia: Chuadanga, Munshiganj, 03.01.1976, Huq, Rahman & Mia H. 1862 (DACB).

Moulvibazar: Samanbag beat, 25.04.1987, M.K. Alam 5809 (FRIH); Madhabkundo, 05.06.1998, Hosne Ara HA 38 (DACB); Lawachara reserve forest, 02.05.2003, Hosne Ara HA 203 (DACB); 15.05.2005, Hosne Ara HA 1493, 1494 (DACB); Muraichara, 19.05.2005, Hosne Ara HA 1674 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1714, 1715 (DACB); Gazipur beat, Hararganj forest, 21.05.2005, Hosne Ara HA 1735, 1736 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1783, 1785 (DACB); Gazipur beat, Hararganj forest, 05.07.2005, Hosne Ara HA 1801 (DACB); Madhabkundo, 06.07.2005, Hosne Ara HA 1831, 1832 (DACB); Muraichara beat, Ichachara forest, 07.05.2010, Hosne Ara HA 2754 (DACB); Muraichara beat, Awolachara punji, 07.05.2010, Hosne Ara HA 2764 (DACB); Juri forest, 02.12.2014, Hosne Ara HA 2864 (DACB); Madhabkundo, 03.12.2014, Hosne Ara HA 2872 (DACB).

Rangamati: Manikchari, 25.05.1976, Huq, Rahman & Mia H 2524 (DACB); Pablakhali forest area, 29.04.1977, Huq & Rahman H 3274 (DACB); Kaptai, Thandachari, 14.05.1996, Mohiuddin & Hoque 7712 (FRIH); Ansar Campchari, Rampahar, Kaptai, 16.06.2001, Sarder Nasir Uddin N 997 (DACB); Kaptai, Bangchori beat, Bangchori, 06.07.2003, Hosne Ara & Sarder Nasir Uddin HA 349 (DACB); Kaptai, Shilsori, 09.07.2003, Hosne Ara & Sarder Nasir Uddin HA 450 (DACB); Rajbari area, 18.09.2004, Hosne Ara HA 1120 (DACB); Rangamati, DC Bangloo area, 20.09.2004, Hosne Ara HA 1158 (DACB); Kaptai, Chitmaram, 09.01.2005, Hosne Ara & Sarder Nasir Uddin HA 1428 (DACB).

Sylhet: Silhet, Collection date & year unknown, Wallick 1849, 8944, 8947 (K); Sylhet area 24.06.1968, Mozahar 142 (DUSH); Tamabil-Jafflong, 04.06.1998, Hosne Ara HA 27 (DACB).

Economic uses/values/harmful aspects: This plant is poisonous for the human body. It may be used in medicine but never consumed by human beings as a vegetable (Watt, 1889-1892).

Ethnobotanical information: Not known.

94. *Stuednera discolor* N.E. Br. in Gard. Chron. new ser. 4: 708 (1875). Hook. f., Fl. Brit. India 6: 520 (1893-reprint 1954)-*Stuednera colocasiaefolia* Hook. f., Bot. Magaz. (1874) t. 6076, Fl. des Serres 21: 2201 (1875); Krause in Engler, Pflanzenr. 71 (IV. 23E): 15 (1920); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 14 (1989); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 494 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 88-89 (2007). **Photo 73 (Page no. 406).**

Stuednera colocasiifolia var. *discolor* (W. Bull) Engl. in A.L.P. de Candolle & A.C.P. de Candolle, Monog. Phanerog. 2: 452 (1879).

Type: Assam (K).

Bengali / Local name: *Bahari Kachu*.

English name: Not known.

Medium-sized to robust evergreen herb with stem 2-15 cm long, 1.5-3.0 cm diam., epigeal, erect, decumbent with age, densely covered with tattered cataphyll, roots 1.5-3.0 mm diam., produced from the lower stem portions and from the ventral surface of the decumbent stems. Leaves several, 15-30 cm long, 8-18 cm wide, peltate, ovate, apex acuminate, sinus very shallow, posterior lobes almost absent, lamina membranaceous, deep olive green adaxially, large purple brown blotch between each pair of nerves beneath, petioles 10-18 cm long, 3-7 mm wide, pale green, petiolar sheath very short. Inflorescence solitary; peduncle 6-12 cm long, 1.5-3.0 mm wide, pale green. Spathe 10-14 cm long, 3-5 cm wide, ovate-lanceolate, long acuminate, reflexing on opening, upper part soon withering, marcescent, lower part persistent into fruiting stage. Spadix 4-6 cm × 4-7 mm, male flower zone clavate, free, female flower zone cylindrical, dorsally adnate to the spathe. Flowers unisexual, naked. Stamens 1-2 × 1.5-2.5 mm, 4-6 androus, connate into polygonal, shortly stipitate synandrium, thecae dehiscing by apical pores, male flower zone pale cream-white Gynoeceum 2-3 mm high, 0.5-1 mm wide, sub-globose, surrounded by a whorl of 5-8 clavate staminodes, ovary 2-5 loculate, ovules numerous, on parietal placentas, hemi-anatropous, style very

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short, stigma 3-5 lobed, exceeding style width, female flower zone pale cream-white. Fruit a berry, 6-11 × 4-7 mm, ovoid. Seeds 0.5-1 × 0.3-0.5 mm, sarcotestate, testa thick, longitudinally costate.

Flowering and fruiting period: March-May.

Chromosome number: 2n = 56 (Petersen, 1989).

Habitat: Tropical humid forests, shady places of hill slopes and foothills.

Distribution: Bangladesh, Northeast India and Myanmar.

Specimens examined:

Bandarban: Thanchi road, 23.08.1997, Rahman, Alam, Yusuf & Hossain 1792 (HCU).

Moulvibazar: Muraichara beat, Ichachara forest, 07.05.2010, Hosne Ara HA 2753 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

95. *Stuednera gagei* Krause in Engler, Pflanzenr. 71 (IV. 23E): 15-16 (1920). Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 24 (1976); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 14 (1989); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 494 (2002). **Photo 74 (Page no. 408).**

Type : India, Lushai Hills (Gage n. 249-in April 1899-Herb. Calcutta).

Bengali / Local name: *Banno Kachu*.

English: Not Known.

Caudex 6-12×2-3 cm. long, petiole 30-65 × 0.5-1.0 cm, green, petiolar sheath short, purple. Leave blade broadly ovate or suborbicular, 24-39 × 18-23 cm, thinly coriaceous, peltate, acuminate, entire or emarginate at the base, deep green above, paler beneath. Peduncle shorter than petiole, 8-15 × 0.5 cm, light green or light purple. Spathe ovate-lanceolate, 9-11 × 3.5-4.5 cm, acuminate, not constricted,

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reflexed, marcescent, light purple outside and purple-red inside. Spadix lacking appendix, much shorter than spathe, 3.5-4.0 cm long. Male flowers adjoining the female, clavate or capitate, white, 0.7-1.1 × 0.5-0.7 cm; female flowers 2.5-3.0 × 0.5-0.6 cm, pale yellow, slightly longer and narrower than the male flowers. Ovary subglobose, ovules numerous, anatropous, parietal placentation; style very short; stigma 4-lobed. Berries ovoid, many seeded.

Flowering period: March to April.

Chromosome number: Not known.

Habitat: Grows in shady and damp places of forest floor.

Distribution: Bangladesh, India.

Specimens examined:

Moulvibazar: Adampur beat, Gangpali, 23.03.2008, Hosne Ara HA 2735 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 22.04.2009, Hosne Ara HA 2748 (DACB) [Originally collected from Gangpali under Moulvibazar district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for the Flora of Bangladesh (Bangladesh J. Plant Taxon. 19 (1): 17-23, 2012).

25. Genus: Syngonium Schott in Wiener Z. Kunst 1829 (3): 780 (1829).

Type species: *S. auritum* (L.) Schott (*Arum auritum* L.)

Root-climbing or shortly creeping, evergreen herbs, internodes short to elongate, green. Leaves numerous, petioles long, terete above, long vaginate, blades very variable in form according to the stages of development, at maturity cordate, oblong-cordate, lanceolate, sagittate, trifid to trisect, pedatifid to pedatisect, rarely pinnatifid, when juvenile entire, ovate to sagittate or cordate-sagittate or hastate, reticulate to transverse-reticulate in venation. Inflorescence 1-8 in each floral sympodium,

peduncle much shorter than the petiole, erect at anthesis, pendent in the fruit. Spathe strongly constricted between the tube and the blade, tube convolute, ovoid-ellipsoid or cylindrical or globose, sometimes ventricose, persistent, blade usually creamy, boat-shaped to expanded at anthesis, erect to spreading, usually marcescent after anthesis, later deciduous. Spadix sessile, much shorter than the spathe, the female zone cylindrical to conoid, separated from the male zone by a constricted zone of sterile flowers, male zone clavate to cylindrical or ellipsoid, longer than the female zone, fertile at the apex. Flowers unisexual, perigone absent. Male flowers 3-4 androus, stamens connate into the synandrium, synandrium obpyramidal, truncate to rounded at the apex, anthers linear, connective thick, dehiscent by a short slit below the apex of the connective. Female flower connate, ovary obovoid or oblong-obovoid, 1-3 locular, ovules 1-2 per locule, anatropous, funicle short, stylar region as broad as the ovary, stigma discoid or 2-lobed, rarely globose, discoid-capitate or cup-shaped, narrower than the ovary, connate, forming ovoid to ellipsoid, usually brown, sometimes white. Seed ovoid to ellipsoid, rather large, testa smooth, thin, black or dark brown, shiny.

About 35 species distributed throughout tropical America and West Indies (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 2 species.

Key to the species

- | | | |
|----|---|---------------------|
| 1. | Adult leaf blades thick; juvenile blades thick, large, cordate; peduncles 10-13 cm long at anthesis | macrophyllum |
| - | Adult leaf blades thin; juvenile leaves thin, sagittate or hastate (or if cordate, very small), peduncles less than 9 cm long at anthesis | podophyllum |

96. *Syngonium macrophyllum* Engler, Pflanzenr. 71 (IV. 23E): 128 (1920). Standley & Steyermark, Fl. Guatemala, Fieldiana, Bot. 24 (1): 355-356 (1958); Graf, Tropica, edn. 5: 127, 1095 (1978-reprint 2003); Croat, Ann. Missouri Bot. Gard. 68 (4): 621-622 (1981); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 504 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 89-90 (2007).
Photo xxii, xxiia (Page no. 101).

Type: Mexico (locality not known) (B, holotype, two specimens made from cultivated plants in Berlin).

Bengali / Local name: *Latano Kachu*.

English name: Not known.

A large evergreen climbing herb. Juvenile plants with glaucous stem, internodes 0.8-5.2 cm long, usually scandent. Leaves petiolate, petioles 7-25 cm long, glaucous, sheathed c 1/2 of their length, blades sub-coriaceous, broadly ovate, 8-16 × 6-10 cm, the posterior lobes at first rounded, becoming sagittate, rounded at the apex, intermediate leaves with the apical lobe elliptic, acuminate at the apex, much constricted at the base, the posterior lobes becoming nearly pinched off, narrowly rounded to acute at the apex. Adult plants with stems scandent, glaucous, internodes 2-4 cm long near the apex, petioles often glaucous, 25-60 cm long, sheathed 1/2-3/4 their length with a rib between the sheath and the blade, the sheath free-ending and acute at the apex, blades sub-coriaceous, pedatisect, leaflets 7-9, mostly free or the outer ones confluent, the lowermost usually variously auriculate, dark to medium green on the upper surface, smooth, the lower surface light green, rachis sharply margined, median leaflet 17-47 × 5-18 cm, oblanceolate, elliptic, broadly elliptic or ovate-elliptic, acuminate to acute and down-turned at the apex, cuneate to abruptly attenuate at the base. Inflorescence 4-8 per axil, peduncles almost terete, erect, 10-13 cm long at anthesis. Spathe tube ovate, green and glaucous outside, green to greenish-tan inside, 3.0-5.5 × 3-5 cm, spathe blade 7.0-11.5 cm long, at first green, later cream, mucronate at the apex. Pistillate portion of the spadix 1.5-3.0 × 2.0 cm at the base, pale green, flowers irregularly 5-6 sided, stigma sub-sessile, discoid, yellowish at anthesis, staminate portion of the spadix oblong-ellipsoid, abruptly constricted just above the sterile staminate flowers, the fertile staminate flowers with 4 stamens, the synandrium with the line of fusion scarcely visible, the apex truncate or with a conspicuous central depression, the sterile staminate flowers somewhat larger. Infructescences large, 8-14 × 5-8 cm, yellow, seeds obovoid, white before maturity, becoming dark grey.

Flowering and fruiting period: June-August.

Chromosome number: Not known.

Habitat: Shady and damp areas.

Distribution: Mexico to Ecuador (Croat, 1981), also grown in Bangladesh.

Specimen examined:

Dhaka: Moghbazar area, 06.10.2004, Hosne Ara HA 1461 (DACB).

Economic uses/values/harmful aspects: As an ornamental plant, it is commonly planted both in public places and homesteads.

Ethnobotanical information: Not known.

97. *Syngonium podophyllum* Schott, Bot. Zeitung (Berlin) 9: 85 (1851). Standley, Fl. Panama, Ann. Missouri Bot. Gard. 31 (1): 50 (1944); Birdsey, Cultivat. Aroid.: 125 (1951); Standley & Steyermark, Fl. Guatemala, Fieldiana, Bot. 24 (1): 356-357 (1958); Graf, Exotica, edn. 8: 234, 237 (1976); Tropica, edn. 5: 130, 1095 (1978-reprint 2003); Croat, Ann. Missouri Bot. Gard. 68 (4): 628-636 (1981); Walters *et al.*, European Gard. Fl. 2 (2): 104 (1984-reprint 2003); Noltie, Fl. Bhutan 3 (1): 157 (1994); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 505 (2002); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrib. U. S. Nat. Herb. 52: 46 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 90-91 (2007).

Photo xxiii (Page no. 101).

Pothos auritus Willd. *ex* Schult., Mant. 3: 301 (1827), non

Syngonium auritum (L.) Schott.

Arum auritum Vell. non L., Fl. Flum. 9. tap. 113 (1827).

Type: Mexico (Schott drawings 3223 and 3226; NYBG Photos 4330 and 4329 respectively).

Bengali / Local name: *Bahari Kachu*.

English name: Arrow-head Vine,
American Evergreen.

A large, epiphytic vine, caudex 1.0-1.5 cm thick, internodes elongate. Juvenile plants with long-petiolate leaves, leaf blades simple, thin, cordate, 7-14 cm long, becoming sagittate or hastate, basal lobes triangular or oblong-lanceolate, terminal lobe

acuminate, blades on climbing plants 12-27 cm long. Adult plants with stem sometimes glaucous, sap milky, internodes 2.8-14.5 cm long, 0.5-3.5 cm wide (dry), petioles 15-50 cm long, sometimes glaucous, sheathed 2/3 their length, sheath free-ending, rounded to obtusely angular above the sheath, blades pedatisect, thin, the surface dark green above, pale below, leaflets 3-11, united to free, lowermost leaflet variously auriculate at the base, the auricles oblong to oblong-elliptic to broadly elliptic, median leaflet obovate to broadly elliptic, abruptly acuminate at the apex, broadly or narrowly decurrent at the base, 16-38 × 6-17 cm, segments separated by short or elongate internodes of the rachis. Inflorescence 4-11 per axil, peduncle sometimes glaucous, somewhat compressed laterally, erect and usually less than 9 cm long at anthesis, pendent. Spathe 9-11 cm long, spathe tube sometimes glaucous, narrowly ovoid to ellipsoid, 3-5 cm long, 1.5-2.0 cm in diameter, green inside and outside, spathe blade greenish-white to creamy-white or sometimes green outside and creamy-white inside, 6.0-7.5 × 3-5 cm, long-cuspidate at the apex. Pistillate portion of the spadix 1-2 cm long, 6-9 mm in diameter, greenish-creamy, ovaries depressed-obpyramidal, stigma discoid-capitate, sometimes 2-or 3-lobed. Staminate portion of spadix 4-7 cm long, 7-15 mm in diameter, creamy, synandrium with anthers usually 4, cross-shaped, 3.5-4.0 mm wide. Infructescence red to reddish-orange or yellow (rarely brown) at maturity. Seeds many, ovoid, 7-11 × 5-7 mm, black or brown.

Flowering and fruiting period: February-November.

Chromosome number: $2n = 26$ (Petersen, 1989).

Habitat: Shady moist places.

Distribution: Bangladesh, from Mexico to the Guyanas, Brazil and Bolivia.

Specimens examined:

Bogra: Beltola, 18.03.2001, B.M.Rezia Khatun, R.K. 2875 (DACB).

Chittagong: Lalkhan Bazar, Rahman *et al.* (without date & number).

Dhaka: Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1447 (DACB).

Patuakhali: Patuakhali Sadar, Lebukhali, 22.07.2010, M. Sultana, 1797 (DUSH).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: The juice of crushed leaves of this plant is an effective medicine to cure asthma. The Siona Indians of northeastern Ecuador use sap of the plant against stings of the paraponera ant (Croat, 1994).

26. Genus: Typhonium Schott in Wiener Z. Kunst 1829 (3): 732 (1829).

Type (Lectotype) species: *T. trilobatum* (L.) Schott

(*Arum trilobatum* L.; see Nicolson in Taxon 16: 519. 1967).

Very small to medium-sized, seasonally dormant or evergreen herbs, usually with thickened rhizome or tuber, tuber globose, sub-globose or irregular, cataphyll distinct or indistinct. Leaves few to several, petiolar sheath rather short, blade simple, usually cordate-sagittate, sagittate to hastate, trilobed or pedately dissected, rarely linear, narrowly lanceolate, elliptic-oblong or cordate, venation reticulate. Inflorescence solitary, appearing with or without or after the leaves, peduncle shorter than the petiole. Spathe constricted between the tube and the blade, tube usually persistent, convolute, blade incurved, spreading or recurved, widely ovate, ovate to lanceolate, acute to long acuminate, usually green or purplish, marcescent. Spadix sessile, shorter, subequal or longer than the spathe, basal female part with congested male flowers, interstice between the male and the female parts subcylindrical, partly or entirely covered with sterile flowers, upper male part with congested male flowers, rarely with staminodes above, appendix sessile or shortly stipitate, smooth, basically cylindrical, usually long-exserted, sometimes tapered to the apex. Male flowers 1-3 androus but commonly 1-androus, stamens free or sometimes connate, anther subsessile, laterally dehiscent to slits or apically short dehiscent to pores. Female flowers each consisting of a pistil, ovary ovoid, ellipsoid or obovoid, unilocular, ovules 1-3, orthotropous, placenta basal, stigma sessile, discoid-hemispheric. Sterile flowers on interstice capitate, clavate, subulate, or filiform, variously curved. Infructescence usually surrounded by a persistent spathe tube. Fruit usually a berry, ovoid, 1-or rarely 2-seeded, orange-red, green or white. Seed globose to obnapiiform, testa thin, rugulose to smooth, albuminous.

About 37 species distributed throughout tropical south, southeast and east Asia, Malay Archipelago and Australasia (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 9 species.

Key to the species

- | | | |
|----|---|----------------------|
| 1. | Leaves pedate | 2 |
| - | Leaves simple | 3 |
| 2. | Sterile flowers tubular, tip shortly bifurcate | geniculatum |
| - | Sterile flowers filiform | listeri |
| 3. | Spathe with a long slender apical tail | flagelliforme |
| - | Spathe without apical tail | 4 |
| 4. | Base of the appendix expanded forming an oblique cap like structure | cochleare |
| - | Base of the appendix not expanded and not forming an oblique cap like structure | 5 |
| 5. | Male part of the spadix more than 1.4 cm long | 6 |
| - | Male part of the spadix less than 1.1 cm long | gracile |
| 6. | Sterile flowers filiform | 7 |
| - | Sterile flowers not filiform | 8 |
| 7. | Petiole green, staminode yellow | elatum |
| | Petiole purple, staminode white | trilobatum |

- | | | |
|----|--|-------------------|
| 8. | Sterile flowers distinctly papillose,
curved upward | blumei |
| - | Sterile flowers weakly papillose,
curved downward | roxburghii |

98. Typhonium blumei Nicolson & Sivadasan, *Blumea* 27: 494 (1981). A. Hay, *Blumea* 37: 373-375 (1993); Sriboonma *et al.*, *J. Fac. Sci. Univ. Tokyo* 3 (15): 305 (1994); Govaerts & Frodin, *World Checkl. Bibliog. Araceae*: 515 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 91-92 (2007); Heng & Hetterscheid in Heng *et al.*, *Fl. China* 23: 35 (2010). **Photo 75 (Page no. 419).**

Arum trilobatum var. β *auriculatum* Sims, *Bot. Mag.* 49 (1822) t. 2324.

Arum trilobatum auct. *non* L.: Thunb., *Fl. Japon.*: 234 (1784); Curtis, *Bot. Mag.* 10 (1796) t. 339; Lodd. *Bot. Cab.* 6 (1821) t. 516.

Arum divaricatum auct. *non* L.: Roxb. *Hort. Bengal.*: 65 (1814); *Fl. Ind.* 3: 503 (1832); Wight, *Icon. Pl. Ind. Or.* 3: 6, t. 790 (1844).

Typhonium divaricatum auct. *non* Bl., *nom. illegit.*: Bl., *Rumphia* 1 (1837) t. 36A; Schott, *Aroid.* 12 (1855), t. 18; Hook. f., *Fl. Brit. India* 6: 510 (1893-reprint 1954); Engler, *Pflanzenr.* 73 (IV. 23F): 115 (1920); Liu, *Fl. Taiwan* 5: 815 (1978), t. 1530; Li in Wu & Li, *Fl. Reipubl. Pop. Sinic.* 13(2): 3 (1979).

Type: Japan, Buerger and Siebold s.n. (L 898, 90..... 290 holotype, 898, 90-298 isotype).

Bengali / Local name: *Ban Kachu*.

English name: Not known.

Small terrestrial tuberous herb, tuber sub-cylindrical, up to 3 cm long, 2 cm wide. Leaves 2-8, petiole green, 20-35 cm long, 0.4-0.5 cm in diameter, basal 4 cm sheathing, leaf blade simple, membranous, green above, pale green below, usually

ovate-sagittate, occasionally hastate to trilobed, 5-15 × 3.5-10.0 cm, the posterior lobes abruptly narrowing on the inside toward the sinus. Peduncle short, 3-5 × 0.3-0.4 cm, pale green. Spathe 15-38 cm long, lower portion convolute, ellipsoid-ovoid, greenish outside and purplish inside, 1.5-3.5 cm long, spathe blade 13-35 cm long, 4.5 cm broad at the base, spreading and withering, dark purple, abruptly tapering from below the middle, apex usually twisted. Spadix subequalling the spathe, female zone conic, 0.5-0.8 cm long, 0.8 cm broad at the base, sterile portion 1 cm long and covered with densely congested, orange, filiform, erect and slightly curved upward, finely papillose, naked interstice 1.5-3.0 cm long, male zone 1.0-2.8 cm long, 0.4-0.6 cm in diameter, orange, appendix 9.5-29.0 cm long, dark purple, sessile but often unequally somewhat swollen at the base. Inflorescence surrounded by a persistent spathe tube, berry pale green, with several seeds.

Flowering and fruiting period: May-October.

Chromosome number: Not known.

Habitat: Shady hill slopes beside *chhara* in deep rain forests.

Distribution: Bangladesh, East and Southeast Asia.

Specimens examined:

Sherpur: Jhenaigati thana, Rangtia hill, 22.06.2004, Hosne Ara HA 1026 (DACB); Pavel Partha 718 (JUH).

Dhaka: Khilgaon, Tilpapara (Cultivated), 01.05.2005, Hosne Ara HA 1463 (DACB) [Originally collected from Rangtia hill under Sherpur district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

Note: It is a new record for Bangladesh (Bangladesh J. Bot. 34 (2): 115-120, 2005).

99. *Typhonium cochleare* A. Hay, *Blumea* 37: 365-366 (1993). Sriboonma *et al.*, *J. Fac. Sci. Univ. Tokyo* 3 (15): 310 (1994); Govaerts & Frodin, *World Checkl. Bibliog. Araceae*: 515 (2002); Ara in Siddiqui *et al.*, *Encycl. Fl. Fauna Bangladesh* 11: 92-93 (2007). **Photo 76 (Page no. 419).**

Type: Australia, Northern Territory, Kapalga, 13/12/1984, D.L. Jones 1732.

Bengali / Local name: *Tin patar Kachu*.

English name: Not known.

Cormous herb, corm sub-globose, up to 2 cm wide. Leaves simple, 5-8 together, petiole 18-30 cm long, 0.3-0.5 cm wide at the base, elliptic to hastate to very deeply and narrowly trilobed, with the anterior lobe c 10-16 × 5-7 cm and the posterior lobes c 9.5-14.0 × 3.5-5.5 cm, primary lateral veins 5. Peduncle 3-7 cm long, 0.5 cm in diameter. Spathe 15-28 cm long, lower portion ovoid, rather thick-walled, 2.0-2.5 cm long, blade long-acuminate, spreading below, twisted above, 13-26 cm long, 2-3 cm wide at the base, brownish-purple outside and dark purple inside. Spadix exceeding the spathe, 7-30 cm long, basal female zone conic, 0.5 cm long and 0.6 cm in diameter at the base, then a 0.5 cm long and 1 cm diameter zone of very fine, crowded and yellow sterile organs, then a 1.7 cm long and 0.2 cm diameter longitudinally ridged, naked interstice, male zone 0.8-1.0 cm long, 0.4 cm in diameter, coral-pink. Appendix very slender and attenuate, stipe short, 26 cm long, dark purple, base of the appendix expanded forming an oblique cap like structure, spathe base persistent in the fruit.

Flowering and fruiting period: May-October.

Chromosome number: Not known.

Habitat: Shady and stony hill slopes, adjacent to *chhara* in deep rain forests.

Distribution: Bangladesh, Northern territories of Australia.

Specimens examined:

Sherpur: Ghenaigati thana, Rangtia hill, 22.06.2004, Hosne Ara HA 1030 (DACB); Pavel Partha 719 (JUH).

Dhaka: Khilgaon, Tilpapara (Cultivated), 05.05.2005, Hosne Ara HA 1464 (DACB) [Originally collected from Rangtia hill under Sherpur district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

(Photo 75) 419

Note: It is a new record for the Flora of Bangladesh (Bangladesh J. Bot. 34 (2): 115-120, 2005).

100. *Typhonium elatum* H. Ara & M.A. Hassan, sp. nov. Photo. 77 (Page no. 422).

Typhonium elatum H. Ara & M.A. Hassan differs from its closely related species

Typhonium trilobatum (L.) Schott by the (i) petiole length, (ii) peduncle colour, (iii) shape of spathe, (iv) base of appendix and (v) chromosome characters.

Holotype: Bangladesh, Sherpur district, Samaschura beat, 10.10.2003, Hosne Ara HA 701 (DACB).

Tuber c 5 cm long, c 4 cm in diameter, developing several offsets. Leaf paired; petioles to 50-64 cm long, c 1 cm in diameter, pale green. Leaf blade usually deeply trilobed, anterior lobe elliptic lanceolate, to c 25 cm long, c 13 cm in diameter, posterior lobe c 19.5 cm long, c 9 cm in diameter, bright pale green. Inflorescence paired. Peduncle c 10 cm long, c 0.8 cm in diameter, pale green. Spathe c 40 cm long, tube and blade separated by a strong constriction; tube c 3.5 cm long, outside pale green, inside glossy dark purple; blade c 36.5 cm long, outside pale green, inside glossy dark purple. Spadix shorter than spathe, c 29 cm long; female part c 0.8 cm long, c 0.8 cm in diameter, flowers congested; sterile part between female and male parts 2.7-4.0 cm long, the lower 0.5-2.2 cm with yellow staminodes, the remainder naked, light pink, longitudinally grooved; male part cylindrical, c 1.8 cm long, c 1 cm in diameter, base and top oblique, flowers congested; appendix very shortly stipitate, narrow lanceolate, 20-24 cm long, c 1 cm in diameter at the base, top acute, base multifurcate, with surface shallowly, irregularly furrowed, dark purple, producing a strong unpleasant smell at female anthesis. Ovaries elongate, cylindric, c 1.5 mm long, 1.1-1.2 mm in diameter, white with a faint pinkish flush near the top, unilocular, with one basal ovules; stigma sessile, depressed, hemispheric, c 0.8 mm in diameter, c 0.2 mm high, papillose, pink. Stamens 0.6-0.9 mm long, light pinkish. Staminodes filiform, c 1.6 cm long, c 0.5 mm in diameter, dark yellowish, curled. Fruit not observed, usually die before fruit formation.

Flowering and fruiting period: Flowering was observed in March to October.

Chromosome number: $2n = 18$ (Huq *et al.* 2007).

Habiyat: Grows on the hilly area as under growth.

Distribution: Central parts of Bangladesh (Sherpur district).

Specimen examined:

Sherpur: Samaschura beat, 10.10.2003, Hosne Ara. HA 701 (DACB); *ibid*, 23.06.2004, Hosne Ara HA 1060 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 02.07.2015, Hosne Ara HA 2889 (DACB) [Originally collected from Samaschura beat under Sherpur district].

Etymology: The species is named after tallness of its habit.

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

The major morphological and cytological differences between two taxa of *Typhonium* Schott are outlined in Table-6.8.

Table 6.8. **Morphological and cytological comparison of *Typhonium elatum* H. Ara & M.A. Hassan, sp. nov. with *Typhonium trilobatum* (L.) Schott**

Characters	<i>Typhonium elatum</i> H. Ara & M.A. Hassan	<i>Typhonium trilobatum</i> (L.) Schott
Petiole	green, not less than 50 cm long	purple, not more than 45 cm long
Leaf shape	elliptic lanceolate	ovate, ovate-lanceolate
Peduncle	light green	purple
Spathe	c 40 cm long, narrow lanceolate	15-18 cm long, ovate to broadly ovate
Spadix length	c 29 cm long	c 13.5 cm long
Appendix	base of the appendix multifurcate	base of the appendix truncate
Staminodes	yellow	white

(Photo 77) 422

Characters	<i>Typhonium elatum</i> H. Ara & M.A. Hassan	<i>Typhonium trilobatum</i> (L.) Schott
Ovary	c 1.5 mm long, c 1.2 mm in diameter, white with a faint pinkish flush near the top	c 1.0 mm long, c 0.7 mm in diameter, cream colour
Chromosome number	18 (12m + 6sm)	18 (16m + 2sm)
Satellite and DAPI	satellite 2, DAPI band 5	no satellite, DAPI band 3

m = metacentric chromosome, sm = submetacentric chromosome.

Note : Although the two species bear same chromosome number, they differ by the position of centromere, presence or absence of satellite and DAPI characters.

101. *Typhonium flagelliforme* (Lodd.) Blume, Rumphia 1: 134 (1837). Kunth, Enum. Pl. 3: 26 (1841); Schott, Aroideae: 12 (1853); Syn. Aroid.: 19 (1856); Prodr. Syst. Aroid.: 106 (1860); Engler, Pflanzenr. 73 (IV. 23F): 112 (1920); Fischer in Gamble, Fl. Pres. Madras, 3: 1100 (1931- reprint 1967); Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 22 (1931); Mitra, Fl. Pl. E. India 1: 84 (1958); Bennet, Fl. Howrah Dist.: 94 (1979); Nicolson & Sivadasan, Blumea 27: 489-492 (1981); Bakshi, Fl. Murshidabad Dist.: 339 (1984); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 65-66 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 15 (1989); A. Hay, Blumea 37: 349-351 (1993); Sriboonma, *et al.*, J. Fac. Sci. Univ. Tokyo 3 (15): 303-304 (1994); Sookchaloem, Thai For. Bull. (Bot.) 23: 24-25 (1995); A. Hay *et al.*, Blumea Supplement 8: 158 (1995); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 516 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 93 (2007); Heng & Hetterscheid in Heng *et al.*, Fl. China 23: 35 (2010). **Photo 78. (Page no. 425).**

Arum flagelliforme Lodd., Bot. Cab. 4: t. 396 (1819).

Typhonium cuspidatum (Blume) Decne, Herb. Timor in Ann. Hist. Nat. 3: 39 (1834); Hook. f., Fl. Brit. India 6: 511-512 (1893-reprint 1954); Prain, Beng. Pl. 2: 1108 (1903-reprint 1981); Cooke, Fl. Pres. Bombay 2: 823 (1908); Ridley, Fl. Malay

Peninsula: 91 (1925); Datta & Mitra, Bull. Bot. Soc. Beng. 7 (1 & 2): 101 (1953).

Type: Lodd., Bot. Cab. 4: t. 396 (1819).

Bengali / Local name: *Ghechu*.

English name: Not known.

Small tuberous or cormous herb, tuber or corm depressed-globose, up to 2 cm wide. Leaves petiolate, petiole 10-30 cm long, distinctly sheathing in lower 2/3 parts, leaf blade extremely variable, typically narrowly hastate with spreading basal lobes but sometimes elliptic, dull mid-green above, paler below, anterior lobe 6-25 cm long, 1-5 cm wide, posterior lobes horizontally spreading, 4-5 cm long, 3-5 mm wide. Peduncle 10-12 cm long, slender. Spathe basically greenish-white and pinkish, tube ovate, longitudinally keeled, 1.5-3.5 cm long, blade narrowly triangular-lanceolate, 10-25 cm long, sometimes long acuminate, recurved or coiled, greenish abaxially, purplish-brown to white adaxially. Spadix as long as the spathe. Female part c 5 mm long, interstice c 2 cm long, covered with sterile flowers up to the male part. Male part c 5 mm long, appendix narrowly conical, subsessile, greenish-yellow, up to 20 cm long, deeply ridged and channelled, usually tapering from the base. Sterile flowers dimorphic, on the lower part of the interstice spatulate, incurved, dark or purple tipped, c 6 mm long, but those on the upper part smaller, filiform and spreading to deflexing. Inflorescence surrounded by persistent spathe tube.

Flowering and fruiting period: April-October.

Chromosome number: $2n = 14, 16, 50$ (Petersen, 1989).

Habitat: Shady and moist areas.

Distribution: Bangladesh, Indo-China, Tropical Asia, East Malesia to Australia (Queensland).

Specimens examined:

Barisal: Usirpur thana, Mandapasha village, 15.04.2004, Hosne Ara HA 716 (DACB).

(Photo 78) 425

Bogra: Dhunot Upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2799 (DACB).

Dhaka: Locality unknown, 19.05.1872, C.B. Clarke 17085 (BM); Munshiganj, Rampal, 28.05.1977, Huq & Rahman H 3359 (DACB); Postogola, 04.10.1956, Abdul Ghani 27 (CAL, DUSH); Savar Bank Town, 16.05.2003, Hosne Ara HA 317 (DACB); Savar, 15.04.2004, Hosne Ara HA 715 (DACB); Savar, 26.05.2012, Hosne Ara HA 2810 (DACB); Khigaon, Tilpapara (Cultivated), 22.09.2015, Hosne Ara HA 2900 (DACB) [Originally collected from Savar under Dhaka district].

Dinajpur: Fultala, 19.08.2005, Hosne Ara HA 2179 (DACB).

Gazipur: Tetupara road, Baropaiha, 25.7.2004, Hosne Ara HA 1085 (DACB); Kaliakair, 19.08.2005, Hosne Ara HA 2209 (DACB).

Jessore: Jhikorgacha-Mallikpur, 02.09.1983, Huq, Mia & Mahbuba H 6143 (DACB); Keshabpur, 30.08.1983, Huq, Mia & Mahbuba H 5992 (DACB); Jessore town area, 26.05.2012, Hosne Ara HA 2837 (DACB).

Kurigram: Baruitari village, 24.08.2013, Hosne Ara HA 2858 (DACB).

Magura: Magura area, 26.05.2012, Hosne Ara HA 2832 (DACB).

Manikganj: Manikganj area, 26.05.2012, Hosne Ara HA 2818 (DACB).

Mymensingh: Mymensingh, 25.01.1973, Md. Quamrul Islam 28 (DUSH).

Narayanganj: Deobhag, 14.09.1973, A.M. Huq 1096 (DACB).

Sirajganj: Kazipur upazilla to Charkhadah village, 18.03.2011, Hosne Ara HA 2788 (DACB).

Tangail: Mirzapur, 19.08.2005, Hosne Ara HA 2199 (DACB).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: The tuber of the plant possesses medicinal value and is used for the treatment of cough, phlegm and chronic bronchitis. The same is crushed and turned into a paste and then applied externally on the human body to cure traumatic injury and abscesses (Heng, 1979).

102. *Typhonium geniculatum* H. Ara & M.A. Hassan, sp. nov. Photo 79 (Page no. 429-430).

Typhonium geniculatum H. Ara & M.A. Hassan is closely related to *Typhonium listeri* Prain but can be readily differentiated by the (i) number of cataphyll, (ii) peduncle length and colour and (iii) sterile flower characters.

Holotype: Bangladesh, Moulvibazar district, Muraichhara beat, Eowlachhara forest, 12.03.2011, Hosne Ara HA 2778 (DACB).

Tuber 2.8 - 6.5 cm in diameter, 1.5-3.5 cm high, subglobose, surface irregular. Petiole 12-60 cm long, 0.3-2.0 cm in diameter, at the base, pale green, 1.5-2.5 cm long furrow at the base. Leaf solitary or paired; leaf-blade simple to pedately 3-7 dissected; leaflets sessile, elliptic to elliptic lanceolate, apex acute, margin entire; lateral leaflets gradually decrease in size; terminal leaflet 16-33 cm long, 5.0-11.8 cm in diameter, outermost leaflet 8-22 cm long, 3-8 cm in diameter, bright green upper, pale green lower, cataphylls 3, the innermost one, largest, to c 17 cm long, c 4 cm diameter, at the base. Peduncle 2.5-15.0 cm long, 0.8-1.0 cm in diameter, whitish. Spathe elongate, elliptic, 16-17 cm long, 7-8 cm in diameter, tube and blade separated by a strong constriction, tube base ovate, 2.0-2.5 cm long, 2.0-2.5 cm in diameter, outside pale green, smooth, inside glossy dark purple, smooth, upwards near the constriction turning pale green; blade 10-15 cm long, acute, outside smooth, glossy pale green with a purple flush, inside smooth, dark purple, near the base pale green. Spadix longer than spathe, 12-18 cm long; female part conical, 0.8-1.3 cm long, 1.0-1.5 cm in diameter, flowers congested; sterile part between female and male part 0.7-1.5 cm long, the lower 0.3-0.5 cm with staminodes, dark maroon in colour, tip shortly bifurcate, the remainder naked, light orange, multi-lobed. Male part cylindrical, 1.3-1.9 cm long, 0.8-1.1 cm in diameter, flowers congested, light maroon in colour. Appendix stipitate, stipe c 0.5 cm long, c 0.5 cm in diameter, geniculate, elongate, cylindric-conical, 8-15 cm long, 1.0-1.1 cm in diameter, at the base, base surface shallowly, irregularly furrowed, light yellow. Ovaries elongate, cylindric, c 2 mm long, 1.0-1.5 mm in diameter, whitish yellow, unilocular, with one or two basal ovules; stigma not sessile, style c 0.04 mm long, c 0.5 mm in diameter, orange. Stigma divided into two or three lobes, 0.1-15.0 mm in diameter, 0.01-0.02 mm high,

yellow. Stamens 0.05-0.1 mm long, 0.08-0.10 mm in diameter, light maroon. Staminodes straight or slightly curved, c 1 cm long, 2.0-2.5 mm in diameter, dark purple, acute or subacute, tip shortly bifurcate. Infructescence surrounded by persistent spathe tube. Mature infructescence 3-6 cm long, 2.5-3.5 cm in diameter, outside and inside dark purplish. Ovaries elongate cylindric, 5-8 mm long, 2-4 mm in diameter, green.

Flowering and fruiting period: Flowering was observed in March to April; fruiting in May to June.

Chromosome number: $2n = 27$ (Worked out in Cytogenetics Lab., DU: perhaps triploid).

Habitat: Grows on the hill slopes as under growth.

Distribution: North-Eastern part of Bangladesh, Moulvibazar district (within greater Sylhet).

Specimens examined:

Moulvibazar: Madhabkundo forest, 20.05.2005, Hosne Ara HA 1701 (DACB); *ibid*, 06.07.2005, Hosne Ara HA 1823 (DACB); Muraichara beat, Veluachhara forest, 18.05.2008, Hosne Ara HA 2743 (DACB); Aowlachara forest, 08.05.2010, Hosne Ara HA 2771 (DACB); *ibid*, 12.03.2011, Hosne Ara HA 2778 (DACB).

Dhaka: Bangladesh National Herbarium garden (Cultivated), 05.03.2011, Hosne Ara HA 2777 (DACB) [Originally collected from Aowlachara forest under Moulvibazar district].

Etymology: The species is named after its geniculate character of appendix.

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

The major morphological differences between three taxa of *Typhonium* Schott are outlined in Table-6.9.

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Table 6.9. **Morphological comparison of *Typhonium geniculatum* H. Ara & M.A. Hassan, sp. nov. with *Typhonium listeri* Prain**

Characters	<i>Typhonium geniculatum</i> H. Ara & M.A. Hassan	<i>Typhonium listeri</i> Prain
Number of cataphyll	3	more than 3
Peduncle length and colour	2.5-15 cm long, whitish	1-2 cm long and purplish
Interstice	Sterile flowers deep maroon colour, tubular, tip shortly bifurcate	Sterile flowers filiform and reflexed
Stigma	tripartite	not clear from the type specimen. In type description nothing mentioned about stigma character

Note: The taxa also differs from another related species, *Typhonium hirsutum* (S.Y. Hu) J. Murata *et* Mayo (not found in Bangladesh) by the number of cataphyll (3, not 4-5), glabrous spathe (not hirsute), shape of stigma (tripartite, not disc shaped) and infructescence surrounded by persistent spathe tube (not exposed).

103. *Typhonium gracile* (Roxb.) Schott, Aroideae 1: 12 (1855); Prodr. Syst. Aroid.: 108 (1860). Hook. f., Fl. Brit. India 6: 512 (1893-reprint 1954); Engler, Pflanzenr. 73 (IV. 23F): 120 (1920); Mitra, Fl. Pl. E. India 1: 84 (1958); Rao & Verma, Bull. Bot. Surv. India 18 (1-4): 20 (1976); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 15 (1989); Sriboonma *et al.*, J. Fac. Sci. Univ. Tokyo 3 (15): 308 (1994); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 516 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 93-94 (2007). **Photo 82 (Page no. 436).**

Arum gracile Roxb., Hort. Bengal.: 651 (1814); Fl. Ind. ed. 3: 505 (1832); Wight, Icon. Pl. Ind. Or. 3: 793 (1843).

Arisaema gracile (Roxb.) Kunth, Enum. Pl. 3: 21 (1841).

Type: Rheede, Hort. Malabar. 11: t. 21 (1692).

Bengali / Local name: *Ban Kachu*.

English name: Not known.

Terrestrial small tuberous herb, tuber sub-globose, 1-2 cm wide. Leaves simple, solitary or few, petiole 20-30 cm long, blade trifoliolate to imperfectly 5-lobed, rachis between terminal leaflet and adjacent lateral one 5-12 mm long, leaflets elliptic, 7-10 × 2.5-5.0 cm, apex acuminate. Peduncle solitary, slender, short, up to 5 cm long. Spathe tube ovoid-oblong, 2-3 × 1.0-1.3 cm, blade linear-lanceolate, 10-20 × 1.5-2.0 cm at the base. Spadix equal to the spathe. Female part c less than 11mm long, mm long, interstice c 2 cm long, covered with sterile flowers at the base, naked above. Male parts 5 mm long, appendix sub-sessile, 15 cm long or longer, up to 2 mm thick at the base, narrowed to a filiform tip. Sterile flowers filiform, slender, 5-6 mm long, curled, yellow.

Flowering and fruiting period: April-October.

Chromosome number: Not known.

Habitat: Shady and moist places of hill slopes and at the foothills.

Distribution: Bangladesh, Khasia Hills in India.

Specimens examined:

East Bengal: Bangladesh, Locality, Collection date & year unknown, Griffith 6000 (CAL).

Sherpur: Gajni forest, Gandhagaon, 05.05.1982, Mia *et al.* M 735 (DACB); 06.05.1982, Mia *et al.* M 785 (DACB); Rangtia Range, Gazni beat, 09.10.2003, Hosne Ara HA 638 (DACB); Rangtia range, Samaschura beat, 10.10.2003, Hosne Ara HA 674 (DACB); Ghenaigathi thana, 21.06.2004, Hosne Ara HA 917 (DACB); Gazni beat, 21.06.2004, Hosne Ara HA 925 (DACB); Rangtia hill, 22.06.2004, Hosne Ara HA 1033 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 02.07.2015, Hosne Ara HA 2890 (DACB) [Originally collected from Rangtia range, Gazni beat under Sherpur district].

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

104. *Typhonium listeri* Prain, J. Asiat. Soc. Beng. 64: 304 (1895). Prain, Beng. Pl. 2: 1107 (1903-reprint 1981); Engler, Pflanzenr. 73 (IV. 23F): 120 (1920); Heinig, List Chittagong: 74 (1925); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 15 (1989); Mitra, Fl. Pl. E. India 1: 83 (1958); Naithani, Fl. Pl. India, Nepal & Bhutan: 455 (1990); Sriboonma *et al.*, J. Fac. Sci. Univ. Tokyo 3 (15): 294 (1994); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 517 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 94 (2007). **Photo 80 (Page no. 430).**

Type: Myanmar, Chittagong, Lister 335 (CAL syntype); India, Assam, Watt s.n. (CAL syntype).

Bengali / Local name: Not available.

English name: Not known.

A tuberous herb, tuber 2.5-3.5 cm wide, cataphylls more than 3, triangular-ovate, up to 5 cm long, surrounding flowering shoot. Leaf 1, petiole 25-30 cm long, leaf blade completely pedate, 5-foliolate, all leaflets about the same size, up to 15 cm long, 4-6 cm wide, oblong-lanceolate to lanceolate, apex acuminate, base cuneate, petiole c 1 cm long. Peduncle 1-2 cm long, purple, shorter than the petiole. Spathe constricted between the tube and the blade, tube usually persistent, c 2.5 × c 1.5 cm, oblong-ovoid, apex acute, light green outside, blade abruptly reflexed at the base, 16-22 × 5-9 cm, ovate, light green outside with purple margin, purplish inside, marcescent. Spadix with female part 8 mm long, 12 mm wide at the base, male part 15 × 7 mm, interstice c 1 cm long with filiform and reflexed, sterile flowers c 5 mm long, appendix c 11 cm long, narrowly conical, abruptly narrowed to the base.

Flowering and fruiting period: No reports available.

Chromosome number: Not known.

Habitat: Moist, shady places in rain forests.

Distribution: Bangladesh, Myanmar and India.

Specimen examined:

Chittagong Hill Tracts: Locality & Collection number unknown, 1876, J.L. Lister (CAL).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: Not known.

105. *Typhonium roxburghii* Schott, Aroid. 1: 12 (1855) excl. t. 17; Syn Aroid. 18 (1856); Prodr. Syst. Aroid. 106 (1860). Hook. f., Fl. Brit. India 6: 510 (1893-reprint 1954); Trimen, Handb. Fl. Ceylon 4: 353 (1898); Prain, Beng. Pl. 2: 1108 (1903-reprint 1981); Engler, Pflanzenr. 73 (IV. 23F): 119 (1920); Ridley, Fl. Malay Peninsula: 90-91 (1925); Mitra, Fl. Pl. E. India 1: 84 (1958); Nicolson & Sivadasan, Blumea 27: 492-494 (1981); Mayo, Fl. Trop. E. Africa: 6 (1985); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 66-67 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 15 (1989); A. Hay, Blumea 37 (2): 373 (1993); Sriboonma *et al.*, J. Fac. Sci. Univ. Tokyo 3 (15): 305 (1994); A. Hay *et al.*, Blumea Supplement 8: 160 (1995); Sookchaloem, Thai For. Bull. (Bot.) 23: 34-36 (1995); Deshpande *et al.*, Fl. Mahabaleshwar Adjoin., Maharashtra: 618-619 (1995); Govaerts & Frodin, World Checkl. Bibliog. Arareae: 518 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 95 (2007); Heng & Hetterscheid in Heng *et al.*, Fl. China 23: 36 (2010). **Photo 83 (Page no. 436).**

Arum trilobatum sensu Roxburgh, Hort. Beng. 65 (1814), non
Linnaeus (1753); Fl. Ind. 3: 505 (1832); Wight, Icon Pl. Ind.
Or. 3: 7, t. 803 (1844).

Arum diversifolium Blume, Catal. 102 (1823), non *Typhonium
diversifolium* Wall. ex Schott (1855).

Arum divaricatum sensu Moon, Cat. 64 (1824), non Linnaeus
(1753).

Typhonium divericatum Blume in Decne., Nouv. Ann. Mus. Hist.
Nat. Paris. 3: 367 (1834), *nom. illeg.* (incl. type of *Arum
diversifolium* Blume (1823)).

Arum roxburghii (Schott) Thw., Enum. Pl. Zeyl. 432 (1864).

Typhonium divericatum var. *roxburghii* (Schott) Engler in DC.,
Monogr. Phan. 2: 612 (1879).

Typhonium motleyanun Schott, Prodr. 106 (1860); Hook. f., Fl.
Brit. India 6: 510 (1893-reprint 1954).

Typhonium schottii Prain, J. Asiat. Soc. Beng. 67: 303 (1878),
Beng. Pl. 2: 1108 (1903-reprint 1981).

Typhinum trilobatum var. *schottii* (Prain) Engler, Pflanzenr. 73
(IV. 23F): 118 (1920).

Typhonium amboinense Blatter & McCann, J. Bombay Nat.
Hist. Soc. 35: 23 (1931), *nom. illeg.* (incl. type of *T.*
roxburghii Schott, 1855).

Typhonium trilobatum auct., non (L.) Schott (1829); Backer &
Bakhuizen van den Brink, Fl. Java 3: 123 (1968).

Lectotype: Ceylon, Thwaites, C.P. 3764 (K), basis of Schott's t. 17; dupl. (BM, PDA),
vide Nicolson and Sivadasan, Blumea 27: 492 (1981).

Bengali / Local name: *Ban Kachu*.

English name: Voodoo lily.

Terrestrial small tuberous herb, tuber sub-globose, up to 3.5 cm wide, rooting at top. Leaves petiolate, petiole up to 30 cm long, basal part sheathing in the lower third, leaf blade shallowly to deeply 3-lobed, lobes ovate to ovate-lanceolate, anterior lobe 6-12 cm long, posterior lobes smaller. Inflorescence on a short peduncle, usually up to 4 cm long. Spathe 10-17 (-22) cm long, tube oblong, 2-3 cm long, spathe blade ovate to ovate-lanceolate, long acuminate, dark red to purple inside, abruptly tapering from below the middle, usually twisting at the tip, withering. Spadix as long as the spathe. Female part c 5 mm long, pink, interstice 2.0-2.5 cm long, covered with sterile flowers in the lower 5-10 mm, naked above. Male part 7 (-12) mm long, appendix narrowly conical, 8-15 cm long, with stipe of 1 cm long, dark purple, male flowers

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coral pink. Sterile flowers weakly papillose, yellowish to reddish, c 5 mm long, curved downward. Spathe base persistent in the infructescence. Fruit a berry, 1-2 seeded.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 52$ (Petersen, 1989).

Habitat: Shady and moist hill slopes.

Distribution: Bangladesh, South India, Sri Lanka, south and central Malaysia. Introduced into northeast India, Luzon, East Africa (Zanzibar) and Neotropics (Brazil).

Specimens examined:

Chittagong: Joy pahar, Sarsan road, 30.04.1998, Rahman's collector, Rashid 2841B (HCU).

Bandarban: Keochia, Chimbuk, 08.09.1999, Boyce, Toha & Rahman 5764 (HCU, K).

Economic uses/values/harmful aspects: Not known.

Ethnobotanical information: The tuber of the plant is taken along with bananas to serve as a medicine for rheumatism.

106. *Typhonium trilobatum* (L.) Schott in Weiner, *Kunst.* 3: 72 (1829). Schott, *Aroideae* 1 (1853); *Syn. Aroid.* 18 91856); *Prodr. Syst. Aroid.* 108 (1860); Kunth, *Enum. Pl.* 3: 26 (1841); Hook. f., *Fl. Brit. India* 6: 509-510 (1893-reprint 1954); Prain, *Beng. Pl.* 2: 1107 (1903-reprint 1981); Engler, *Pflanzenr.* 73 (IV-23F): 117-119 (1920); Haines, *Bot. Bihar and Orissa:* 865 (1924-reprint 1978); Heinig, *List Chittagong:* 74 (1925); Fischer in Gamble, *Fl. Pres. Madras* 3: 1100 (1931-reprint 1967); Blatter & McCann, *J. Bombay Nat. Hist. Soc.* 35: 22-23 (1931); Ridley, *Fl. Malay Peninsula:* 90 (1945); Datta & Mitra, *Bull. Bot. Soc. Beng.* 7 (1 & 2): 101 (1953); Mitra, *Fl. Pl. E. India* 1: 83 (1958); Hu, *Dansk Bot. Arkiv* 23 (4): 450 (1968); Rao & Verma, *Bull. Bot. Surv. India* 18 (1-4): 19 (1976); Hara *et al.*, *Enum. Fl. Pl. Nepal* 1: 92 (1978); Bennet, *Fl. Howrah Dist.:* 94-95 (1979); Nicolson & Sivadasan, *Blumea* 27: 488-489 (1981); Deb, *Fl. Tripura State* 2: 406 (1983); Bakshi, *Fl.*

Murshidabad Dist.: 339 (1984); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 67-69 (1987); Karthikeyan *et al.*, Fl. India Enum. in Fl. India ser. 4: 15 (1989); Parmar in Shetty & Singh, Fl. Rajasthan 3: 869 (1993); Sriboonma *et al.*, J. Fac. Sci. Univ. Tokyo 3 (15): 306 (1994); Sookchaloem, Thai For. Bull. (Bot.) 23: 37-38 (1995); Saxena & Brahmam, Fl. Orissa 4: 2054 (1996); Hajra & Verma, Fl. Sikim 1: 195 (1996); Pullaiah, Fl. Andra Pradesh 3: 1029-1030 (1997); Bhattacharyya & Sarkar, Fl. W. Champaran Dist. Bihar: 405 (1998); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 519 (2002); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 95-96 (2007); Heng & Hettterscheid in Heng *et al.*, Fl. China 23: 36 (2010).

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Arum trilobatum L., Sp. Pl. 965 (1753); Curtis, Bot. Mag. 10: t. 339 (1796); Wight, Icon. Pl. Ind. Or. 3: 7, t. 803 (1844); Roxb., Fl. Ind. 3: 505 (ed. 2, 1832).

Arum orixense Roxb. *ex* Andrew, Bot. Reposit. 5: t. 356 (1804) ('orixensis'); Roxb., Fl. Ind. 3: 503 (1832); Wight, Icon. Pl. Ind. Or. 3: 6, t. 801 (1844).

Typhonium orixense (Andr.) Schott, Wiener Z. Kunst 1829: 732 (1829).

Type: Sri Lanka, Herm. Icon. 177.

Key to the varieties

- | | | |
|----|---|-------------------|
| 1. | Tip of the spathe twisted, base of the appendix crenulate or multifurcate, stigma light yellowish cream | fulvus |
| - | Tip of the spathe not twisted, base of the appendix truncate, stigma purple | trilobatum |

var. **trilobatum**

Bengali / Local name: *Ghet kachu, Ghekul.*

English name: Not known.

Small tuberous terrestrial herb, tuber sub-globose, sub-cylindric, up to 5 cm wide. Leaves simple, petiolate, petiole up to 25-40 cm long, purple, sheathing at the basal part, leaf blade usually deeply trilobed, united for about 1/4-1/3 of the length of the anterior lobe, anterior lobe ovate to lanceolate-ovate, up to 20 cm long, 10 cm wide, posterior lobe slightly smaller than anterior lobe. Peduncle slender, up to 5 cm long, elongating somewhat in fruit. Spathe 15-18 cm long, tube elliptic, persistent, greenish outside and purplish inside, 2-5 cm long, spathe blade dark red inside, greenish outside, ovate to broadly ovate, gradually tapering from the middle, acuminate, 15 × 5-9 cm, spreading and soon withering. Spadix erect, several cm shorter than the spathe, female part c 1 cm long, pinkish, interstice 1-2 cm long, densely covered with sterile flowers in the lower part, upper 1.0-2.5 cm naked, male part 2-3 cm long, pink, appendix dark red, narrowly conical, 5-10 cm long, base truncate, with 0.5 cm long stipe. Male flowers pink with coral-coloured pollen. Sterile flowers filiform, whitish, curled, 1 cm long. Inflorescence surrounded by the persistent spathe tube.

Flowering and fruiting period: April-October.

Chromosome number: $2n = 18$ (Kumar and Subramaniam, 1986).

Habitat: Damp moist places.

Distribution: Bangladesh, from Nepal to southeast China, north Malaysia and Sri Lanka. Introduced in the Philippines, West Borneo, Singapore, West Africa (Ivory Coast) and the Neotropics.

Specimens examined:

Bandarban: Locality, Collection number & year unknown, J. Ilwood, 1890 (CAL); Locality unknown, 03.05.1977, A.M. Huq 3353 (DACB); Keochia, Chimbuk, 08.09.1999, Boyce, Toha & Rahman 5763 (HCU, K).

Barisal: Rajapur, 18.05.1979, Sh-202 (DACB).

Bengal: Locality, Collection date, year & number unknown, J.D. Hooker & Thomson (K).

Bogra: Beltola, 18.03.2001, Rezia Khatun RK 2876 (DACB); Shibgonj area, 19.08.2005, Hosne Ara HA 2184 (DACB); Dhunot Upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2798 (DACB).

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Chittagong Hill Tracts: Locality, Collection date & number unknown, 1880, J.J. Wood (CAL).

Comilla: Jashpur, 26.09.2004, Hosne Ara HA 1390 (DACB).

Dhaka: Dhaka Station, 11.10.1868, C.B. Clarke (CAL); 19.05.1872, C.B. Clarke 17082 (K); Purana Palton, 22.05.1946, Sukdev, Collection number unknown (DUSH); Dhaka, June 1952, P. Sensarme, Collection number unknown (DUSH); 30.06.1960, A Mozmader 213 (DUSH); Kurmitola, 22.04.1964, G. Hussain 147 (DUSH); Dhaka University Botanical garden, 26.05.1965, A Malek 102 (DUSH); Savar, 05.05.1968, Mozahar 111 (DUSH); 05.05.1968, A. Hassan 45 (DUSH); Balda garden, 25.05.1969, Moiz 141 (DUSH); 25.05.1969, M.H. Rahman 130 (DUSH); Savar, 19.04.1970, M.A. Rahman 84 (DUSH); Dhaka High Court, 18.07.1970, Nazim 238 (DUSH); Farmgate, 16.04.1988, Momtaz Begum (DACB); Dhaka University Botanical garden, Curzon Hall, 04.06.1999, B.M. Rezia Khatun 1817 (DACB); Fakirapul, Md. Akhtar Hossain, Collection date & number unknown (DUSH); Savar, 26.05.2012, Hosne Ara HA 2809a (DACB); Khilgaon, Tilpapara (Cultivated), 04.07.015, Hosne Ara HA 2891 (DACB) [Originally collected from Lawachara reserve forest under Moulvibazar district].

Dinajpur: Singra forest, 18.08.2005, Hosne Ara HA 2070 (DACB); Near Birgonj Sal forest, 18.08.2005, Hosne Ara HA 2131 (DACB); Fultala, 19.08.2005, Hosne Ara HA 2178 (DACB).

Faridpur: Near Goalandaghat, 01.07.1973, A.M. Huq 1025 (DACB); Goalando, 16.06.1981, Mia, Huq, Halim & Begum H. 526 (DACB).

Gazipur: Joydebpur, 02.08.1969, M.M.R. Bhuiyan 140 (DUSH); Tetupara Road, Baropaiha, 25.07.2004, Hosne Ara HA 1084 (DACB); Kaliakair, 19.08.2005, Hosne Ara HA 2207 (DACB); Rajendrapur, 04.12.2009, M. Khatun 554 (DUSH).

Habiganj: Kalenga beat, Kalenga, 06.03.2003, Hosne Ara HA 314 (DACB); 16.05.2005, Hosne Ara HA 1540 (DACB); Satchari, 17.05.2005, Hosne Ara HA 1576 (DACB).

Jessore: Jessore town area, 26.05.2012, Hosne Ara HA 2836 (DACB).

Khagrachari: Pathachara, 11.09.2006, Rafiqul Islam 323 (DUSH).

Kurigram: Singhimari village, 20.05.2013, Hosne Ara HA 2845 (DACB); Baruitari village, 24.08.2013, Hosne Ara HA 2857 (DACB).

Kushtia: Meherpur-Baradi, Koolpala, 10.06.1974, Khan & Huq K 3887 (DACB).

Lower Bengal: Locality & Collection number unknown, 04.06.1896, Seed house mallies (CAL); Locality & Collection number unknown, July 1962, S. Kurz (CAL).

Magura: Magura area, 26.05.2012, Hosne Ara HA 2831 (DACB).

Manikganj: Manikganj road, near Manikganj, 12.11.1975, Huq, Rahman & Mia H 1474 (DACB); Near Nayarhat Ceramic factory, 28.08.1977, Khan & Rahman K 4539 (DACB); Manikganj, 09.06.1981, Huq & Mia H 5167 (DACB); Manikganj area, 26.05.2012, Hosne Ara HA 2817 (DACB).

Moulvibazar: Sreemangal, Lawachara reserve forest, 15.05.2005, Hosne Ara HA 1496 (DACB); Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1629, 1620 (DACB); Muraichara, 19.05.2005, Hosne Ara HA 1677 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1721 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1749 (DACB); Madhabkundo, 06.07.2005, Hosne Ara HA 1825 (DACB).

Mymensingh: Haluaghat thana, Koroitoli, 20.06.2004, Hosne Ara HA 910 (DACB).

Narshingdi: Narshingdi Sadar, 07.07.2005, Hosne Ara HA 1888 (DACB).

Narayanganj: Sonargaon, 07.07.2005, Hosne Ara HA 1918 (DACB); Sonargaon, 07.07.2005, Hosne Ara HA 1918 (DACB).

Netrakona: Durgapur thana, Bijoypur, 16.06.2004, Hosne Ara HA 752 (DACB); Attrakhali, 17.06.2004, Hosne Ara HA 779 (DACB); Dargapur thana, Vabanipur, 18.06.2004, Hosne Ara HA 851 (DACB); Dhahapara, 18.06.2004, Hosne Ara HA 863 (DACB); Vabanipur, 18.06.2004, Hosne Ara HA 864 (DACB).

Nowabganj: Sonamosjid area, 02.09.2002, Rezia, Momtaz, Bushra & Harun RK 3743 (DACB).

Patuakhali: Patuakhali Sadar SDO road, 15.05.2005, M Sultana 760 (DUSH); Mirzagonj, Amragasia, 16.05.2005, M Sultana 770 (DUSH); Dumki, Srirampur,

17.05.2005, M. Sultana 924 (DUSH); Bauphal, Bogha, 03.06.2006, M Sultana 1363 (DUSH); Dasmina, Ranggopaldi 02.02.2007, M Sultana 1524 (DUSH).

Rajbari: Rajbari area, 26.05.2012, Hosne Ara HA 2826 (DACB).

Rangamati: Locality unknown, 2005, Sajsdha Roy R 63 (DACB).

Sherpur: Bakshigonj, Lawchapra, Dumurtola, 08.10.2003, Hosne Ara HA 594 (DACB); Rangtia Range, Samaschura beat, 10.10.2003, Hosne Ara HA 684 (DACB); Rangtia range, Gazni beat, 21.06.2004, Hosne Ara HA 926 (DACB); Koshba village, 22.06.2004, Hosne Ara HA 994 (DACB).

Sirajganj: Kazipur upazilla to Charkhadah village, 18.03.2011, Hosne Ara HA 2787 (DACB).

Sunamganj: Town area, 06.06.1998, Hosne Ara HA 43 (DACB).

Tangail: Madhupur, Dulail, 05.08.1976, Khan & Huq K 4185 (DACB); Madhupur Sal forest, 02.06.1978, Khan & others K 4932 (DACB); Sakhipur, 20.06.1978, Reaz 59 (DACB); Madhupur, pargacha, 14.06.1989, M.K. Mia 209 (DACB); Modhupur, Dokhola, 06.10.2003, Hosne Ara HA 551 (DACB); Mirzapur, 19.08.2005, Hosne Ara HA 2197 (DACB).

Economic uses/values/harmful aspects: Young leaf and petiole of this plant are used as a vegetable.

Ethnobotanical information: Both tuber and root of the plant are acrid and a stimulant when fresh. These are used to cure piles. In case of tumours, the tuber is used as a poultice. The tuber serves as a good medicine to cure diseases of the stomach if taken along with bananas. It is also an effective drug in case of venomous snake bites when applied externally and internally (Ghani, 2003).

107. *Typhonium trilobatum* (L.) Schott var. *fulvus* H. Ara & M.A. Hassan, var. nov. Photo 85 (Page no. 446).

Typhonium trilobatum (L.) Schott var. *fulvus* H. Ara & M.A. Hassan differs from the variety proper by (i) twisted spathe tip, (ii) appendix base character, (iii) stigma colour and (iv) by chromosome characters.

Holotype: Bangladesh, Netrakona district, Farangpara, 18.06.2004, Hosne Ara HA 865 (DACB).

Bengali / Local name: Not available.

English name: Not known.

Tuber c 5 cm long, c 4 cm in diameter. Petiole 15-55 cm long, c 0.8 cm in diameter, green. Leaf paired, blade usually deeply trilobed, anterior lobe ovate-lanceolate, to c 18.0 cm long, c 9.5 cm in diameter, posterior lobe c 18 cm long, c 8 cm in diameter, green. Inflorescence paired. Peduncle c 4 cm long, c 1 cm diameter, green. Spathe c 17 cm long, tube and blade separated by a strong constriction; tube c 3 cm long, outside green, inside light green; blade c 14 cm long, c 8 cm in diameter at the middle, outside dark green, inside light purple, tip of the spathe twisted up to 4 cm. Spadix shorter than spathe, c 11 cm long; female part c 1 cm long, c 1 cm in diameter, flowers congested; sterile part between female and male part 2.3-2.5 cm long, the lower 0.8-1.0 cm densely covered with staminodes, the remainder naked, cream colour, longitudinally grooved; male part cylindrical, c 1.6 cm long, c 1.0 cm in diameter; base and top oblique, flowers congested; appendix very shortly stipitate, stipe c 1 mm long, elongate conical, c 6.5 cm long, c 1.3 cm in diameter at the base, pale purple, top acute, base crenulate or multifurcate, producing a strong unpleasant smell at female anthesis. Ovaries cylindrical, c 1 mm long, c 1 mm in diameter, yellowish green, unilocular, with one basal ovules; stigma sessile, large, discoid, with a central depression, 0.8 mm in diameter, 0.2 mm high, densely shortly papillose, light yellowish cream. Staminode filiform, c 1.5 cm long, c 0.3 mm in diameter, creamy white or light yellowish, curled.

Flowering and fruiting period: April-November.

Chromosome number: $2n = 18$ (Warasy and Alam, 2009).

Habitat: Shady moist areas.

Distribution: Bangladesh.

Specimens examined:

Netrakona: Farangpara, 18.06.2004, Hosne Ara HA 865 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 30.05.2006, Hosne Ara HA 2648 (DACB); 22.09.2015, Hosne Ara HA 2902 (DACB) (Originally collected from Farangpara under Netrakona district).

Economic uses/values/harmful aspects: Young leaf and petiole of this plant are used as a vegetable.

Ethnobotanical information: Not known.

Etymology: The variety is named after light yellowish cream colour of its stigma.

The major morphological and cytological differences between two taxa of *Typhonium trilobatum* (L.) Schott are outlined in Table-6.10.

Table 6.10. Morphological and cytological comparison of *Typhonium trilobatum* (L.) Schott var. *fulvus* H. Ara & M.A. Hassan, var. nov. with *Typhonium trilobatum* (L.) Schott var. *trilobatum*

Character	<i>Typhonium trilobatum</i> (L.) Schott var. <i>fulvus</i> H. Ara & M.A. Hassan, var. nov.	<i>Typhonium trilobatum</i> (L.) Schott var. <i>trilobatum</i>
Tip of the spathe	tip of the spathe twisted up to 4 cm	not twisted
Appendix	pale purple, very shortly stipitate, stipe 1 mm long, base crenulate or multifurcate	glossy purple or reddish, stipitate, stipe 2-3 mm long, base truncate
Sterile zone	sterile zone densely covered with staminode	sterile zone loosely covered with staminode
Stigma colour	light yellowish cream	purple
Chromosome number	18 (16 m + 2ac)	18 (16m + 2sm)
Acrocentric chromosome	presence of acrocentric chromosome	absence of acrocentric chromosome
CMA	CMA-band absent	CMA-band present

m = metacentric chromosome, sm = submetacentric chromosome, ac = acrocentric chromosome.

(Photo 85) 446

27. Genus: Xanthosoma Schott in Schott & Endlicher,

Melet. Bot. 19 (1832).

Type (Lectotype) species: *X. sagittifolium* (L.) Schott(*“sagittaeifolium”*; *Arum sagittaeifolium* L.; see Nicolson 1975).

Small to gigantic, sometimes arborescent, evergreen or seasonally dormant herbs with milky sap, stem either a thick, sub-cylindric, hypogeal tuber often producing smaller tubers on stoloniferous side branches. Petiole sheathing below, sheath persistent, leaf blade cordate, sagittate, hastate, trifid, trisect, pedatifid to pedatisect, rarely linear-lanceolate to ovate with emarginate base, rarely peltate, venation reticulate with secondary veins forming a zigzag connecting vein between the primary lateral veins. Inflorescence 1-many in each floral sympodium, always appearing with leaves. Peduncle usually rather short, rarely long. Spathe strongly constricted, the lower tube with convolute margins, ovoid to ellipsoid, persistent, the upper blade boat-shaped, oblong to oblong-lanceolate, spreading and withering. Spadix shorter than the spathe, densely flowered, the lower female zone cylindric-conoid, often obliquely inserted onto the peduncle, separated from the male zone by longer, conoid to attenuate, basally thicker zone of sterile male flowers, the upper male zone cylindric-conoid, longer than the female zone, usually fertile to the apex, rarely with a few sterile flowers at the extreme apex. Flowers unisexual, perigone absent. Male flowers 4-6 androus, stamens connate into a truncate-obpyramidal synandria with marginal thecae, anthers lateral, dehiscing by sub-apical pore or short slit. Sterile male flower composed of obpyramidal, truncate, laterally compressed synandrodes, lowermost larger, uppermost narrower and more elongated (in sense of spadix axis). Ovary ovoid, 2-4 locular, more rarely 1-locular, ovules (12-) 20-numerous, anatropous or hemianatropous, funicles rather long, placentae usually pseudo-axile, or sometimes parietal or axile basally, stylar region broader than ovary, stigma sub-hemispheric or 2-4 lobed, yellow, narrower than the style. Fruit a berry, cylindric, 3-4 celled, the cells many-seeded, whitish to orange. Seeds ovoid, testa costate.

About 57 species distributed throughout tropical and southern subtropical America and West Indies (Mayo *et al.*, 1997). In Bangladesh, this genus is represented by 4 species.

Key to the species

- | | | |
|----|--|----------------------|
| 1. | Plant with above ground long stem | 2 |
| - | Plant with above ground short stem | 3 |
| 2. | Spathe with abaxially greenish white tube and blade | sagittifolium |
| - | Spathe with abaxially deep pink tube and blade | undipes |
| 3. | Leaf-blade sagittate, upper portion of leaf green | violaceum |
| - | leaf blade arrow-shaped, hastate, upper portion of leaf grey-green with white veins and midrib | lindenii |

108. Xanthosoma lindenii (André) Engler in Fl. Bras. 1. c. 191 (1840). Engler & Krause in Engler, Pflanzenr. 71 (IV. 23E): 57 (1920); Graf, Tropica, edn. 57: 130, 1108 (1978-reprint 2003); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 97 (2007). **Photo xxiv (Page no. 101).**

Phyllotaenium lindenii André in III Hortic. 19, t. 88 (1872).

Type: Colombia.

Bengali / Local name: *Bahari patar Kachu.*

English name: Not known.

A perennial evergreen herb with tuberous short stem. Leaves petiolate, petiole sheathing below, sheath persistent, 25-30 cm long, leaf blade arrow-shaped, hastate, oblong, 25-35 × 7-15 cm, grey-green, with white veins and midrib. Peduncle circular, 15 cm long. Spathe in two parts, the lower tube convolute, tube oblong, 4.0-4.5 cm long, persistent, the upper blade spreading, oblong lanceolate, 7-9 cm long, 2 cm broad and quickly withering. Spadix in three parts: female below, male above with a

constricted sterile area in between. Female flowers 2.5 cm long, sterile flowers 2.5-3.0 cm long and male flowers 7-8 cm long, 6-8 mm broad. Pistil 2.5 mm long, ovary 2-4 locular, ovules many. Synandria 2 mm broad. Fruit sub-cylindrical. Seeds many, ovoid.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 26$ (Kumar and Subramaniam, 1986).

Habitat: Shady moist areas.

Distribution: Bangladesh, Colombia.

Specimen examined:

Dhaka: Mirpur Botanical Garden, 02.10.2004, Hosne Ara HA 1448 (DACB).

Economic uses/values/harmful aspects: The plant is widely used for ornamental purposes in public places and homesteads.

Ethnobotanical information: Not known.

109. *Xanthosoma sagittifolium* (L.) Schott, Schott & Endl., Melet. Bot.: 19 (1832). Schott, Syn. Aroid. 56 (1856); Prodr. Syst. Aroid. 179 (1860); Engler, Pflanzenr. 71 (IV. 23E): 45-47 (1920); Bailey, Manual Cultivat. Pl.: 188 (1949); Nicolson, Fl. Vitiensis Nova 1: 459 (1979); Watters *et al.*, European Gard. Fl. 2(2): 100 (1984-reprint 2003); Nicolson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 6: 52-53 (1987); Matthew, Excursion Fl. Cent. Tamilnadu Ind. 543 (1991); Matthew, Fl. Palni Hills 3: 1373 (1999); Govaerts & Frodin, World. Checkl. Bibliog. Araceae: 536 (2002); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrib. U. S. Nat. Herb. 52: 50 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 97-98 (2007). **Photo 86 (Page no. 451).**

Arum sagittifolium L., Sp. Pl. 966 (1753).

Arum xanthorrhizon Jacq., Pl. Rar. Hort. Schoenbr.
2: 32, t. 188 (1797).

Caladium xanthorrhizon (Jacq.) Willd. Sp. Pl. 4: 490
(1800).

Caladium sagittifolium (L.) Vent. Arch. Bot. Roemer
2(3): 351 (1801).

Xanthosoma xanthorrhizon (Jacq.) Koch, Bonplandia
4: 4 (1856).

Lectotype: Jamaica. Illustr. in Sloane, Voy. Jamaica Nat. Hist. 2: t. 106, f. 2 (1725).

Bengali / Local name: *Dudh Kachu*. English name: Tannia, Tanier, Yautia,
Coco-yam, Yantia-blanca.

Perennial herb with caulescent or tuberous long stem which bears up to 10 or more lateral tubers or cormels. Leaves petiolate, petiole 1 m long, sheath persistent, 40 cm long, attached at the base of sinus, leaf blade simple, hastate or compound, milky latex present in the tissue, dull dark green above, below glaucous, anterior lobe 30-50 × 20-26 cm, posterior lobes smaller, the posterior midrib not denuded. Inflorescence in clusters, peduncled. Spathe with a constriction between a basal convolute, green, in white 8 cm long persistent tube and an upper, deciduous, cream in colour, 14 cm long cymbiform limb. Spadix sessile, equal to or shorter than the spathe, female at the base, 2-3 cm long, neuters at the middle, 3.5 cm long and male at the top, 11 cm long and no terminal sterile appendage. Ovary 2-4 locular, ovules many, style short, dilated, stigma small, disc-like, yellow, neuters sub-synandrioid. Synandria truncate, hexagonal, formed of 4-6 united stamens. Fruit sub-cylindrical, seeds many, ovoid.

Flowering and fruiting period: May-October.

Chromosome number: $2n = 26$ (Petersen, 1989).

Habitat: Shady and moist areas.

Distribution: Bangladesh, the West Indies and South America.

Specimens examined:

Barisal: East Narayanpur and Dostani village, 22.02.2008, Hosne Ara HA 2663 (DACB); Kashipur, Lakaotta, 23.02.2008, Hosne Ara HA 2717 (DACB).

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Bogra: Beltola, 06.02.2003, Hosne Ara & Rezia khatun HA 160 (DACB); Shibgonj area, 19.08.2005, Hosne Ara HA 2188 (DACB); Dhunot Upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2797 (DACB).

Chittagong: Chunati, 26.09.2005, Hosne Ara HA 2223 (DACB); Herbang, 26.09.2005, Hosne Ara HA 2269 (DACB); Baramashi teastate area, on the way of Hazarikhil, 27.09.2005, Hosne Ara HA 2304 (DACB); Fatiqchari, 27.09.2005, Hosne Ara HA 2309 (DACB); Hathazari, Nandirkir, 27.09.2005, Hosne Ara HA 2317 (DACB); Chittagong University area, 28.09.2005, Hosne Ara HA 2335 (DACB); BCSIR Campus area, 29.09.2005, Hosne Ara HA 2343 (DACB); Bariadhala, 01.10.2005, Hosne Ara HA 2574 (DACB); Bara Kumira, 01.10.2005, Hosne Ara HA 2581 (DACB); Sitakundo, 01.10.2005, Hosne Ara HA 2594 (DACB); Mirsarai, 01.10.2005, Hosne Ara HA 2601 (DACB); Town area, 01.10.2005, Hosne Ara HA 2613 (DACB); Foiage lake area, 01.10.2005, Hosne Ara HA 2617 (DACB).

Cox's Bazar: Ramu, 26.09.2005, Hosne Ara HA 2284 (DACB); Punnagram, 26.09.2005, Hosne Ara HA 2289 (DACB); Teknafe Game Researve, Whykeon Range, Rhykong beat, 29.09.2005, Hosne Ara HA 2360 (DACB); Upper Rezu range, 29.09.2005, Hosne Ara HA 2404 (DACB); Chotta Inani, 30.09.2005, Hosne Ara HA 2436 (DACB); Bara Inani, 30.09.2005, Hosne Ara HA 2466 (DACB); Swankhali, 30.09.2005, Hosne Ara HA 2503 (DACB); Cox's Bazar town area, 30.09.2005, Hosne Ara HA 2564 (DACB).

Dhaka: Khilgaon area, 15.04.1988, Hosne Ara HA 3 (DACB); Uttara, 11.05.1998, M.S. Khan 9950 (DACB); Khilgaon, Tilpapara, 26.08.1999, Hosne Ara HA 41 (DACB); Bangladesh National Herbarium Garden, 25.02.2008, Hosne Ara HA 2729 (DACB); Savar, 26.05.2012, Hosne Ara HA 2808 (DACB); Bangladesh National Herbarium garden (Cultivated), 22.09.2015, Hosne Ara HA 2901 (DACB) [Originally collected from Bijoypur under Netrokona district].

Dinajpur: Town area, 17.08.2005, Hosne Ara HA 2032 (DACB); Ramsagar, 17.08.2005, Hosne Ara HA 2066 (DACB); Singra forest, 18.08.2005, Hosne Ara HA 2077 (DACB); Near Birgonj, Sal forest, 18.08.2005, Hosne Ara HA 2130 (DACB); Ranigonj, 19.08.2005, Hosne Ara HA 2166 (DACB); Fultala, 19.08.2005, Hosne Ara HA 2175 (DACB).

Gazipur: Kaliakair, 19.08.2005, Hosne Ara HA 2205 (DACB).

Habiganj: Satchari, 17.05.2005, Hosne Ara HA 1600 (DACB); 07.07.2005, Hosne Ara HA 1872 (DACB).

Jessore: Jessore town area, 26.05.2012, Hosne Ara HA 2840 (DACB).

Khagrachari: Narikal Begun Collage road, 12.07.2003, Hosne Ara & Sarder Nasir Uddin HA 504 (DACB).

Magura: Magura area, 26.05.2012, Hosne Ara HA 2833 (DACB).

Manikganj: Manikganj area, 26.05.2012, Hosne Ara HA 2812 (DACB).

Moulvibazar: Madhabkundo 07.07.2002, Hosne Ara & Sader Nasir Uddin HA 126 (DACB); Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1641 (DACB); Muraichara, 19.05.2005, Hosne Ara HA 1675 (DACB); Madhabkundo, 20.05.2005, Hosne Ara HA 1722 (DACB); Gazipur beat, Hararganj reserve forest, Hosne Ara HA 1743 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1772 (DACB); Lawachara reserve forest, 04.07.2005, Hosne Ara HA 1788 (DACB); Gazipur beat, Hararganj forest, 05.07.2005, Hosne Ara HA 1806 (DACB); Mabhabkundo, 06.07.2005, Hosne Ara HA 1833 (DACB); Muraichara beat, Awolachara punji, 07.05.2010, Hosne Ara HA 2767 (DACB).

Mymensingh: Haluaghat thana, Koroitoli, 20.06.2004, Hosne Ara HA 909 (DACB).

Narsingdi: Narsingdi Sadar, 07.07.2005, Hosne Ara HA 1884 (DACB).

Narayanganj: Sonargaon, 07.07.2005, Hosne Ara HA 1913 (DACB).

Netrakona: Durgapur thana, Bijoypur, 16.06.2004, Hosne Ara HA 754 (DACB); Attrakhali, 17.06.2004, Hosne Ara HA 777 (DACB); Durgapur thana, Vabanipur, 18.06.2004, Hosne Ara HA 850 (DACB).

Panchagarh: Banglabanda, Tetulia upazilla, 17.08.2005, Hosne Ara HA 1980 (DACB).

Rajbari: Salmara, 12.03.2006, M. Khatun 401 (DUSH); Rajbari area, 26.05.2012, Hosne Ara HA 2825 (DACB).

Sherpur: Rangtia range, Samaschura beat, 10.10.2003, Hosne Ara HA 697 (DACB).

Sirajganj: Kazipur upazilla to Charkhadah village, 18.03.2011, Hosne Ara HA 2785 (DACB).

Sunamganj: Town area, 06.06.1998, Hosne Ara HA 41 (DACB).

Tangail: Mirzapur, 19.08.2005, Hosne Ara HA 2195 (DACB).

Thakurgaon: Dharmagar, 17.08.2005, Hosne Ara HA 2010 (DACB).

Economic uses/values/harmful aspects: From ancient time, this plant is under cultivation and used as foodstuff in the tropics. Some varieties of this plant have been developed for superior starchy corms while some are planted as pot herbs for their beautiful foliage (Plowman, 1969).

Ethnobotanical information: Not known.

110. Xanthosoma undipes (K. Koch) K. Koch, Bonplandia 4: 3 (1856). Nicolson, Taxon 24: 347 (1975); Fl. Vitiensis Nova 1: 459-460 (1979); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 537 (2002); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrib. U. S. Nat. Herb. 52: 50-51 (2005).

Photo 87 (Page no. 455).

Alocasia undipes K. Koch, App. Gen. Sp. Nov. 1854: 5
(1854-55).

Xanthosoma jacquinii sensu Schott, Syn. Aroid. 57
(1856), non Schott in Schott & Endlicher, Melet.
Bot. 19 (1832), *nom. illeg.*, non Kunth (1841).

Type: Cultivated material grown in Berlin and Potsdam (Sanssouci).

Bengali / Local name: *Bara patarKachu*.

English name: Tall Elephant's Ear.

Herb with milky sap, erect, 2 m tall, mature plants with a thick, starchy stem to 1.0-1.5 m long, with numerous leaf scars and aerial roots at the base. Petioles erect, 45-100 cm long, green, sheathing below. Leaves several; blades 40-70 × 30-50 cm, simple, cordate-sagittate, chartaceous, upper surface dark green, lower surface grayish green, margin undulate. Inflorescences 1-3, axillary. Peduncles to 30 cm long. Spathe

(Photo 87) 455

constricted, 25-31 cm long, the tube 8-13 cm long, thickened, oblong-ovoid, both sides deep pink, persistent; the blade erect, concave, adaxially cream to white, abaxially pink, shortly acuminate at apex, deciduous. Spadix slightly shorter than the spathe, 30 cm long ; female zone yellowish, 3.0-5.5 cm long, cylindrical; ovaries ovoid, 2.2 × 2.0 mm, cream, 2-4 locular with many ovules, anatropous; stylar region broader than ovary, usually discoid-thickened; stigma hemispheric-discoid, 2-4 lobed, yellow, narrower than style; sterile zone pink, 7.5 cm long, conical; male zone light pink, 17 cm long, elongated; synandria hexagonal, truncate, formed of 6-8 united stamens. Berry cylindrical, many seeded. Seed ovoid.

Flowering and fruiting period time: May.

Chromosome number: Not Known.

Habitat: Grows in shady and moist places of village area.

Distribution: Native to tropical America, grown in Bangladesh.

Specimens examined:

Gazipur: Kamesshor village, 17.05.2009, Hosne Ara HA 2749 (DACB).

Dhaka: Khilgaon, Tilpapara (Cultivated), 30.05.2011, Hosne Ara HA 2780 (DACB) [Originally collected from Kamesshor village under Gazipur district].

Economic uses/values/harmful aspects: The plant is used as a vegetable for its large edible tuber.

Ethnobotanical information: The indigenous people of Bangladesh use the tuber of the plant in curries.

Note: It is a new record for Bangladesh (Bangladesh J. Plant Taxon. 19 (1): 17-23, 2012).

111. *Xanthosoma violaceum* Schott, Oesterr. Bot. Wochenbl. 3: 370 (1853). Schott, Syn. Aroid. 58 (1856); Prodr. Syst. Aroid. 180 (1860); Engler, Pflanzenr. 71 (IV. 23E): 50 (1920); Standley, Fl. Panama, Ann. Missouri Bot. Gard. 31 (1): 40 (1944); Bailey, Manual Cultivat. Pl.: 188 (1949); Birdsey, Cultivat. Aroids.: 129 (1951); Standley & Steyermark, Fl. Guatemala, Fieldiana, Bot. 24 (1): 362 (1958); Graf,

Exotica, edn. 8: 238 (1976); Walters *et al.*, European Gard. Fl. 2 (2); 100 (1984-reprint 2003); Govaerts & Frodin, World Checkl. Bibliog. Araceae: 537 (2002); Acevedo-Rodriguez and Nicolson in Acevedo-Rodriguez and Strong, Contrib. U. S. Nat Herb. 52: 51 (2005); Ara in Siddiqui *et al.*, Encycl. Fl. Fauna Bangladesh 11: 98 (2007). **Photo 88 (Page no. 458).**

Arum nigrum Vell., Fl. Flumin. 9: 386, t. 1c07 (1831 publ. 1881),
nom. illeg.

Xanthosoma nigrum Stellfeld., Tribuna Farm. 12: 201 (1944).

Type: Unknown; representative material of this species and a good candidate for a lectotype of its name is Schott, *Icones Aroideae*, t. 3432 (*NYBG. neg.* 4288). Possibly from cultivated material, collected by Schott in Brazil (1817-1821).

Bengali / Local name: *Dudh kachu*. English name: Blue Taro, Purple-stem Taro.

Terrestrial perennial herb. Rhizome tuberous, hypogeal, short and thick. Leaves petiolate, petioles 30-70 cm long, 1-4 cm broad at the base, long-vaginate, brownish-violaceous, leaf blades at first somewhat pruinose, becoming green, paler beneath, sagittate-ovate, 20-50 cm long and 15-45 cm wide or larger, shortly acuminate-apiculate, glabrous, the basal lobes somewhat triangular, obtuse, separated by an open, acute sinus, the nerves and costa violaceous. Peduncles 15-20 cm long. Spathe in two parts, the lower tube of the spathe c 10 cm long and 3.5-4.0 cm broad, oblong, glaucous, often tinged with violet or dark purple, the upper blade oblong-lanceolate, yellowish-white, 15-20 cm long, 6-7 cm wide. Pistillate portion of the spadix whitish, c 4 cm long, c 2 cm thick, the fertile staminate portion c 15 cm long and the sterile portion c 4 cm long. Ovaries short-ovoid.

Flowering and fruiting period: April-October.

Chromosome number: Not known.

Habitat: Shady, moist places and village thickets.

Distribution: Bangladesh, the West Indies and South America.

(Photo 88) 458

Specimens examined:

Bandarban: On the way of Betchari, 22.09.2004, Hosne Ara HA 1252 (DACB).

Barisal: East Narayanpur village and Dostani village, 22.02.2008, Hosne Ara HA 2662 (DACB); Kashipur, Lakaotta, 23.02.2008, Hosne Ara HA 2718 (DACB).

Bogra: Beltola, 06.02.2003, Hosne Ara & Rezia khatun HA 159 (DACB); Shibgonj area, 19.08.2005, Hosne Ara HA 2187 (DACB); Dhunot Upazilla to Sherpur, 19.03.2011, Hosne Ara HA 2796 (DACB).

Comilla: Jashpur, 26.09.2004, Hosne Ara HA 1391 (DACB).

Dhaka: Khilgaon area, 15.04.1988, Hosne Ara HA 2 (DACB); Savar, 26.05.2012, Hosne Ara HA 2809 (DACB); Mirpur 1, Chiriakhana road, 06.08.2015, Hosne Ara HA 2893 (DACB); Bangladesh National Herbarium garden (Cultivated), 15.07.2015, Hosne Ara HA 2892 (DACB) [Originally collected from Jashpur under Comilla district].

Dinajpur: Town area, 17.08.2005, Hosne Ara HA 2031 (DACB); Singra forest, 18.08.2005, Hosne Ara HA 2076 (DACB); Kantazir Mandir area, 18.08.2005, Hosne Ara HA 2109 (DACB); Near Birgonj Sal forest, 18.08.2005, Hosne Ara HA 2129 (DACB); Near Nawabgonj Sal forest, 18.08.2005, Hosne Ara HA 2139 (DACB); Fultala, 19.08.2005, Hosne Ara HA 2176 (DACB).

Gazipur: Tetupara Road, Baropaiha, 25.07.2004, Hosne Ara HA 1083 (DACB); Kaliakair, 19.08.2005, Hosne Ara HA 2204 (DACB).

Habiganj: Satchari, 17.05.2005, Hosne Ara HA 1601 (DACB).

Jessore: Hashimpur, 05.01.2004, M. Khatun 385 (DUSH); Jessore town area, 26.05.2012, Hosne Ara HA 2839 (DACB).

Kurigram: Singhimari village, 20.05.2013, Hosne Ara HA 2848 (DACB); Baruitari village, 24.08.2013, Hosne Ara HA 2855 (DACB).

Magura: Magura area, 26.05.2012, Hosne Ara HA 2834 (DACB).

Manikganj: Manikganj area, 26.05.2012, Hosne Ara HA 2811 (DACB).

Moulvibazar: Adampur beat, Kawargola forest, 18.05.2005, Hosne Ara HA 1640 (DACB); Murai chara, 19.05.2005, Hosne Ara HA 1676 (DACB); Madhabkundo,

20.05.2005, Hosne Ara HA 1723 (DACB); Gazipur beat, Hararganj reserve forest, 21.05.2005, Hosne Ara HA 1742 (DACB); Adampur beat, Kawargola forest, 03.07.2005, Hosne Ara HA 1752 (DACB); Lawachara forest, 04.07.2005, Hosne Ara HA 1797 (DACB); Gazipur beat, Hararganj reserve forest, 05.07.2005, Hosne Ara HA 1811 (DACB); Madhabkundo, 03.12.2014, Hosne Ara HA 2876 (DACB).

Narayanganj: Sonargaon, 07.07.2005, Hosne Ara HA 1912 (DACB).

Narsingdi: Narsingdi Sadar, 07.07.2005, Hosne Ara HA 1883 (DACB).

Panchagarh: Banglabanda, Tetulia upazilla, 17.08.2005, Hosne Ara HA 1779 (DACB).

Patuakhali: Patuakhali Sadar, Lohalia, 17.11.2004, M. Sultana 450 (DUSH); Galachipa Basbunia, 01.03.2005, M. Sultana 627 (DUSH).

Rajbari: Rajbari area, 26.05.2012, Hosne Ara HA 2824 (DACB).

Rangamati: Tourist spot, Hanging bridge area, 18.09.2004, Hosne Ara HA 1093 (DACB); Rangamati, DC Bangloo area, 20.09.2004, Hosne Ara HA 1160 (DACB).

Sherpur: Bakshiganj, Lawchapra forest, Dumurtola, 08.10.2003, Hosne Ara HA 597 (DACB); Rangtia range, Samaschura beat, 10.10.2003, Hosne Ara HA 698 (DACB); Rangtia Range, Gazni beat, 21.06.2004, Hosne Ara HA 924 (DACB).

Sirajganj: Kazipur upazilla to Charkhadah village, 18.03.2011, Hosne Ara HA 2786 (DACB).

Tangail: Mirzapur, 19.08.2005, Hosne Ara HA 2196 (DACB).

Thakurgaon: Dharmagar, 17.08.2005, Hosne Ara HA 2009 (DACB).

Economic uses/values/harmful aspects: Petiole and leaf blades are commonly used as a vegetable in Bangladesh.

Ethnobotanical information: The Mayna Jivaro tribal people of Peru use the leaves as a pain reliever, especially to treat rheumatic pain in the legs. The juice from the split peduncle of the plants is used to cure itchy skin and the juice from the split fruits is used to remove tapeworms from the skin of dogs (Croat, 1994).

CHAPTER 7

GENERAL DISCUSSION

CHAPTER 7

GENERAL DISCUSSION

7.1 Categorization of Bangladesh Aroids

The present treatment includes 105 species and 6 varieties under 27 genera. Prior to the present study, various workers (Datta & Mitra 1953, Engler & Krause 1920, Haines 1924, Heining 1925, Hooker 1893, Karthikeyan *et al.* 1989, Mitra 1958, Nicolson 1987, Prain 1903, Rao & Verma 1976, Roxburgh 1814-1832, Sinclair 1956 and Toha 2004) recorded 39 taxa including 2 varieties (Table 7.1.1) for the area now under Bangladesh. In the present work 38 species (Table 7.1.2) are reported as new records for Bangladesh. Moreover six new species and four new varieties (Table 7.1.5) have been described. Twenty four species (Table 7.1.3) are grown as ornamentals. Among 111 taxa, about 30 taxa (Table 7.1.4) can be listed as threatened in Bangladesh.

Table 7.1.1: Previously recorded 39 species (1814-2004)

Sl. No.	Name of taxa
1.	<i>Aglaonema hookerianum</i> Schott
2.	<i>Alocasia acuminata</i> Schott
3.	<i>Alocasia cucullata</i> (Lour.) G. Don
4.	<i>Alocasia fornicata</i> (Roxb.) Schott
5.	<i>Alocasia macrorrhizos</i> (L.) G. Don
6.	<i>Alocasia odora</i> (Roxb.) Koch
7.	<i>Amorphophallus bulbifer</i> (Roxb.) Blume
8.	<i>Amorphophallus margaritiferum</i> (Roxb.) Kunth
9.	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson var. <i>campanulatus</i> (Decne.) Sivadasan
10.	<i>Ariopsis protanthera</i> N.E. Br.

Sl. No.	Name of taxa
11.	Colocasia affinis Schott
12.	Colocasia esculenta (L.) Schott
13.	Colocasia esculenta var. antiquorum (Schott) Hubb. & Rehder
14.	Colocasia esculenta var. aquatilis Hassk.
15.	Cryptocoryne ciliata (Roxb.) Fischer <i>ex</i> Wydler
16.	Cryptocoryne retrospiralis (Roxb.) Kunth
17.	Cryptocoryne spiralis (Retz.) Fischer <i>ex</i> Wydler
18.	Homalomena aromatica (Roxb. <i>ex</i> Sim) Schott
19.	Homalomena pendula (Blume) Bakh. f.
20.	Lagenandra gomezii (Schott) Bogner & Jacobsen
21.	Lasia spinosa (L.) Thwaites
22.	Pistia stratiotes L.
23.	Pothos junghuhnii de Vriese
24.	Pothos scandens L.
25.	Remusatia pumila (D. Don) Li & Hay
26.	Rhaphidophora decursiva (Roxb.) Schott
27.	Rhaphidophora hookeri Schott
28.	Rhaphidophora peepla Schott
29.	Rhaphidophora schottii Hook. f.
30.	Scindapsus officinalis (Roxb.) Schott
31.	Stuednera colocasioides Hook. f.
32.	Stuednera discolor N.E. Br.
33.	Typhonium flagelliforme (Lodd.) Blume
34.	Typhonium gracile (Roxb.) Schott
35.	Typhonium listeri Prain

Sl. No.	Name of taxa
36.	Typhonium roxburghii Schott
37.	Typhonium trilobatum (L.) Schott
38.	Xanthosoma sagittifolium (L.) Schott
39.	Xanthosoma violaceum Schott

Table 7.1.2: Taxa appeared as new records for Bangladesh (38 in total)

Sl. No.	Name of taxa	Localities of collections
1.	Aglaonema commutatum Schott	Bandarban, Moulvibazar, Sherpur
2.	Aglaonema marantifolium Blume	Mymensingh
3.	Aglaonema modestum Schott <i>ex</i> Engl.	Moulvibazar, Rangamati
4.	Alocasia decipiens Schott	Netrakona
5.	Alocasia fallax Schott	Habiganj, Netrakona, Tangail
6.	Alocasia navicularis C. Koch <i>et</i> Bouche'	Moulvibazar
7.	Amorphophallus excentricus Hettterscheid	Moulvibazar
8.	Amorphophallus krausei Engler	Moulvibazar
9.	Amorphophallus longituberosus (Engl.) Engl. <i>et</i> Gehrm.	Bogra, Kurigram
10.	Amorphophallus napalensis (Wall.) Bogner & Mayo	Habiganj, Moulvibazar, Mymensingh, Sherpur
11.	Ariopsis peltata Nimmo	Rangamati
12.	Caladium bicolor (Ait.) Vent.	Moulvibazar, Mymensingh, Tangail
13.	Colocasia fallax Schott	Bandarban, Cox's Bazar, Moulvibazar, Netrakona, Rangamati, Sherpur
14.	Colocasia gigantea (Blume) Hook. f.	Bandarban, Khagrachari, Patuakhali, Rangamati

Sl. No.	Name of taxa	Localities of collections
15.	<i>Colocasia heterochroma</i> H. Li <i>et</i> Z.X. Wei	Bandarban, Rangamati
16.	<i>Colocasia lihengiae</i> C.L. Long <i>et</i> K.M. Liu	Bandarban
17.	<i>Colocasia mannii</i> Hook. f.	Moulvibazar
18.	<i>Colocasia oresbia</i> A. Hay	Chittagong, Cox's Bazar, Khagrachari, Moulvibazar, Rangamati
19.	<i>Colocasia virosa</i> Kunth	Moulvibazar
20.	<i>Epipremnum pinnatum</i> (L.) Engl.	Sylhet
21.	<i>Gonatopus boivinii</i> (Decne.) Engl.	Netrakona
22.	<i>Homalomena coerulescens</i> Jungh.	Moulvibazar, Rangamati
23.	<i>Homalomena gigantea</i> Engl.	Moulvibazar, Netrakona
24.	<i>Pothos chinensis</i> (Raf.) Merr.	Chittagong, East Bengal (Bangladesh), Rangamati
25.	<i>Remusatia vivipara</i> (Roxb.) Schott	Moulvibazar
26.	<i>Rhaphidophora affinis</i> Schott	East Bengal (Bangladesh)
27.	<i>Rhaphidophora calophyllum</i> Schott	East Bengal (Bangladesh), Sherpur
28.	<i>Rhaphidophora glauca</i> Schott	East Bengal (Bangladesh), Moulvibazar, Rangamati
29.	<i>Rhaphidophora grandis</i> Schott	Khagrachari, Moulvibazar
30.	<i>Rhaphidophora pertusa</i> (Roxb.) Schott	Moulvibazar
31.	<i>Scindapsus perakensis</i> Hook. f.	Moulvibazar, Netrakona, Sherpur
32.	<i>Scindapsus pictus</i> Hassk.	Chittagong Hill Tracts, Rangamati
33.	<i>Scindapsus scortechinii</i> Hook. f.	Sherpur
34.	<i>Stuednera colocasiifolia</i> K. Koch	Bandarban, Chittagong, Cox's Bazar, Moulvibazar, Rangamati
35.	<i>Stuednera gagei</i> Krause	Moulvibazar

Sl. No.	Name of taxa	Localities of collections
36.	Typhonium blumei Nicolson & Sivadasan	Sherpur
37.	Typhonium cochleare A. Hay	Sherpur
38.	Xanthosoma undipes (K. Koch) K. Koch	Gazipur

Table 7.1.3: Cultivated taxa (24 in total)

Sl. No.	Name of taxa	Localities of collections
1.	Aglaonema costatum N.E. Brown	Dhaka
2.	Aglaonema crispum (Pitcher & Manda) Nicolson	"
3.	Aglaonema nitidum (Jack) Kunth	"
4.	Alocasia cuprea (C. Koch & Bouche') C. Koch	"
5.	Alocasia portei Schott	"
6.	Alocasia sanderiana W. Bull	"
7.	Anthurium andreanum Linden	"
8.	Anthurium crystallinum Linden & Andre'	"
9.	Caladium humboldtii Schott	"
10.	Dieffenbachia seguine (Jacq.) Schott	"
11.	Homalomena wallisii Regel	"
12.	Monstera deliciosa Liebmann	"
13.	Monstera obliqua Miq.	"
14.	Philodendron bipinnatifidum Schott <i>ex</i> Endl.	"

Sl. No.	Name of taxa	Localities of collections
15.	Philodendron lacerum (Jacquin) Schott	Dhaka
16.	Philodendron mamei Andre'	"
17.	Philodendron scandens C. Koch & Sello <i>ex</i> Koch	"
18.	Rhaphidophora aurea (Linden & Andre') Birdsey	"
19.	Schismatoglottis picta Schott	"
20.	Spathiphyllum wallisii Regel	"
21.	Spathiphyllum floribundum (Linden & Andre') N.E. Brown	"
22.	Syngonium macrophyllum Engl.	"
23.	Syngonum podophyllum Schott	"
24.	Xanthosoma lindenii (Andre') Engl.	"

Table 7.1.4: A tentative list of threatened species of the family Araceae in Bangladesh

Sl. No.	Name of Taxa	Localities of collections	Conservation status according to the IUCN (2013) Red List Categories
1.	Aglaonema hookerianum Schott	Bandarban, Chittagong, Chittagong Hill Tracts, Cox's Bazar, East Bengal, Khulna, Moulvibazar, Rangamati and Sylhet	Vulnerable (VU)
2.	Alocasia decipiens Schott	Netrakona	Endangered (EN)
3.	Amorphophallus excentricus Hettterscheid	Moulvibazar	Critically Endangered (CR)
4.	Amorphophallus krausei Engler	Moulvibazar	Vulnerable (VU)

Sl. No.	Name of Taxa	Localities of collections	Conservation status according to the IUCN (2013) Red List Categories
5.	Amorphophallus margaritiferum (Roxb.) Kunth	Dhaka, Rajshahi (Godagari)	Critically Endangered (CR)
6.	Amorphophallus napalensis (Wall.) Bogner & Mayo	Habiganj, Moulvibazar, Mymensingh and Sherpur	Vulnerable (VU)
7.	Ariopsis peltata Nimmo	Rangamati	Critically Endangered (CR)
8.	Ariopsis protanthera N.E. Br.	Rangamati	Endangered (EN)
9.	Colocasia heterochroma H. Li <i>et</i> Z.X. Wei	Bandarban and Rangamati	Vulnerable (VU)
10.	Colocasia lihengiae C.L. Long <i>et</i> K.M. Liu	Bandarban	Endangered (EN)
11.	Colocasia mannii Hook. f.	Moulvibazar	Vulnerable (VU)
12.	Colocasia virosa Kunth	Moulvibazar	Endangered (EN)
13.	Homalomena gigantea Engl.	Moulvibazar and Netrakona	Vulnerable (VU)
14.	Lagenandra gomezii (Schott) Bogner & Jacobson	Sylhet	Extinct (EX) (So far known)
15.	Remusatia pumila (D.Don) Li & Hay	Cox's Bazar	Critically Endangered (CR)
16.	Remusatia vivipara (Roxb.) Schott	Moulvibazar	Critically Endangered (CR)
17.	Rhaphidophora affinis Schott	East Bengal (Bangladesh)	Critically Endangered (CR)
18.	Rhaphidophora calophyllum Schott	East Bengal (Bangladesh) and Sherpur	Critically Endangered (CR)
19.	Rhaphidophora glauca Schott	East Bengal (Bangladesh), Moulvibazar and Rangamati	Vulnerable (VU)
20.	Rhaphidophora peepla Schott	Chittagong and Rangamati	Vulnerable (VU)

Sl. No.	Name of Taxa	Localities of collections	Conservation status according to the IUCN (2013) Red List Categories
21.	Rhaphidophora schottii Hook. f.	Habiganj and Rangamati	Endangered (EN)
22.	Scindapsus perakensis Hook. f.	Moulvibazar, Netrakona and Sherpur	Vulnerable (VU)
23.	Scindapsus scortechinii Hook. f.	Sherpur	Vulnerable (VU)
24.	Stuednera colocasiifolia K. Koch	Bandarban, Chittagong, Cox's Bazar, Moulvibazar and Rangamati	Endangered (EN)
25.	Stuednera discolor N.E. Br.	Chittagong, Chittagong Hill Tracts, Moulvibazar and Sylhet	Vulnerable (VU)
26.	Stuednera gagei C. Krause	Moulvibazar	Endangered (EN)
27.	Typhonium blumei Nicolson & Sivadasan	Sherpur	Critically Endangered (CR)
28.	Typhonium gracile (Roxb.) Schott	East Bengal (Bangladesh), Sherpur and Sylhet	Vulnerable (VU)
29.	Typhonium listeri Prain	Chittagong Hill Tracts	Critically Endangered (CR)
30.	Typhonium roxburghii Schott	Bandarban and Chittagong	Vulnerable (VU)

Table 7.1.5: Taxa described as new species/new varieties

Sl. No.	Name of Taxa	Localities of collections
1.	Alocasia hararganjensis H. Ara & M.A. Hassan	Moulvibazar
2.	Alocasia salarkhanii H. Ara & M.A. Hassan	Moulvibazar
3.	Colocasia hassanii H. Ara	Bandarban, Cox's Bazar, Moulvibazar and Rangamati

Sl. No.	Name of Taxa	Localities of collections
4.	<i>Lasia viridis</i> H. Ara & M.A. Hassan	Barisal
5.	<i>Typhonium elatum</i> H. Ara & M.A. Hassan	Sherpur
6.	<i>Typhonium geniculatum</i> H. Ara & M.A. Hassan	Moulvibazar
7.	<i>Colocasia fallax</i> Schott var. <i>purpurea</i> H. Ara & M.A. Hassan	Bandarban and Moulvibazar
8.	<i>Colocasia oresbia</i> A. Hay var. <i>obtusifolia</i> H. Ara & M.A. Hassan	Rangamati
9.	<i>Rhaphidophora calophyllum</i> Schott var. <i>violaceus</i> H. Ara & M.A. Hassan	Moulvibazar
10.	<i>Typhonium trilobatum</i> (L.) Schott var. <i>fulvus</i> H. Ara & M.A. Hassan	Netrakona

7.2 Distributional Abundance of the Recognized Taxa in Bangladesh

In total 111 taxa have been recognized in the present treatment. All the recognized taxa are not evenly distributed in different parts of the country. Some are very widely distributed, some are found only in the hilly areas, some are restricted to the riverine areas and some are very poorly distributed and restricted to one or two areas only. This uneven distribution and abundance of occurrence are discussed under the following subheadings.

1. Taxa very widely distributed in Bangladesh.

The following taxa are very widely distributed in the country. Collection data and observational records indicate that *Colocasia esculenta* (L.) Schott, *Colocasia esculenta* (L.) Schott var. *antiquorum* (Schott) Hubb. & Rehder, *Colocasia esculenta* (L.) Schott var. *aquatilis* Hassk. are found all over the country. Beside this, *Alocasia acuminata* Schott, *Alocasia macrorrhizos* (L.) G. Don, *Amorphophallus paeoniifolius* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan, *Lasia spinosa* (L.) Thwaites, *Pistia stratiotes* L., *Pothos scandens* L., *Typhonium flagelliforme* (Lodd.) Blume, *Typhonium trilobatum* (L.) Schott, *Xanthosoma sagittifolium* (L.) Schott, *Xanthosoma violaceum* Schott are also widely distributed. The following table (7.2.1) indicates the districts covered by collected and examined materials.

Table 7.2.1: Taxa very widely distributed in Bangladesh.

Sl. No.	Scientific name	No. of districts
1.	Alocasia acuminata Schott	18
2.	Alocasia macrorrhizos (L.) G. Don	30
3.	Amorphophallus paeoniifolius (Dennst.) Nicolson var. campanulatus (Decne.) Sivadasan	21
4.	Lasia spinosa (L.) Thwaites	34
5.	Pistia stratiotes L.	22
6.	Pothos scandens L.	19
7.	Typhonium flagelliforme (Lodd.) Blume	13
8.	Typhonium trilobatum (L.) Schott	31
9.	Xanthosoma sagittifolium (L.) Schott	24
10.	Xanthosoma violaceum Schott	23

2. Taxa which are represented by only one collection from the wild.

The following 19 taxa may be cited as very poorly distributed or in the present treatment they are represented by a single collection. These are, *Aglaonema marantifolium* Blume, *Alocasia decipiens* Schott, *Alocasia navicularis* K. Koch et Bouche', *Alocasia salarkhanii* H. Ara & M.A. Hassan, *Amorphophallus excentricus* Hettterscheid, *Amorphophallus margaritifera* (Roxb.) Kunth, *Ariopsis peltata* Nimmo, *Ariopsis protanthera* N.E. Br., *Colocasia lihengiae* C.L. Long et K.M. Liu, *Colocasia oresbia* A. Hay var. *obtusifolia* H. Ara & M.A. Hassan, *Colocasia virosa* Kunth, *Gonatopus boivinii* (Decne.) Engl., *Remusatia vivipara* (Roxb.) Schott, *Rhaphidophora calophyllum* Schott, *Scindapsus scortechinii* Hook. f., *Typhonium blumei* Nicolson & Sivadasan, *Typhonium cochleare* A. Hay, *Typhonium elatum* H. Ara & M.A. Hassan, *Typhonium trilobatum* (L.) Schott var. *fulvum* H. Ara & M.A. Hassan.

3. Taxa represented by only one collection from gardens/cultivated.

The following 21 species are also based on a single collection each but they are not very poorly represented in Bangladesh. As they are cultivated and maintained in the gardens, only a representative single collection is made. These are *Aglaonema costatum* N.E. Brown, *Aglaonema crispum* (Pitcher & Manda) Nicolson, *Aglaonema nitidum* (Jack) Kunth, *Alocasia cuprea* (C. Koch & Bouche) C. Koch, *Alocasia portei* Schott, *Alocasia sanderiana* W. Bull, *Anthurium andreanum* Linden, *Anthurium crystallinum* Linden & Andre' *Caladium humboldtii* Schott, *Homalomena wallisii* Regel, *Monstera deliciosa* Liebmann, *Monstera obliqua* Miq., *Philodendron bipinnatifidum* Schott ex Endl., *Philodendron lacerum* (Jacquin) Schott, *Philodendron mamei* Andre', *Philodendron scandens* C. Koch & Sello ex Koch, *Schismatoglottis picta* Schott, *Spathiphyllum floribundum* (Linden & Andre') N.E. Brown, *Spathiphyllum wallisii* Regel, *Syngonium macrophyllum* Engler, *Xanthosoma lindenii* (Andre') Engler.

4. Taxa endemic to Bangladesh.

Of the previously recorded species only one species *Lagenandra gomezii* (Schott) Bogner & Jacobson, is truly endemic to Bangladesh. Other 10 taxa described as new, are also regarded here as endemic to Bangladesh and this will remain valid until they are described from any other parts of the world. The new endemic taxa are: *Alocasia hararganjensis* H. Ara & M.A. Hassan, *Alocasia salarkhanii* H. Ara & M.A. Hassan, *Colocasia hassanii* H. Ara, *Lasia viridis* H. Ara & M.A. Hassan, *Typhonium elatum* H. Ara & M.A. Hassan, *Typhonium geniculatum* H. Ara & M.A. Hassan, *Colocasia fallax* Schott var. *purpurea* H. Ara & M.A. Hassan, *Colocasia oresbia* A. Hay var. *obtusifolia* H. Ara & M.A. Hassan, *Rhaphidophora calophyllum* Schott var. *violaceus* H. Ara & M.A. Hassan, *Typhonium trilobatum* (L.) Schott var. *fulvus* H. Ara & M.A. Hassan.

5. Taxa at risk of extinction.

The following 18 taxa may be considered at a risk of extinction as they are represented by a single wild collection or no collection could be made. These are *Alocasia decipiens* Schott, *Alocasia salarkhanii* H. Ara & M.A. Hassan, *Amorphophallus excentricus*

Hetterscheid, *Amorphophallus margaritiferum* (Roxb.) Kunth, *Ariopsis peltata* Nimmo, *Ariopsis protanthera* N.E. Br., *Colocasia lihengiae* C.L. Long et K.M. Liu, *Colocasia virosa* Kunth, *Homalomena pendula* (Blume) Bakh. f., *Lagenandra gomezii* (Schott) Bogner & Jacobson, *Pothos junghuhnii* de Vriese, *Remusatia pumila* (D. Don) Li & Hay, *Remusatia vivipara* (Roxb.) Schott, *Rhaphidophora affinis* Schott, *Rhaphidophora calophyllum* Schott, *Rhaphidophora schottii* Hook. f., *Typhonium blumei* Nicolson & Sivadasan, *Typhonium listeri* Prain.

6. Taxa of which no collection could be made.

After repeated fieldtrips and search no collection for the following 6 species could be made from any part of the country. There is every possibility that they are lost from the territory of Bangladesh. These are *Homalomena pendula* (Blume) Bakh. f., *Lagenandra gomezii* (Schott) Bogner & Jacobson, *Pothos junghuhnii* de Vriese, *Remusatia pumila* (D. Don) Li & Hay, *Rhaphidophora affinis* Schott, *Typhonium listeri* Prain.

However, search for the rediscovery of these taxa should remain continued.

7. Collection of specimens after a long gap.

After a long gap of more than 100 years specimens of *Amorphophallus margaritiferum* (Roxb.) Kunth was recollected from Rajshahi, Godagari Upazilla, Bangladesh. This species was first collected from Dhaka by CB Clarke (as cited by Hooker 1893) and after a long gap again collected in 2015.

This finding make us hopeful that if search continued, specimens of *Homalomena pendula* (Blume) Bakh. f., *Lagenandra gomezii* (Schott) Bogner & Jacobson, *Pothos junghuhnii* de Vriese, *Remusatia pumila* (D. Don) Li & Hay, *Rhaphidophora affinis* Schott, *Typhonium listeri* Prain may be collected in future by any of our young researchers.

8. Taxa only found in Hilly areas.

Following 51 taxa are found only in the hilly areas indicating preferential distribution of Arioids. They prefer to grow in an area of high rainfall, remain shaded and altitude is bit high. These are *Aglaonema hookerianum* Schott, *Aglaonema marantifolium* Blume,

Aglaonema modestum Schott ex Engler, *Alocasia hararganjensis* H. Ara & M.A. Hassan, *Alocasia navicularis* K. Koch et Bouche', *Alocasia salarkhanii* H. Ara & M.A. Hassan, *Amorphophallus excentricus* Hetterscheid, *Amorphophallus krausei* Engler, *Amorphophallus napalensis* (Wall.) Bogner & Mayo, *Ariopsis peltata* Nimmo, *Ariopsis protanthera* N.E. Br., *Colocasia affinis* Schott, *Colocasia fallax* Schott, *Colocasia fallax* Schott var. *purpurea* H. Ara & M.A. Hassan, *Colocasia hassanii* H. Ara, *Colocasia heterochroma* H. Li et Z.X. Wei, *Colocasia lihengiae* C.L. Long et K.M. Liu, *Colocasia mannii* Hook. f., *Colocasia oresbia* A. Hay, *Colocasia oresbia* A. Hay var. *obtusifolia* H. Ara & M.A. Hassan, *Colocasia virosa* Kunth, *Gonatopus boivinii* (Decne.) Engl., *Homalomena aromatica* (Roxb. ex Sim) Schott, *Homalomena coerulescens* Jungh., *Homalomena gigantea* Engler, *Pothos chinensis* (Raf.) Merr., *Pothos junghuhnii* de Vriese, *Remusatia pumila* (D. Don) Li & Hay, *Remusatia vivipara* (Roxb.) Schott, *Rhaphidophora affinis* Schott, *Rhaphidophora calophyllum* Schott, *Rhaphidophora calophyllum* Schott var. *violaceus* H. Ara & M.A. Hassan, *Rhaphidophora decursiva* (Roxb.) Schott, *Rhaphidophora glauca* (Wall.) Schott, *Rhaphidophora grandis* Schott, *Rhaphidophora hookeri* Schott, *Rhaphidophora peepla* Schott, *Rhaphidophora schottii* Hook. f., *Scindapsus pictus* Hassk., *Scindapsus scortechinii* Hook. f., *Stuednera colocasiifolia* K. Koch, *Stuednera colocasioides* Hook. f., *Stuednera discolor* N.E. Br., *Stuednera gagei* Krause, *Typhonium blumei* Nicolson & Sivadasan, *Typhonium cochleare* A. Hay, *Typhonium elatum* H. Ara & M.A. Hassan, *Typhonium geniculatum* H. Ara & M.A. Hassan, *Typhonium gracile* (Roxb.) Schott, *Typhonium listeri* Prain, *Typhonium roxburghii* Schott.

9. Taxa preferring plain lands/reverine area.

Aroids not only prefer hilly areas to grow but there are aroids which prefer plain land/reverine areas to grow successfully. The following 10 taxa prefer such areas. These are *Alocasia decipiens* Schott, *Colocasia gigantea* (Blume) Hook. f., *Cryptocoryne ciliata* (Roxb.) Fischer ex Wydler, *Cryptocoryne retrospiralis* (Roxb.) Kunth, *Cryptocoryne spiralis* (Retz.) Fischer ex Wydler, *Lasia spinosa* (L.) Thwaites, *Lagenandra gomezii* (Schott) Bogner & Jacobson, *Lasia viridis* H. Ara & M.A. Hassan, *Typhonium flagelliforme* (Lodd.) Blume, *Xanthosoma undipes* (K. Koch) K. Koch.

Cryptocoryne spp. are strictly reverine.

10. Taxa found both in Hilly as well as plain land areas.

The following 21 taxa are found to grow both in the hilly areas as well as in the plain land areas. This adaptational character is important from conservation point. These are *Aglaonema commutatum* Schott, *Alocasia acuminata* Schott, *Alocasia cucullata* (Lour.) G. Don, *Alocasia fallax* Schott, *Alocasia fornicata* (Roxb.) Schott, *Alocasia odora* (Roxb.) K. Koch, *Amorphophallus bulbifer* (Roxb.) Blume, *Amorphophallus longituberosus* (Engl.) Engl. et Gehrm., *Amorphophallus paeoniifolius* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan, *Caladium bicolor* (Ait.) Vent., *Epipremnum pinnatum* (L.) Engl., *Lasia spinosa* (L.) Thwaites, *Pothos scandens* L., *Rhaphidophora pertusa* (Roxb.) Schott, *Scindapsus officinalis* (Roxb.) Schott, *Scindapsus perakensis* Hook. f., *Syngonium podophyllum* Schott, *Typhonium roxburghii* Schott, *Typhonium trilobatum* (L.) Schott, *Typhonium trilobatum* (L.) Schott var. *fulvum* H. Ara & M.A. Hassan, *Xanthosoma sagittifolium* (L.) Schott, *Xanthosoma violaceum* Schott.

7.3 Need for Conservation of Bangladesh Aroids

The main threat to the long term survival of many Araceae members is the loss and reduction in quality of their natural habitats, especially in the rainforest regions of Asia (including Bangladesh), the Malay Archipelago, Africa and Tropical America (Mayo *et al.* 1997).

Some aroids, e.g. *Chlorospatha* Engler spp. are highly adapted to very specific habitats and can not survive in changed conditions. These are also very difficult to cultivate, so there are unlikely to survive for long term in botanic gardens. For such species In-situ conservation practice is the only way to conserve them.

A total of 111 aroid taxa have been recorded from Bangladesh territory. Many of them are in cultivation as ornamental [e.g. *Aglaonema commutatum* Schott, *Alocasia sandariana* W. Bull, *Anthurium andreaum* Linden, *Caladium humboldtii* Schott, *Dieffenbachia seguine* (Jacq.) Schott, *Epipremnum pinnatum* (L.) Engl., *Monstera deliciosa* Liebmann, *Philodendron bipinnatifidum* Schott ex Endl., *Rhaphidophora aurea* (Linden & André) Birdsey, *Rhaphidophora pertusa* (Roxb.) Schott, *Spathiphyllum wallisii* Regel, *Syngonium*

macrophyllum Engl., *Syngonium podophyllum* Schott and *Xanthosoma lindenii* (André Engl.) and some edible taxa are cultivated to meet commercial demand [eg. *Colocasia esculenta* (L.) Schott, *Xanthosoma sagittifolium* (L.) Schott, *Alocasia macrorrhizos* (L.) G. Don and *Amorphophallus paeoniifolius* (Dennst.) Nicolson var. *campanulatus* (Decne.) Sivadasan]. Therefore there is little need to take conservation measures for them. The growers themselves will try to conserve and maintain them. But out of 111 taxa, many are wild and growing in the hilly area of high rainfall zones. These taxa need conservation because their habitats are reducing and changing fast. Removal of our hill forests, however, eliminates most terrestrial, climbing and epiphytic species, many of which are shade dependent. Invasion of woody plants to the forest area after the outbreak of fire prevent regeneration of many aroids.

There are some taxa which have been collected from a restricted area, even from a single place, viz. *Alocasia salarkhanii* H. Ara & M.A. Hassan, *Ariopsis peltata* Nimmo, *Ariopsis protanthera* N.E. Br., *Colocasia oresbia* A. Hay var. *obtusifolia* H. Ara & M.A. Hassan, *Gonatopus boivinii* (Decne.) Engl., *Lasia viridis* H. Ara & M.A. Hassan, *Typhonium blumei* Nicolson & Sivadasan, *Typhonium elatum* H. Ara & M.A. Hassan, *Typhonium trilobatum* (L.) Schott var. *fulvus* H. Ara & M.A. Hassan and *Xanthosoma undipes* (K. Koch) K. Koch need more attention to conservation immediately. Others also deserves help to grow freely in their own natural growing areas such as *Alocasia salarkhanii* H. Ara & M.A. Hassan, many species of *Amorphophallus* Blume ex Decaisne available in Bangladesh, *Ariopsis peltata* Nimmo, *Ariopsis protanthera* N.E. Br., *Colocasia affinis* Schott, *Rhaphidophora glauca* Schott, *Rhaphidophora hookeri* Schott, *Scindapsus scortechinii* Hook.f., *Stuednera colocasiifolia* K. Koch, *Stuednera discolor* N.E. Br., *Stuednera gagei* Krause and *Typhonium geniculatum* H. Ara & M.A. Hassan.

Besides these, 32 species have been collected from Moulvibazar district. At least one large area in the forest of Moulvibazar may be declared sanctuary so that aroids growing there may continue growing to long time. Some species also need to be conserved in different botanic gardens of the country *ex-situ*.

7.4 Concluding Remarks

Species richness of an area or of a group like Araceae can be confirmed through intensive and extensive search to all the possible places within the territorial boundary. Distributional records based mainly on sample collection places indicates that aroid rich areas mainly lie in the North-east and East boarder districts i.e. Sherpur, Netrakona, greater Sylhet, greater Chittagong and Chittagong Hill Tracts districts. More extensive and intensive collections from these areas may increase total number of aroid taxa in Bangladesh.

Identification of new taxa always comes from careful comparative morphological floral and cytological studies. Identification of 10 new taxa (6 species and 4 varieties) in the present treatment is the outcome of such careful comparative studies. Therefore, new aroid collection having any morphological uniqueness should be carefully studied taking aids from other related branches like Cytology.

Strong steps should be taken officially by the Ministry of Environment and Forest to stop forest clearing, Hill cutting, Firing. For aroid conservation protected areas in Sherpur, Moulvibazar, Chittagong and Hill Tract districts should be declared. For Ex-situ conservation collection of living specimens as well as propagules should be made and planted in suitable areas.

Under a definite programme our wild aroids may be investigated for their toxic as well as nutritional properties so that some of them could be included in our edible list.

CHAPTER 8

REFERENCES

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REFERENCES

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284.	Lagenandra Dalzell	3,41,47,49,50,54,55,56,57,58,106,126,142, 309
285.	Lagenandra gomezii (Schott) Bogner & Jacobson	82,86,142, 310 ,463,468,472,473,474
286.	Lagenandra nairii Ramam. & Rajan	142
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N.B. : Bold face = correct name; italic = synonyms.

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292.	<i>Lasia deciscens</i> Schott	314
293.	<i>Lasia hermanni</i> Schott	314
294.	<i>Lasia heterophylla</i> (Roxb.) Schott	314
295.	<i>Lasia loureirii</i> Schott	314
296.	Lasia Loureiro	39,53,54,55,126,139, 312
297.	<i>Lasia roxburghii</i> Griff.	314
298.	Lasia spinosa (L.) Thw.	47,82,90,96,97,104,110,114,118,122, 129,133, 312, 313 ,463,470,471, 474,475
299.	<i>Lasia spinosa</i> f. <i>diversifolia</i> Alderw.	315
300.	<i>Lasia spinosa</i> f. <i>simplex</i> Alderw.	315
301.	<i>Lasia spinosa</i> var. <i>hermannii</i> Engler	314
302.	Lasia viridis H. Ara & M.A. Hassan, sp. nov.	82,86,129,133,313, 320 ,470,472,474, 476
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304.	Lasimorpha Schott	126
305.	Lazarum A. Hay	126
306.	Lemna L.	59
307.	<i>Leucocasia gigantea</i> (Blume) Schott	256
308.	Lysichiton camtschatcensis (L.) Schott	111
309.	Lysichiton Schott	107,126
310.	Mangonia Schott	126
311.	Menyanthes (Tourn.) L.	59
312.	Monstera Adanson	3,47,96,97,105,126,140, 323
313.	<i>Monstera adansonii</i> Schott	323
314.	<i>Monstera borsigiana</i> Engler	325
315.	Monstera deliciosa Liebmann	38,82,90,96,97,99,130, 324 ,466,472, 475

N.B. : Bold face = correct name; italic = synonyms.

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318.	<i>Monstera microstachya</i> Schott	326
319.	Monstera obliqua Miq.	82,99,324, 326 ,466,472
320.	<i>Monstera peepla</i> Schott	375
321.	<i>Monstera pertusa</i> (Roxb.) Schott	378
322.	<i>Monstera pinnata</i> Schott	291
323.	<i>Monstera tacanaensis</i> Matuda	325
324.	Montrichardia arborescens (L.) Schott	107
325.	Montrichardia linifera Schott	95,102
326.	Montrichardia H. Crüger	126
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329.	Orontium L.	47,107,126
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331.	Pedicellarum M. Hotta	126
332.	Peltandra Rafinesque	103,107,126
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334.	Philodendron bipinnatifidum Schott <i>ex</i> Endl.	38,82,97,100,130, 329 ,466,472,475
335.	Philodendron crassinervium Lindl.	47,49
336.	<i>Philodendron grandifolium</i> (Jacq.) Schott	328
337.	Philodendron lacerum (Jacq.) Schott	82,100,329, 331 ,467,472
338.	<i>Philodendron lundii</i> Warming	329
339.	Philodendron mamei Andre'	82,100,329, 332 ,467,472
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341.	Philodendron scandens C. Koch & Sello <i>ex</i> Koch	82,97,100,130,329, 333 ,467,472
342.	Philodendron Schott	3,39,41,43,47,49,50,54,58,97,102,103, 108, 111,126,141, 328

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351.	Pistia L.	38,39,43,49,50,54,56,126,139, 334
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354.	Pistia stratiotes L.	82,96,102,104,107,130,334, 335 ,463,470,471
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371.	<i>Pothos chapelieri</i> Schott	346
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384.	Pothos junghuhnii de Vriese	82,341, 343 ,463,473,474
385.	Pothos L.	4,39,43,47,50,53,54,55,58,126,139, 340
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419.	Remusatia vivipara (Roxb.) Schott	82,96,104,108,130,352,353, 355 ,465,468,471,473,474
420.	<i>Remusatia vivipara</i> sensu Wight	222
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422.	Rhaphidophora affinis Schott	83,359, 360 ,465,468,473,474

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424.	Rhaphidophora calophyllum Schott	83,130,360, 363 ,465,468,471,473,474
425.	Rhaphidophora calophyllum Schott var. violaceus H. Ara & M.A. Hassan	83,86, 365 ,470,472,474
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430.	<i>Rhaphidophora glauca</i> (Wall.) Schott var. <i>hasiana</i> Hook. f.	371
431.	Rhaphidophora grandis Schott	83,359, 372 ,465,474
432.	Rhaphidophora Hasskarl	38,39,43,50,55,97,105,126,140, 358
433.	Rhaphidophora hookeri Schott	83,114,118,120,360, 374 ,463,474,476
434.	<i>Rhaphidophora lacera</i> Hasskarl	358
435.	<i>Rhaphidophora lancifolia</i> Schott	363
436.	Rhaphidophora peepla Schott	83,96,360, 375 ,463,468,474
437.	Rhaphidophora pertusa (Roxb.) Schott	83,96,360, 378 ,465,475
438.	<i>Rhaphidophora pinnata</i> (L.) Schott	291
439.	Rhaphidophora schottii Hook. f.	83,360, 380 ,463,469,473,474
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454.	<i>Scindapsus argyraeus</i> Engl.	390
455.	<i>Scindapsus aureus</i> (Linden & André) Engl.	362
456.	<i>Scindapsus decursivus</i> (Roxb.) Schott	369
457.	<i>Scindapsus erectus</i> Presl	153
458.	<i>Scindapsus glaucus</i> (Wall.) Schott	371
459.	Scindapsus officinalis (Roxb.) Schott	83,95,114,118,120,123,130,384, 385 , 463,475
460.	<i>Scindapsus peepla</i> Schott	375
461.	Scindapsus perakensis Hook. f.	83,130,385, 388 ,465,469,475
462.	<i>Scindapsus pertusus</i> (Roxb.) Schott	378
463.	Scindapsus pictus Hassk.	83,385, 390 ,465,474
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465.	<i>Scindapsus pothoides</i> Schott	390
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478.	Stuednera colocasioides Hook. f.	84,130,398, 401 ,463,474
479.	Stuednera discolor N.E. Br.	84,398, 405 ,463,469,474,476
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488.	Syngonium podophyllum Schott	84,96,97,101,114,118,120,123,130, 410, 412 ,467,475,476
489.	Syngonium Schott	3,97,127,142, 409
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497.	<i>Typhonium amboinense</i> Blatter & McCann	435
498.	Typhonium blumei Nicolson & Sivadasan	57,84, 416 ,466,469,471,473,474,476
499.	Typhonium cochleare A. Hay	84,415, 417 ,466,471,474
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504.	Typhonium elatum H. Ara & M.A. Hassan, sp. nov.	84,86,130,132,415, 420 ,470,471,472, 474,476
505.	Typhonium flagelliforme (Lodd.) Blume	57,84,114,118,123,130,415, 423 ,463, 470,471,474
506.	Typhonium geniculatum H. Ara & M.A. Hassan, sp. nov.	84,86,131,415, 427 ,470,472,474,476
507.	Typhonium gracile (Roxb.) Schott	84,415, 431 ,463,469,474
508.	Typhonium listeri Prain	84,415, 433 ,463,469,473,474
509.	<i>Typhonium motleyanum</i> Schott	435
510.	<i>Typhonium orixense</i> (Andr.) Schott	438
511.	Typhonium roxburghii Schott	57,84,95,104,131,416, 434 ,464,469, 474,475
512.	Typhonium Schott	3,38,43,47,50,53,54,55,56,58,107,127, 132, 142, 414
513.	Typhonium trilobatum (L.) Schott	55,57,85,94,96,104,114,120,123,131, 132,414, 415, 437 ,464,470,471,475
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530.	<i>Xanthosoma xanthorrhizon</i> (Jacq.) Koch	450
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