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No. 72

TACCACEAE

EDITORS

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And
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By
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AND
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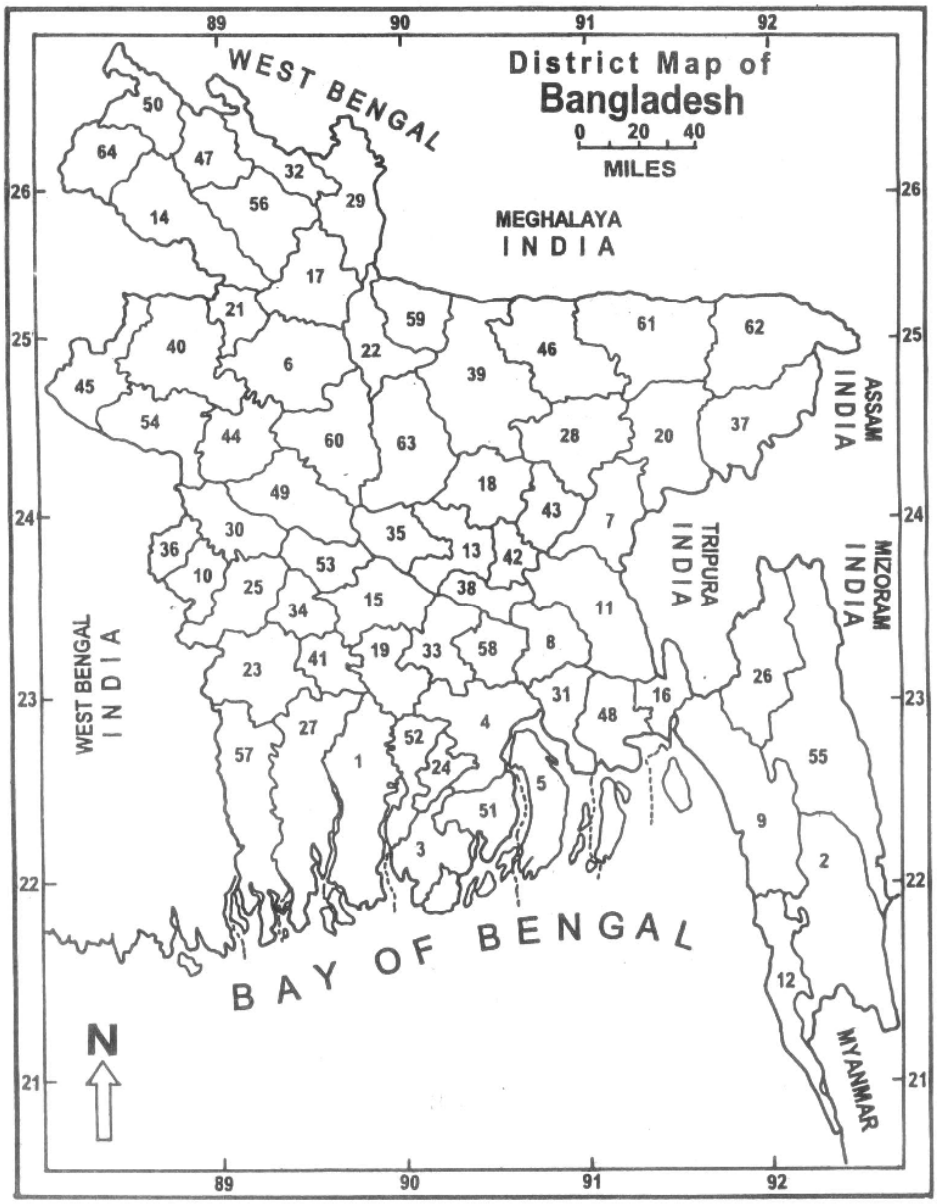
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MILES
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7. Brahamanbaria
8. Chandpur
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11. Cumilla
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13. Dhaka
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15. Faridpur
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30. Kushtia
31. Lakshmipur
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33. Madaripur
34. Magura
35. Manikganj
36. Meherpur
37. Maulvibazar
38. Munshiganj
39. Mymensingh
40. Naogaon
41. Narail
42. Narayanganj
43. Narsingdi
44. Natore
45. Nawabganj
46. Netrakona
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48. Noakhali
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51. Patuakhali
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53. Rajbari
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60. Sirajganj
61. Sunamganj
62. Sylhet
63. Tangail
64. Thakurgaon

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TACCACEAE Dumortier

Hosne Ara[1] and Md. Abul Hassan[2]

Perennial herbs with rhizomatous stem. Rhizome solid, starchy, globose or elongate, vertical or horizontal, sometimes tuberous. Leaves all basal, usually large, long petioled, blades entire to much dissected, venation parallel or palmate and with secondary network. Inflorescence a cymose umbel, involucrate, borne on a scape. Flowers pedicellate, actinomorphic, bisexual, epigynous, trimerous. Tepals 6, in two whorls of 3 each, usually dark-coloured, petaloid, often connate toward the base. Stamens 6, arranged in 2 cycles, attached to the perianth-tube or to the base of the tepals, filaments short, flat, anthers tetrasporangiate, 2-celled, bursting through longitudinal slits. Carpels 3, syncarpous, 6-ribbed, ovary inferior, unilocular, ovules many, placentation parietal, styles very short, stigmatic branches 3, incurved, stigmas dry, papillate. Fruit a berry or seldom a loculicidal capsule. Seeds 10 to many, endosperm copious.

The family Taccaceae consists of the single genus Tacca (including Schizocaspa), with about 10 species, pantropical in distribution, but mostly in South East Asia and Polynesia (Hassan, 2008). In Bangladesh, the family is represented by 4 species.

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Abbreviations used for the herbaria (Other than the recognized acronyms)

DUSH= Dhaka University Salar Khan Herbarium
HCU= Herbarium of Chittagong University
BFRIH= Herbarium, Bangladesh Forest Research Institute

Tacca J. R. & G. Forst.,
Char. Gen. Pl.: 35 (1775), nom.cons.
Type species: *T. Pinnatifida* J.R. & G. Forst.

Terrestrial perennial herbs. Stem rhizomatous, rhizome tuberous, solid, globose or elongate, starchy. Leaves rosulate, up to 13 in number, appearing together with the inflorescence, petiolate, entire or pinnatifid, palmatipartite or palmatisect, palmately or pinnately nerved, venation ultimately reticulate, petioles erect, ribbed, canaliculate distally, base sheathing, usually solid. Inflorescence an involucrate umbell, usually at the top of a simple scape, involucral bracts mostly 4 in 2 whorls. Flowers pedicellate, bisexual, actinomorphic, epigynous. Tepals 6 (very rarely 8), gamophyllous, basally connate forming a tube, upper part 6-lobed in 2 whorls each of 3, imbricated in bud, usually dark-coloured. Stamens 6 (very rarely 8), inserted on the perianth tube, epitepalous, filaments short and flattened, basal adnate portion rhomboid in outline, the free portion helmet-shaped, anthers introrse, bursting lengthwise. Carpels 3, united, 6-

ribbed (sometimes 3 ribs obscure), ovary unilocular, placentas 3, parietal, style 1, usually with 3-wings. Fruits berry-like.

KEY TO THE SPECIES

1	Leaf blade entire, elliptic, oblong to lanceolate	**2**
+	Leaf blade deeply lobed	**T. leontopetaloides**
2	Leaf base attenuate along the petiole. Fruit dehiscent	**T. plantaginea**
+	Leaf base not attenuate along the petiole. Fruit indehiscent	**3**
3	Seeds ovate to ovate-oblong, dorsoventrally flattened, inner 2 involucral bracts long petiolate	**T. integrifolia**
+	Seeds reniform, laterally flattened, inner 2 involucral bracts sessile	**T. chantrieri**

Tacca chantrieri André, Rev. Hort. 73: 541 (1901). Drenth, Blumea 20: 393 (1972); in Fl. Malesiana 7(1): 813 (1976); Naithani, Fl. Pl. India, Nepal & Bhutan: 439 (1990); Phengklai, Fl. Thailand 6 (1): 3- 4 (1993); Ting & Larsen, Fl. China 24: 274 (2000); Hassan in Ahmed *et al*., Encycl. Fl. Fauna Bangladesh 12: 447 (2008); *T. vespertilio* Ridl., Mat. Fl. Malay. Penins.2: 77 (1907); *T. minor* Ridl., Mat. Fl. Malay. Penins. 2: 78 (1907); Fl. Mal. Pen. 4: 311 (1924); *T. garrettii* Craib, Bull. Misc. Inform. Kew 1912: 106 (1912); *Schizocapsa brevis-capa* (Ostenf.) H. Limpr., Pflanzenr. IV, 42: 11 (1928); *Tacca paxiana* H. Limpr., Pflanzenr. IV, 42: 16 (1928). **Fig. 1.**

English: *Bat Flower*

A perennial herb with cylindrical rhizome, rhizome growing vertically, up to 10.0 × 1.5 cm. Leaves 3-12, rosulate, petiolate, petioles including sheath up to 30 cm long, blades elliptic-ovate, oblong to lanceolate, up to 60 × 18 cm, glabrous, base cuneate, more or less oblique, not attenuate along petiole, margin entire, apex acuminate to cuspidate. Inflorescence 1-2, each usually 4 to 6-flowered, rarely up to 25-flowered,

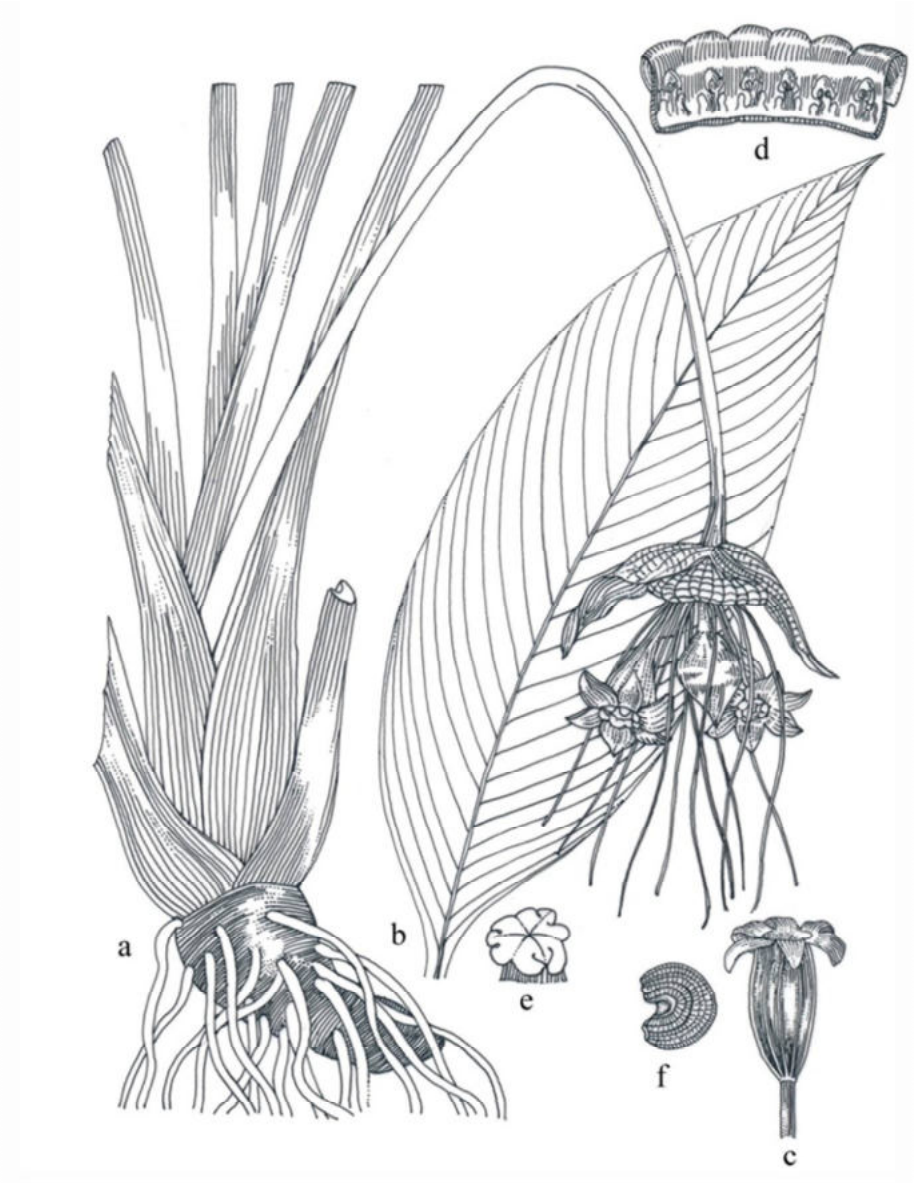

Figure 1. **Tacca chantrieri** André. a) habit sketch; b) leaf; c) flower; d) opened perianth showing stamens; e) stigma; f) seed.

scape up to 70 cm long, longer than the petioles. Involucral bracts 4, arranged in 2 decussate pairs, green to dark purple, sessile, outer pair ovate or lanceolate, inner pair ovate or obovate. Bracts filiform, up to 25 cm long, greenish-purple, each flower in the axil of a bract. Flowers pedicellate (pedicels 2.0-3.5 cm long), 1.0-2.5 × 0.6-2.0 cm, greenish to dark purple, actinomorphic, epigynous, trimerous. Perianth of 6 tepals in 2 whorls, 3 outer tepals ovate or triangular, 5-12 × 3-8 mm, 3 inner tepals broad, ovate, 4-11 × 4-12 mm, all reflexed during anthesis. Stamens 6, each opposite to a tepal, greenish-yellow, basal part of the filaments adnate to the tepals. Carpels 3, united, ovary inferior, 2-7 × 3-5 cm, many, reniform, 3-4 × 2.0-2.3 mm, glabrous, brown. *Fl. & Fr.*: 1-12. *Primary and secondary evergreen forests, up to an altitude of 1000 m.*

Dhaka: Dhaka University Botanical Garden, 6 vii 2009, *Sumona Afroz* 54 (DUSH). **Moulvibazar**: Adampur beat, Kawrargola forest, 06 x 2005, *Hosne Ara* HA. 2620 (DACB).

Continental South East Asia such as the region comprising India, Myanmar, Thailand, China, Vietnam and Malay Peninsula (van Steenis, 1975).

In Vietnam, the rhizome is macerated in alcohol and used externally to treat rheumatism. In Thailand, rhizomes are used as an antipyratic. Rhizome of this plant contains about 1.2% diosgenin. Stigmasterol and daucosterin have also been isolated from the rhizome. Diosgenin is the starting material in the production of oral contraceptives, sex hormones and corticosterrids (Lemmens and Bunyapraphatsara, 2003).

Young leaves and inflorescence are eaten as vegetable (Hassan, 2008).

Tacca integrifolia Ker-Gawl., Bot. Mag. 35: t. 1488 (1812). Hook. f., Fl. Brit. India 6: 287-288 (1892); Prain, Bang. Pl. 2: 1063 (1903); Heinig, List Chittagong: 71 (1925); Drenth, Blumea 20: 388 (1972); in Fl. Malesiana 7 (1): 811-812 (1976); Fl. Pl. India, Nepal & Bhutan: 439 (1990); Phengklai, Fl. Thailand 6 (1): 1-3 (1993); Noltie, Fl. Bhutan 3 (1): 17-19 (1994); Ting & Larsen, Fl. China 24: 274 (2000); Hassan in Ahmed *et al*., Encycl. Fl. Fauna Bangladesh 12: 447-448 (2008); *T. cristata* Jack, Malayan Misc.

1 (5): 23 (1821); Hook. f., Fl. Brit. India 6: 287 (1892); *T. aspera* Roxb., Fl. Ind. ed. Carey 2: 169 (1832); Sinclair, Bull. Bot. Soc. Beng. 9 (2): 109 (1956); *T. laevis* Roxb., Fl. Ind. ed. Carey 2: 171 (1832); Hook. f., Fl. Brit. India 6: 288 (1892); Prain, Beng. Pl. 2: 1063 (1903); Heinig, List Chittagong: 71 (1925); *T. lancaefolia* Zoll. & Mor., Mor. Syst. Verz.: 91 (1846); *T. chantieri* (non André) Ridl., Fl. Mal. Pen. 4: 311 (1924). **Fig. 2.**

Bengali: *Mati Munda* English: *White Bat Flower*

A perennial herb with cylindric rhizome, rhizome growing vertically, up to 12 × 3 cm. Leaves 2-13 together, rosulate, variable in shape, usually oblong or lanceolate, petiolate (petioles long, up to 50 cm long including basal sheath), 7.5-50.0 × 5-25 cm, base attenuate, margin entire, apex acuminate, nerves pinnate. Inflorescence 1 to few, each up to 30-flowered, scape 10-50 cm long. Involucral bracts 2 pairs, not decussate, outer pair greenish-white, smaller, broadly lanceolate to ovate-lanceolate, sessile, inner pair longer and broader, ovate with basal stalk-like structure, one-sided, more or less in the axils of outer bracts, 15 × 9 cm. Flowers pedicellate, bracteate, bisexual, actinomorphic, epigynous, trimerous, pedicels up to 4 cm long, dark purple. Bracts filiform, off-white, 1 per flower, up to 40 cm long. Tepals 3 + 3, outer lobes elliptic or oblong, inner lobes ovate or obovate. Stamens 6, 3 opposite to the outer tepals and 3 opposite to the inner tepals. Carpels 3, syncarpous, 6-ribbed, ovary inferior, styles short, stigmas 3. Fruits slightly 6-angled with persisting perianth. Seeds ovoid, concave, ribbed. *Fl. & Fr.*: 3-11. *Evergreen forests, up to an altitude of 1200 m.* 2n = 28 (Kumar and Subramaniam, 1986).

Bandarban: Thana para, Ruma, 10 v 2018, *Khandakar Kamrul Islam* KKI. 2805 (DACB). **Chattogram:** Hazarikhil, 16 iv 1994, *Hug & Mia* 10285 (DACB); Chunati, 09 vi 2001, *Sarder Nasir Uddin* N. 936 (DACB); Hazarikhil, 20 viii 2014, *Sarder Nasir Uddin* N. 5523 (DACB); Fatikchori, 22 v 2017, *Tajul, Al-Amin & Kawsar* TAK. 5067 (DACB); 06 xi 2017, *Md. Moniruzzaman, Al-Amin & Kawsar* MAK. 6241 (DACB); Rangunia, 17 i 2018, *Md. Moniruzzaman & Kawsar* MK. 7243 (DACB). Napittachora,

Figure 2. **Tacca integrifolia** Ker-Gawl., a) habit sketch; b) inner bract; c) flower; d) stigma; e) seed.

Mirsori, 14 v 2018, *Md. Moniruzzaman & Kawsar* MK. 8448 (DACB). **Chittagong Hill Tracts**: Locality unknown, 1936, Rev. *W.I. L. Wenger*. 482 (CAL); 1876, *J.L. Lister* (CAL). **Dhaka:** Khilgaon (originally collected from Maulvibazar dist.), 15 iii 2009, *Hosne Ara* HA. 2745 (DACB); Dhaka University Botanical Garden, 6 vii 2009, *Sumona Afroz* 52, 53 (DUSH). **Maulvibazar:** Adampur beat, Kawargola forest, 06 × 2005, *Hosne Ara* HA. 2619 (DACB); Khilgaon (Originally collected from Moulvibazar dist, Adampur beat, Gangpali), 15 iii 2009, *Hosne Ara* HA. 2745 (DACB); Lawachara National Park, 17 viii 2009, *Sarder Nasir Uddin* N. 3848 (DACB). **Rangamati**: Sitapahar, Kaptai, 1 × 1996, *Sarder Nasir Uddin* N. 310 (DACB); 15 iv 1997, *Khan, Yusuf, Alam & Nasir* K. 9882 (DACB); Naniar char, 26 x 1998, *M.A. Rahman's collector, SB Uddin, MK Huda* 3480A (HCU); Sitapahar, Kaptai, 04 vi 1999, *M.A. Rahman's collector, SB Uddin & Hossain* 4963 (HCU); Sita Pahar, Kaptai, 17 vi 2001, *Sarder Nasir Uddin* N. 1048 (DACB); 12 vi 2002, *A.F.M. Nazmus Sadat* (DACB); 24 ix 2002, *Sarder Nasir Uddin* N. 1515 (DACB); Rampahar, 2 × 2002, *Sarder Nasir Uddin* N. 1771 (DACB); locality unknown, 2005, *Singdha Roy* R. 13 (DACB); Farua reserve forest, Biloichari, 16 i 2009, *Sarder Nasir Uddin* N. 3195 (DACB). **Sylhet**: Potichara, Kurma beat, 25 viii 1982, *M.K. Alam* 4451 (BFRIH).

Bhutan, India (Assam and Tripura states), Myanmar, China, Thailand, Malaysia and Indonesia (van Steenis, 1975).

Rhizomes of *Tacca integrifolia* contain up to 3.3% diosgenin. In peninsular Malaysia, pulped rhizomes are applied externally to skin to treat rash. A decoction of rhizome is used in Thailand in the treatment of hypotension and as an aphrodisiac. It is planted in the gardens as an ornamental (Hassan, 2008).

Tacca leontopetaloides (L.) Kuntze, Revis. Gen. Pl. 2: 704 (1891). Back., Handb. Fl. Java 3: 107 (1924); Carter, Fl. Trop. E. Africa: 1-3 (1962); Drenth, Blumea 20: 375 (1972); in Fl. Malesiana 7 (1): 809- 811 (1976); Phengklai, Fl. Thailand 6 (1): 5-7 (1993); Ting & Larsen, Fl. China 24: 274 (2000); Hassan in Ahmed *et al*., Encycl. Fl. Fauna Bangladesh 12; 448-449 (2008); Jayanthi, Fl. Campbell Bay National Park, G. Nicobar, India: 328 (2017); *Leontice leontopetaloides* L., Sp. Pl. 1: 313 (1753); *Tacca pinnatifida*

J.R. & G. Forst., Char. Gen. Pl. 35. t. 35 (1775); Hook. f., Fl. Brit. India 6: 287 (1892-reprint 1954); Prain, Beng. Pl. 2: 1063 (1903-reprint 2004); Haines, Bot. Bihar & Orissa 6: 1114 (1924); Heinig, List Chittagong: 71 (1925); Fischer in Gamble, Fl. Pres. Madras 3: 1052 (1935-reprint 1967); *T. pinnatifolia* Gaertn., Fruct. 43. t. 14 (1788); *T. involucrata* (Limpr.) Schum. & Thonn., Beskr. Guin. Pl.: 197 (1827); *T. dubia* Schult., Syst. Veg. 7: 167 (1829). **Fig. 3.**

Bengali: *Dhai (Santal)*

A perennial herb with starchy tuber. Tuber depressed-globose or broadly ellipsoid, up to 5 cm (or more) high, older ones dark grey to brown, white within. Leaves 1-3, long petioled (petioles up to 170 cm long), palmately 3-sect, each of the 3 segments pinnately-lobed to dissected. Inflorescence 1 or 2, 20 to 40-flowered, scape hollow, green, up to 170 cm long. Involucral bracts 4-10, of different size and shape. Bracts filiform, 20-40 in number (same as the number of flowers), up to 25 cm long, dark purple or blackish-brown. Flowers pedicellate (pedicels up to 6 cm long), bisexual, actinomorphic, trimerous, 6-17 × 6-13 cm, drooping, light-yellow, yellowish-green or blackish-purple green. Perianth of 6 tepals, arranged in 2 whorls of 3 each, 3 outer lobes elliptic or lanceolate, 3 inner lobes ovate or oblong. Stamens 6, white or dull-yellow to brown or purple. Carpels 3, united into a compound ovary, ovary 2-5 × 2-4 mm, disk annular, ribbed, placentation parietal. Fruits globose, 1.5-2.5 cm in diameter, pendulous, pale to dark green, pale orange on ripening. Seeds many, ovoid to ellipsoid, flattened, yellowish-brown. *Fl. & Fr.*: 8-9 (Phengklai, 1993), 1-12 (van Steenis, 1975). *Soil and inland vegetation, also found in coastal vegetation, usually below an altitude of 200 m, rarely in heavy shade and in primary forests* (van Steenis, 1975). 2n = 30 (Lemmens *et al.*, 2003).

This plant was recorded from Bangladesh by Prain (1903). But this species was not observed by the authors anywhere in Bangladesh during field visits within the period of 1970-2018. Description of the plant furnished here is based on Phengklai (1993).

This species widely distributed in the Old and New World from West Africa through South East Asia, throughout Malesia, North Australia to Polynesia (van Steenis, 1975).

Figure 3. **Tacca leontopetaloides** (L.) Kuntze, a) habit sketch; b) ovary and style; c) fruit; d) seed.

Tuber is edible. Starch is extracted from the tubers for making bread, paste and pudding mixed with other ingredients. The tubers contain a bitter substance, known as taccalin, which is said to be poisonous and hence before eating the cut tuber pieces should be thoroughly washed. In India and Polynesia, tubers are used as a medicine against diarrhoea, dysentery and oedemas (van Steenis, 1975; Lemmens and Bunyapraphatsara, 2003).

Notes: This species may easily be confused in its vegetation state with the genus *Amorphophallus* (Araceae) but can be readily recognized by its ribbed and hollow petiole, which is smooth and solid in *Amorphophallus*.

Tacca plantaginea (Hance) Drenth, Blumea 20: 391 (1972). Phengklai, Fl. Thailand 6 (1): 5-6 (1993); Hassan & Uddin, Bangladesh J. Plant Taxon. 14 (1): 71-73 (2007); Hassan in Ahmed *et al*., Encycl. Fl. Fauna Bangladesh 12: 449-450 (2008); *Schizocapsa plantaginea* Hance, J. Bot. 19: 292 (1881). **Fig. 4.**

English: *Mini Bat Plant*

A perennial herb with cylindrical rhizome. Leaves 3-8 together, rosulate, petiolate, petioles up to 30 cm long, channelled along upper surface, lamina lanceolate, up to 30 × 8 cm, base attenuate along the petiole, margin entire, apex acuminate. Inflorescence 1-4, scape up to 20 cm long and 20-flowered. Involucral bracts 4, arranged in 2 pairs, decussate, sessile, green, outer pair larger, 1-2 × 1.3 cm, ovate-lanceolate, inner pair smaller, 0.8-1.6 × 0.5-1.0 cm, ovate. Bracts filiform, light green, up to 8 cm long, one for each flower. Flowers pedicellate, light green, 1-2 × 0.5-1.0 cm, bisexual, actinomorphic, epigynous. Tepals 6 in 2 series of 3 each, outer 3 larger 5-11 × 2.5 mm, ovate, inner 3 smaller, broadly ovate. Stamens 6, light green, each opposite to a tepal. Carpels 3, 6-ribbed, 3 ribs prominent and 3 obscure, ovary inferior, 1-chambered, placentation parietal. Fruits dehiscent, triangular. Seeds oblong-ovoid. *Fl*. & *Fr.*: 5-11. *Evergreen and mixed deciduous forests, up to an altitude of 600 m.*

Figure 4. **Tacca plantaginea** (Hance) Drenth, a) habit sketch; b) flower; c) stigma; d) outer tepal and stamen; e) seed.

Dhaka: Dhaka University Botanical Garden, 6 vii 2009, *Sumona Afroz* 51 (DUSH).

Habiganj: Rema- Kalenga Wildlife Sanctury, *Zashim Uddin* (DUSH).

South China, Vietnam and Laos (Phengklai, 1993).

May be grown as an ornamental pot plant (Hassan, 2008).

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