

FIVE NEW RECORDS OF AROIDS FOR BANGLADESH

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Keywords: New record; Araceae; Bangladesh.

Abstract

The paper deals with five species of the family Araceae which are new records for Bangladesh, viz. *Amorphophallus excentricus* Hett., *A. krausei* Engl., *Colocasia virosa* Kunth, *Stuednera gagei* Krause and *Xanthosoma undipes* (K. Koch) K. Koch. An updated nomenclature, important synonyms, description, phenology, ecology, specimen citation and geographical distribution are provided for each species.

Introduction

The family Araceae de Juss. is represented by 110 genera and 1,800 species mostly throughout the tropical and subtropical regions of the world with few in the temperate regions (Cronquist, 1981). The family is represented in Bangladesh by 30 genera and 89 species including wild and cultivated (Ara, 2007). Hooker (1893) and Prain (1903) have previously reported 30 and 27 species of the Araceae respectively, from the area now in Bangladesh. Rahman and Toha (2001) and Toha *et al.* (2004) reported some aroids as new distributional records for Bangladesh. In the last decade or so, extensive field trips throughout the country have been made by the first author which resulted in several new records of the Araceae for Bangladesh (Ara 2001, 2007). The first author collected a large number of specimens of the family Araceae from different parts of Bangladesh and identified them up to species. After confirmation of the identity of all the specimens it has been confirmed that none of the following five species viz. *Amorphophallus excentricus* Hett., *A. krausei* Engl., *Colocasia virosa* Kunth, *Stuednera gagei* Krause and *Xanthosoma undipes* (K. Koch) K. Koch have been reported from the area of Bangladesh in any relevant literature, such as, Hooker (1893), Prain (1903), Heinig (1925), Sinclair (1956), Mia and Khan (1995), Rahman (1997), Rahman (2004a, 2004b) and Ara (2007). Therefore, these five species of Araceae have been treated here as the new records for Bangladesh.

Materials and Methods

The paper is based on the materials collected by the first author from different forest areas of the country during different field trips made from 2000 to 2010. The specimens, after study, have been preserved in Bangladesh National Herbarium (DACB). Identifications were confirmed by consulting Engler (1911), Engler and Krause (1920), Nicolson (1987), Hetterscheid (1994), Noltie (1994), Hetterscheid and Ittenbach (1996) and Rodriguez and Strong (2005). Description of each species, based on examined specimens, has been prepared. Photographs from fresh specimens have been taken. Each species is cited with current nomenclature, commonly known synonyms, specimen citation, ecology and geographical distribution.

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Taxonomy

1. **Amorphophallus excentricus** Hett., *Blumea* 39 (1-2): 254-257 (1994). Hetterscheid and Ittenbach, *Aroideana* 19: 67 (1996). (Figs 1-3)

Tuber subglobose, 11 cm in diam., 10 cm in height. Leaf solitary, lamina 65 cm in diam., leaflets elliptic-lanceolate, acuminate, 2-20 cm long, 2-5 cm in diam., marginal surface slightly undulate, dark green above and paler below; petiole 120 cm long, 4 cm in diam. at base and tapering towards the tip, smooth, cream colour with bottle-green mottlings and paler towards the tip. Peduncle 98 cm long, 2.5 cm in diam., smooth, cream with bottle-green mottlings, covered by cataphylls; cataphyll 23 cm long, 7 cm in diam. Spathe erect, cymbiform, not differentiated into tube and limb, 33 cm long, 10.5 cm in diam. at base, with cream coloured small wart at the base. Spadix shorter than spathe, 29.5 cm long. Male flowers in a zone 8 cm long, 2 cm in diam.; appendix elongate fusiform, top acute or slightly rounded, base constricted, 17 cm long, 3 cm in diam., at the middle and tapering towards the tip, light yellow; stamens 3-5, c 2 mm long, 1.5 mm in diam.; anthers truncate. Female flowers below in a zone, cylindric, 4 cm long, 2 cm in diam.; no sterile region between male and female zones. Ovary sub-globose, 1 mm long, 2 mm in diam., greenish, unilocular with a single basal anatropous ovule; style very short, 0.5 mm long; stigma 1.5-2.5 mm in diam., 0.5-1.0 mm long, inconspicuously 4-lobed with a bigger median lobe, yellowish to brownish. *Flowering time*: June.

Specimens examined: **Maulvi Bazar**: Madhabkundo forest, 5.6.1998, Hosne Ara HA 35 (DACB). **Dhaka**: Bangladesh National Herbarium Garden (Cultivated), 26.6.2004, Hosne Ara HA 1075 (DACB) [Originally collected from Maulvi Bazar district].

Ecology: Grows in shady places of forest.

Geographical distribution: Peninsular Thailand.

Note: *A. excentricus* Hett. differs from previously reported four *Amorphophallus* species (Ara, 2007) by its much heavier appendix and a much flatter stigma.

2. **Amorphophallus krausei** Engl., Engler, *Pflanzenr.* 48 (IV. 23 C): 94 (1911). Hetterscheid and Ittenbach, *Aroideana* 19: 92-93 (1996). (Figs 4-6)

Tuber globose, 9 cm in diam., 6.5 cm in height, no branching. Leaf solitary, lamina 60-80 cm in diam.; leaflets elliptic-lanceolate, acuminate, base decurrent, 2-25 cm long, 1-3 cm in diam., upper side green, lower side paler green; petiole smooth, 20-120 cm long, 1-2 cm in diam., 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. Peduncle 34-45 cm long, 1.3 cm in diam. 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 diam. at base, outside brown with green spots, inside white. Spathe ovate-lanceolate, acuminate, 19.0-21.5 cm long, 6 cm in diam. at the middle, 7 cm in diam. at the base, basally convolute for 3.5-4.0 cm, remainder flattened, erect, greenish purple with light green spot outside, light greenish yellow inside at the middle, smooth, very light pinkish purple area at the base within, no distinct warts present, upper side of the spathe twisted, light purple, the margin of the spathe reflexed at maturity, top acute, twisted for 5 cm long. Spadix 17.5-21.0 cm long. Male zone elongate, 4.5-6.5 cm long, 1.3-1.7 cm in diam., flowers congested; appendix elongate, conical, 10.5-12.0 cm long, 2.1-2.8 cm diam. at the middle, base slightly widened, surface smooth, dark yellow, a few staminode present at the base of appendix; male flowers with 1 or 2 stamens, stamens 1.0-2.1 mm long; filaments thick, 1-2 mm long, 1.0-1.4 mm in diam., orange; anthers

subtruncate, 1 mm long, 0.7-1.5 mm in diam. Female zone cylindrical, 2-3 cm long, 1.4-1.5 cm in diam., flowers congested; a few staminode present between male and female zones, 2-3 mm long. Ovary subglobose, 2 mm in diam., 1.5 mm long, pale green, unilocular; style 0.8 mm long, 0.6 mm diam., cream colour; stigma 1.3 mm diam., 0.5 mm long, with a shallow irregular central depression, yellowish or orange. *Flowering and fruiting time*: May to July.

Specimens examined: **Maulvi Bazar**: Adampur beat, Kawargola forest, 3.7.2005, Hosne Ara HA 1768 (DACB). Lawachara reserve forest, 4.7.2005, Hosne Ara HA 1776 (DACB); Gazipur beat, Harargonj reserve forest, 5.7.2005, Hosne Ara HA 1809 (DACB). **Dhaka**: Bangladesh National Herbarium Garden (Cultivated), 28.5.2006, Hosne Ara HA 2645 (DACB); 30.5.2006, Hosne Ara HA. 2646 (DACB); 25.6.2008, Hosne Ara HA 2744 (DACB) [Originally collected from Maulvi Bazar district].

Ecology: Grows in shady, moist places of hill slope, damp places of forest under growth and often mixed with bamboo.

Geographical distribution: Northern Thailand, northern Myanmar and southern China.

Note: *Amorphophallus krausei* Engl. differs from its closest *A. excentricus* Hett. by the presence of the following characters: staminode present between male and female zones of the spadix and also present at the base of appendix.

3. **Colocasia virosa** Kunth, Enum. Pl. 3 : 39 (1841). Schott, Syn.: 41 (1856); Hook. f., Fl. Brit. Ind. 6: 524 (1893); Engler and Krause, Pflanzenr.: 71 (IV. 23 E): 68-69 (1920); Karthikeyan *et al.*, Fl. Ind. Enum.: 10 (1989); *Calla virosa* Roxb., Fl. Ind. III: 517 (1832); Wight, Ic. III.: t. 808 (1844); *Zantedeschia virosa* C. Koch, Ind. Sem. Hort. Berol. App.: 9 (1854). (Figs 7-9)

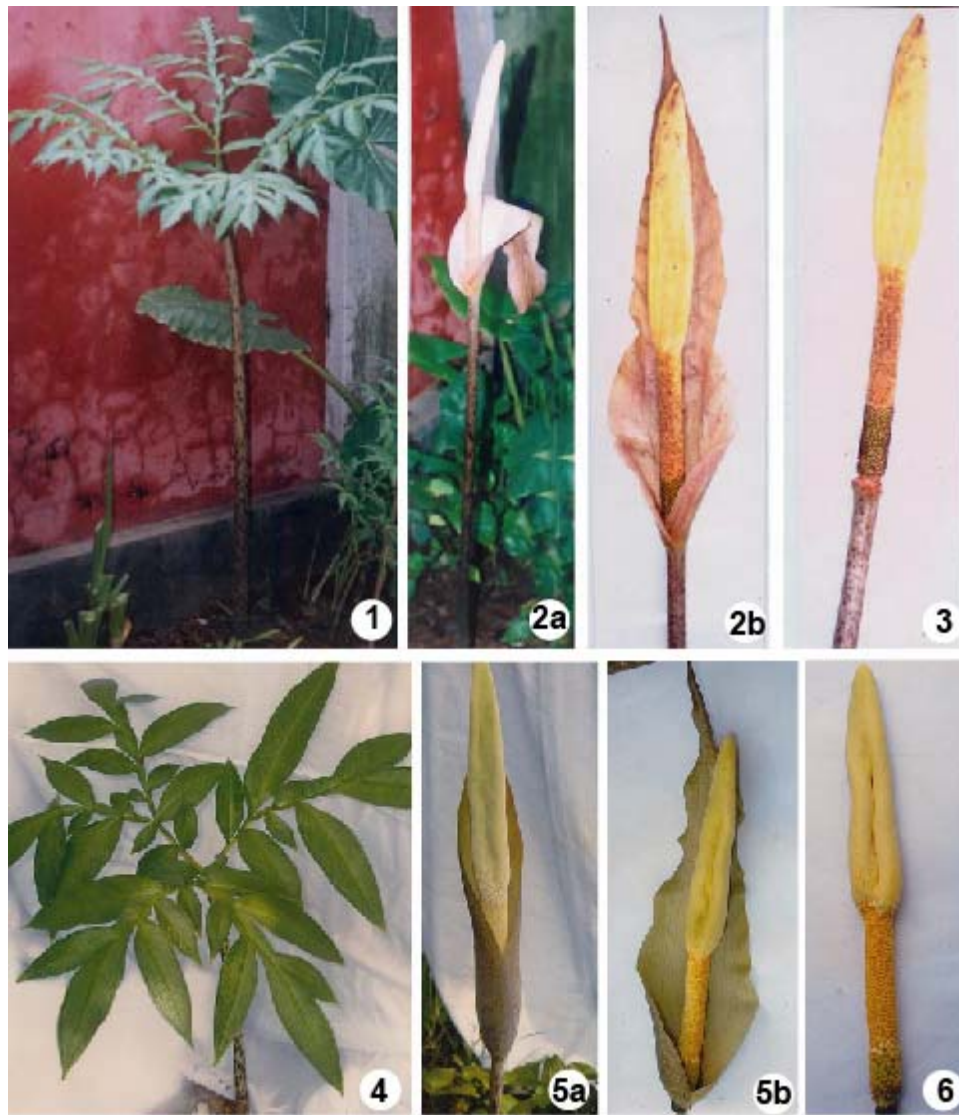
Caudex 10 cm long, 2-3 cm in diam., cylindrical, stolons absent. Leaves many, blades oblong-ovate, 24 × 16 cm, peltate, coriaceous, margin slightly wavy, upper surface glossy green, lower surface pale green; primary lateral veins 6-9 pairs; petiole green, 40 cm long, smooth. Peduncles clustered, 17 cm long, green. Spathe nearly straight, 15.5 cm long, tube 2.5 cm long, 1.5 cm wide, oblong, light green, limb narrowly lanceolate, dark yellow, 12 cm long, 5 cm wide. Spadix much shorter than the spathe, 6.9-7.5 cm long. Male zone 4.5-5.0 cm long, 0.5 cm in diam., tip acute; anthers peltate, 8-12 celled, yellow; appendix absent. Female zone 2.3-2.5 cm long, 0.8 cm in diam. Ovary broadly ovoid, 0.4 mm long, 0.3 mm in diam., green, 3-4 locular with parietal placentation and numerous ovules; stigma large, peltate, white. *Flowering time*: May.

Specimens examined: **Maulvi Bazar**: Muraichara beat, Ichachara forest, 7.5.2010, Hosne Ara HA 2752 (DACB). **Dhaka**: Khilgaon (Cultivated), 17.5.2011, Hosne Ara HA 2779 (DACB) [Originally collected from Maulvi Bazar district].

Ecology: Grows in shady and moist places of forest.

Geographical distribution: South and east India.

Note: *Colocasia virosa* Kunth can easily be separated from all other *Colocasia* species so far reported from Bangladesh (Ara, 2007) by the presence of the following characters: tube of the spathe oblong, much shorter than the narrowly lanceolate limb, spadix much shorter than the spathe, tip acute and appendix absent.

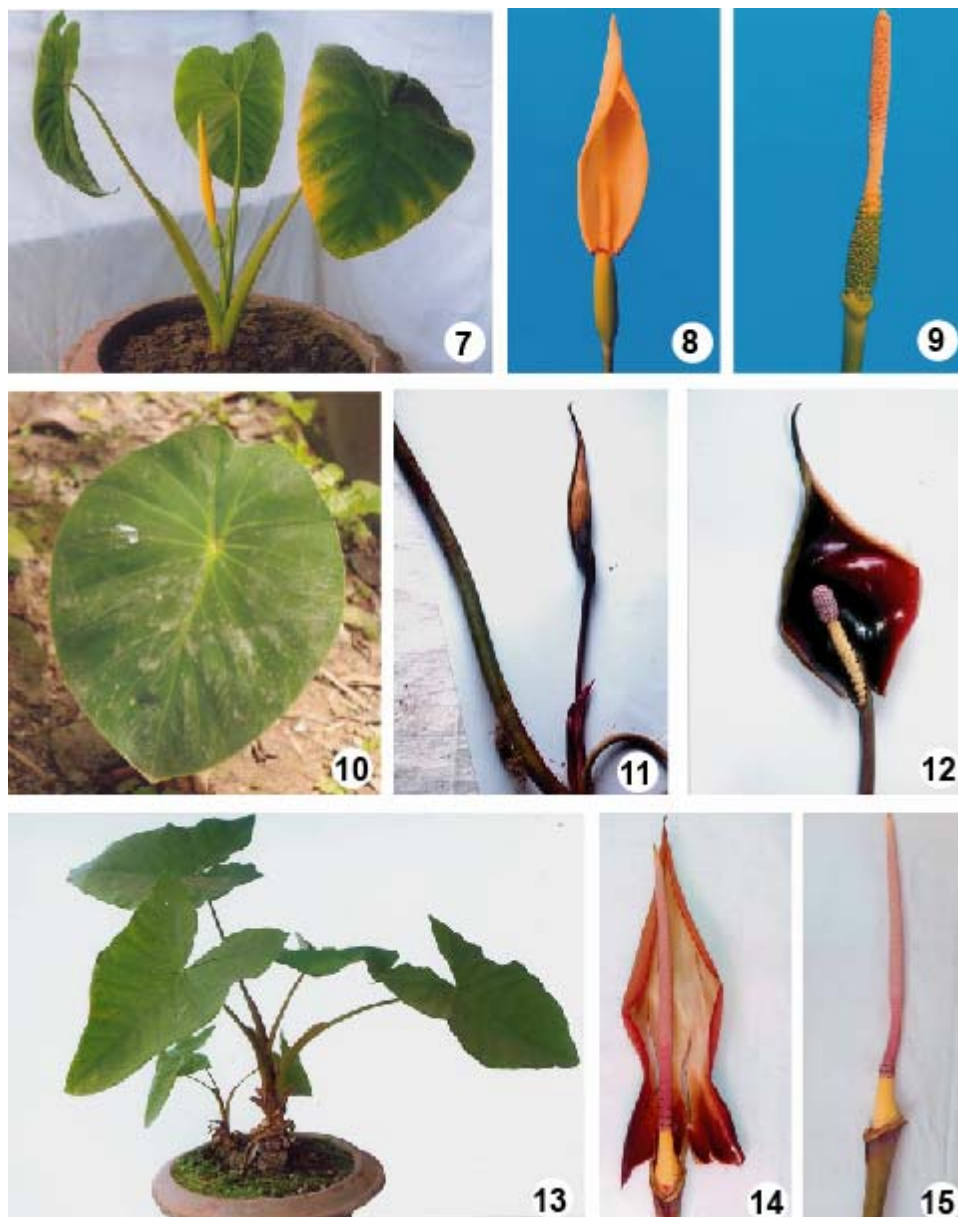


Figs 1-3. *Amorphophallus excentricus* Hett. (1. habit, 2a-b. inflorescence, 3. spadix). 4-6. *Amorphophallus krausei* Engl. (4. habit, 5a-b. inflorescence, 6. spadix).

- 4. *Stuednera gagei*** Krause, Engler and Krause, Pflanzenr. 71 (IV. 23 E): 15-16 (1920). Rao and Verma, Bull. Bot. Surv. Ind. 18 (1-4): 24 (1976); Karthikeyan *et al.*, Fl. Ind. Enum.: 14 (1989). (Figs 10-12)

Caudex 6-12 cm long, 2-3 cm in diam. Leaf 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; petiole 30-65 × 0.5-1.0 cm, green, petiolar sheath short, purple. 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, 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, placentation parietal; style very short; stigma 4-lobed. Berry ovoid, many-seeded. *Flowering time*: March to April.



Figs 7-9. *Colocasia virosa* Kunth (7. habit, 8. inflorescence, 9. spadix). 10-12. *Steudnera gagei* Krause (10. habit, 11. inflorescence, 12. spadix). 13-15. *Xanthosoma undipes* (K. Koch) K. Koch (13. habit, 14. inflorescence, 15. spadix).

Specimens examined: **Maulvi Bazar:** Adampur beat, Gangpali, 23.3.2008, Hosne Ara HA 2735 (DACB). **Dhaka:** Bangladesh National Herbarium Garden (Cultivated), 22.4.2009, Hosne Ara HA 2748 (DACB) [Originally collected from Maulvi Bazar district].

Ecology: Grows in shady and damp places of forest floor.

Geographical distribution: India.

Note: *S. gagei* Krause differs from the previously reported three *Staudnera* species by its broadly ovate or suborbicular leaves, light purple spathe outside and purple-red inside.

5. *Xanthosoma undipes* (K. Koch) K. Koch, Bonplandia 4: 3 (1856). *Alocasia undipes* K. Koch, App. Gen. Sp. Nov. 1854: 5 (1854-55); *Xanthosoma jacquinii* sensu Schott, Syn. Aroid. : 57 (1856), non Schott in Schott & Endicher, Melet. Bot.: 19 (1832), *nom. illeg.*, non Kunth (1841). (Figs 13-15)

Herb with milky sap, erect, 2 m tall, mature plants with a thick, starchy stem, up to 1.5 m long, with numerous leaf scars and aerial roots at the base. Leaves several, blades 40-70 × 30-50 cm, simple, cordate-sagittate, chartaceous, upper surface dark green, lower surface greyish green, margin undulate; petiole erect, 45-100 cm long, green, sheathing below. Inflorescences 1-3, axillary. Peduncle up to 30 cm long. Spathe 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. Male zone light pink, 17 cm long, elongated; synandria hexagonal, truncate, consisted of 6-8 united stamens. Female zone yellowish, 3.0-5.5 cm long, cylindrical. Ovary 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. Berry cylindrical, many-seeded. Seeds ovoid. *Flowering time:* May.

Specimens examined: **Gazipur:** Kamesshor village, 17.5.2009, Hosne Ara HA 2749 (DACB). **Dhaka:** Khilgaon (Cultivated), 30.5.2011, Hosne Ara HA 2780 (DACB) [Originally collected from Gazipur district].

Ecology: Grows in shady and moist places of village area.

Geographical distribution: Native to tropical America.

Note: *Xanthosoma undipes* (K. Koch) K. Koch can easily be differentiated from all other *Xanthosoma* species so far reported from Bangladesh (Ara, 2001) by the presence of the following characters: basal part of the spathe (both adaxially and abaxially) deep pink; upper part of the spathe adaxially cream to white, abaxially pink; pistillate zone yellowish; sterile zone pink and male zone light pink.

Acknowledgement

The authors are grateful to Dr. Wilbert Hettterscheid, Director, Botanical Gardens of Wageningen University, the Netherlands for assistance to identify *Amorphophallus krausei* Engl.

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(Manuscript received on 19 June, 2011; revised on 22 April, 2012)