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Ariopsis (Araceae: Colocasieae) a new generic record for Thailand & preliminary observations on trans-Himalayan biogeography in Araceae

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ABSTRACT. *Ariopsis* Nimmo (Araceae: Colocasieae) is reported as a new generic record for Thailand with a single species (*A. protanthera* N.E.Br.). The genus and species are described and illustrated. A key to the genera of the Colocasieae and Caladieae in Thailand and a brief overview of trans-Himalayan biogeography in the Araceae are presented.

KEY WORDS: Araceae, *Ariopsis*, new record, key, Flora of Thailand, biogeography.

INTRODUCTION

While based at the Forest Herbarium as part of a BRT-funded project to complete the Araceae account for the Flora of Thailand, the author was passed a specimen of an unidentified aroid from northeastern Thailand, and a photograph of clearly the same species, from a different locality, to determine. By its unique vegetative appearance the specimen was readily identified to the genus *Ariopsis*, hitherto unrecorded in Thailand.

The single collection comprises three plants all in fruit. The combination of almost ripe fruits associated with still slightly immature leaves, plus the diminutive habit and trans-Himalayan distribution convincingly identifies the specimen as *A. protanthera* N.E.Br., a species hitherto recorded from Assam in northeastern India) and northern Burma (Mayo et al., 1997).

Ariopsis is a diminutive ephemeral plant easily overlooked, even when fertile, as 'just an *Alocasia* seedling' and it is thus no great surprise that it has remained undetected in Thailand for so long, especially since Araceae usually receive scant attention from fieldworkers who often regard aroids as too difficult to collect.

TAXONOMIC TREATMENT

Ariopsis is a genus of two species in the Colocasieae probably most closely related to *Remusatia* Schott and *Steudnera* K.Koch (Cabrera et al., 2008). The generic type, *A. peltata* Nimmo, is restricted to the Western Ghats of India (Mayo, et al., 1997) while the other species, *A. protanthera* N.E.Br. is distributed from the tropical eastern Himalaya (Assam) through northern Burma and in this paper is shown to occur in northeastern Thailand.

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In vegetative form *Ariopsis* is somewhat intermediate between *Remusatia* (with which it shares globose tuberous stems) and *Steudnera* (also with a wholly peltate leaf lamina that is often glaucous abaxially). From either genus *Ariopsis* is readily differentiated by the inflorescences in which the synandria are connate apically, forming a continuous surface punctured by cavities ('pits') with somewhat prominent margins and with the thecae of adjacent synandria encircling the pits and shedding pollen into them, each pair of thecae belonging to a different synandrium.

For much of its history, *Ariopsis* has been treated as monospecific, with *A. protanthera* N.E.Br. considered merely a diminutive morph of *A. peltata* Nimmo. During the preparation of plates for *The Genera of Araceae* (Mayo et al., 1997) the opportunity arose to study living collections of *Ariopsis* from the Western Ghats (the region from which *A. peltata* was described) and northeastern India (the original collecting locality of *A. protanthera*), with the result that the species proved to be readily separable. The salient identification points are outlined in the key below. Also included is *Hapaline* Schott (Araceae: Caladieae) a genus that is often encountered in the wild and can be confused with *Colocasia* Schott.

KEY TO *ARIOPSIS* SPECIES AND THE GENERA OF THE COLOCASIEAE & CALADIEAE IN THAILAND

1. Spathe differentiated into an upper limb and lower part separated by one or sometimes two pronounced constrictions
   2. Plant with conspicuous erect aerial stolons bearing along their distal portion numerous barbed bulbils **Remusatia**
   2. Plant without conspicuous erect aerial stolons; if stolons present then these decumbent and bearing tubercules at the tips
      3. Mature infructescences declinate to pendent; berries small (<3 mm), pale yellow to brown and fruity smelling when ripe; seeds small and very numerous per fruit **Colocasia**
      3. Mature infructescences erect; berries medium-sized (>4 mm), red when ripe, odourless; seeds large, few per fruit **Alocasia**
1. Spathe not differentiated into an upper limb and lower part by constrictions
   4. Synandria connate, thecae of adjacent synandria encircling pits in the spadix, each pit with a somewhat prominent upper margin; leaf peltate
   4. Synandria not so; leaf peltate or hastate
      5. Plants diminutive, not exceeding 12 cm; petioles very slender, 6–14 cm long, lamina 5–10 by 4–10 cm. Plants flowering before leaf emergence, fruits well developed when leaf expansion occurs. Transhimalaya, including North and Northeastern Thailand **Ariopsis protanthera**
      5. Plants robust, to 40 cm tall; petioles stout, 18–30 cm, lamina up to 15 by 40 cm. Plants flowering after leaf emergence, fruits ripening as leaves begin to yellow prior to shedding. Western Ghats, India **Ariopsis peltata**
         6. Spathes brightly coloured (internally commonly yellow or purple-red);female flowers with staminodes; stem a repent or suberect epigeal rhizome **Steudnera**
         6. Spathe white; female flowers without staminodes; stem a hypogeal tuber or stolon **Hapaline**

ARIOPSIS

Nimmo in J.Graham, Cat. Pl. Bombay: 252. 1839; Hook.f., Fl. Brit. India 6: 519. 1893; Mayo et al., Gen. Araceae 275, Pl. 99 & 129B, 1997.

Very small to medium-sized slender seasonally dormant lithophytic herbs with milky latex. *Stem* a ± subglobose tuber. *Leaves* usually solitary, rarely few together. *Petiole* very slender. *Petiolar sheath* fairly short. *Lamina* peltate, cordate-ovate or only emarginate basally, thin, often glaucous below, posterior lobes very short; *primary lateral*

veins pinnate, radiating from petiole insertion, forming submarginal collective vein, marginal vein also present, higher order venation reticulate. *Inflorescence* 1–3 in each floral sympodium, appearing before or with leaves. *Peduncle* very slender, equalling to much longer than spathe, erect to spreading. *Spathe* ovate, boat-shaped, fornicate, not constricted, gaping widely, not convolute at base, marcescent. *Spadix* shorter than spathe; *female flower zone* adnate to spathe, very short and few-flowered, sometimes separated from male zone by short, free, naked axis; *male flower zone* fertile to apex, relatively thick, cylindric-conoid, many-flowered. *Flowers* unisexual, perigone absent. *Female flower* an ovoid to ovoid-oblong ovary, 1-locular, ovules many, orthotropous, placentae 4–6, parietal, extending from base to apex of locule, stylar region absent, stigma stellate with 4- to 6-laciniate lobes, lobes initially erect, later spreading and reflexed. *Male flower* a peltate synandrium, 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 6(–8) surrounding thecae (each pair of thecae belonging to a different synandrium). *Fruit* a 4–6-angled berry, stigma persistent, many-seeded. *Seed* oblong, apically narrowed and obtuse, with indistinct strophiole, testa thickish, longitudinally costate, embryo axile, small, endosperm copious.

Distribution.— 2 species distributed with one in Western India (*A. peltata*) and the other (*A. protanthera*) in the tropical & subtropical eastern Himalayas through northern Burma to northern Thailand. Fig. 1.

Ariopsis protanthera N.E.Br., Rep. Roy. Bot. Gard. Kew 1877: 51. 1877. Hook.f., Fl. Brit. India 6: 519. 1893; Mayo et al., Gen. Araceae 275, Pl. 99 & 129B, 1997.— *Ariopsis peltata* f. *protanthera* (N.E.Br.) Engl. & K.Krause in H.G.A.Engler, Pflanzenr. 4. 23E: 130. 1920. Fig. 2.

Very small, slender, seasonally dormant, lithophytic herbs with milky latex, to 12 cm tall. *Stem* a ± subglobose tuber, ca 2 cm diam., mostly clustered, covered with fibrous cataphyll remains. *Leaves* solitary. *Petiole* very slender, 6–14 cm, sheath very short; *lamina* peltate, cordate-ovate, 5–10 by 4–10 cm, membranaceous, pale green above, glaucous below, posterior lobes short, fully fused; *primary lateral veins* pinnate radiating from petiole insertion, forming submarginal collective vein; *higher order venation* reticulate. *Inflorescence* 1–3 in each floral sympodium, appearing before the leaves. *Peduncle* very slender, 4–5 cm, much longer than spathe, erect to spreading. *Spathe* ovate, boat-shaped, 2–2.5 by 1 cm, not constricted, fornicate, gaping widely at anthesis, not convolute at base, marcescent, dull yellow. *Spadix* shorter than spathe, ca 1.5 by 0.4 cm; *female flower zone* adnate to spathe, ca 4 mm long, few-flowered; *ovaries* rhombic-ovoid to rhombic-ovoid-oblong, ca 3 by 4 mm, pale green speckled purple, stylar region very short, stigma stellate with 4–6 lobes, lobes initially erect, later spreading and reflexed, whitish green; *sterile interstice* free, naked, ca 3 mm long; *male flower zone* fertile to apex, cylindric-conoid, ca 1 cm by 4 mm, many-flowered, dirty very pale yellow; *synandria* peltate, the connate filaments forming a stipe longer and narrower than dilated common connective, synandria all connate apically, forming continuous surface punctured by cavities with somewhat prominent margins into which pollen is shed from the 6(–8) surrounding thecae of which each pair of thecae belongs to a different synandrium. *Fruit* a 4–6-angled berry, ca 5 by 5 mm, pale green, stigma persistent.

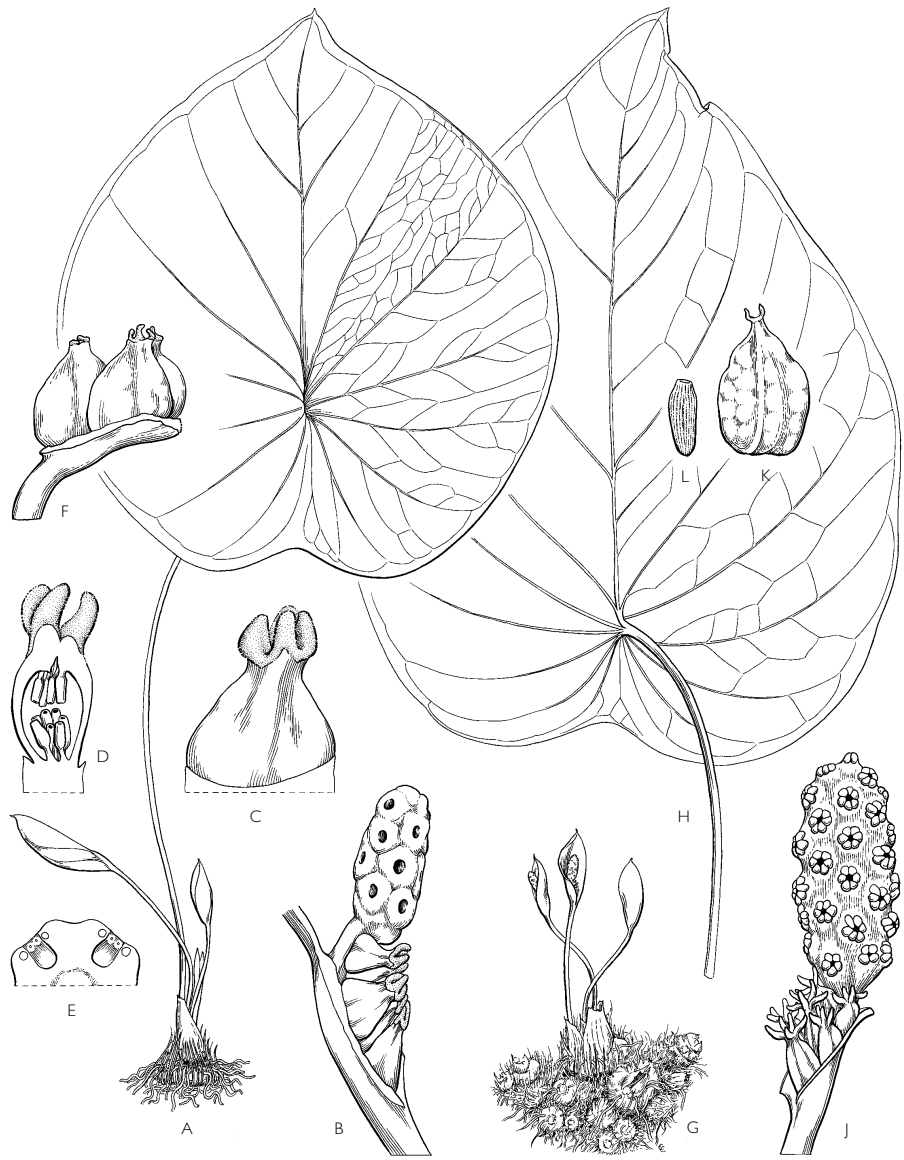

Figure 1. *Ariopsis*: A. habit × 1; B. spadix × 6; C. gynoecium × 15; D. gynoecium, longitudinal section × 15; E. section through male portion of spadix to show synandrium arrangement × 10; F. infructescence × 6; G. habit in flower, showing branching of tubers × 1; H. leaf × 1; J. spadix × 6; K. berry × 6; L. seed × 12. *Ariopsis peltata*: A. *Talbot* 496 (K); B–E. *Bogner* 1922 (RBG, Kew spirit collection 56425); F. *Barnes* 1087 (K); *A. protanthera*: G–H. Cult. Kew.1851 (K); J. *Kurz* s.n. (K); K–L. Cult. Kew. 1851 (Kew spirit collection 58040). Plate © Trustees of the Royal Botanic Gardens, Kew. Used with permission. Original artwork by Eleanor Catherine.

Figure 2. *Ariopsis protanthera*: Plants in habitat in Nong Khai. Photographed by Rachun Pooma, Forest Herbarium. Used with permission.

Thailand.— NORTHERN: Tak [Thi Mo Bo Falls, Tha Song Yang, 29 May 2008, *Pooma et al.*, 7071A-B (**BKF**)]; NORTH-EASTERN: Nong Khai [Phu Wua Wildlife Sanctuary, 21 May 2004, *Pooma et al.*, 4203 (**BKF**!)].

Distribution.— From NE India (Assam) through N Burma.

Ecology.— Dry seasonal evergreen forest, on rocks by stream; altitude 300 m.

Vernacular.— None recorded.

Uses.— None recorded.

TRANS-HIMALAYAN BIOGEOGRAPHY

The extension in the known distribution of *Ariopsis protanthera* fits well a trans-Himalayan distribution pattern that is shared with many other aroid species occurring through the forested hills and mountains of the southern North-East Himalayan foothills south and east into northern parts of Thailand. Quite a number of other aroids have a similar distribution and continue into southwestern China and further south into the Lao PDR and Vietnam (Boyce, in prep.).

Aroid species in Thailand that have a partial to complete trans-Himalayan distribution include:

Amorphophallus (*A. paeoniifolius* (Dennst.) Nicolson).

Arisaema (*A. consanguineum* Schott, *A. roxburghii* Kunth).

Alocasia (*A. acuminata* Schott, *A. cucullata* (Lour.) G.Don, *A. navicularis* (K.Koch & C.D.Bouché) K.Koch & C.D.Bouché, *A. odora* (Lindl.) K.Koch).

Colocasia (*C. fallax* Schott).

Pothos (*P. chinensis* (Raf.) Merr., *P. scandens* L.).

Remusatia (*R. pumila* (D.Don) H.Li & A.Hay & *R. vivipara* (Roxb.) Schott).

Rhaphidophora (*R. decursiva* (Roxb.) Schott, *R. glauca* (Wall.) Schott, *R. hookeri* Schott, *R. megaphylla* H.Li, *R. peepla* (Roxb.) Schott, *R. pertusa* (Roxb.) Schott).

Scindapsus (*S. maclurei* (Merr.) Merr. & F.P.Metcalf, *S. officinalis* (Roxb.) Schott).

Steudnera (*S. discolor* N.E.Br.).

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