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# *Argostemma glabra* (Rubiaceae), a new species from Vietnam

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*Argostemma glabra* Joongku Lee, T.B. Tran & R.K. Choudhary, a new species of Rubiaceae from Khanh Hoa Province of Vietnam is described and illustrated. It is morphologically similar to *A. apiculatum*, but differs in its creeping habit, 4–6 flowered inflorescence, bigger and triangular bracts, smaller peduncle, bigger and broadly triangular calyx lobes, and non-apiculate and smaller corolla. Color photographs, a line drawing and a taxonomic key are provided to facilitate identification.

*Argostemma* is the largest genus in the Argostemmateae tribe of Rubiaceae, having about 220 described species distributed widely in tropical and subtropical Asia and two species in west tropical Africa (Verdcourt 1958, Robbrecht 1988, Bremer 1989, Mabberley 1997, Sridith 1999, Sridith & Puff 2000, Sridith 2007). They are usually terrestrial, often lithophytic, or occasionally epiphytic, perennial herbs. In Indo-China, the genus is represented by only seven species (Pitard 1923) and in Vietnam four species are known (Ho 2003).

During a floristic exploration work in the HonBa Nature Reserve of Khanh Hoa Province in Vietnam, we collected an interesting species of *Argostemma* which after a close scrutiny of the available literature (Pitard 1823, Ho 2003) appeared somewhat similar to *A. bariense* by having 5 sepals and 3–4 pairs of opposite leaves, but the glabrous character of our specimen was intriguing, as that character is not seen in any of the previously reported Indo-Chinese *Argostemma*. Further examination of the morphology and study of some additional literature (Bremer 1989, Sridith 2007), suggested a close affinity with a Bornean species, *A. apiculatum*. However, examination of the type specimens and protologue showed no complete match with either *A. apiculatum* or any other earlier described taxa of *Argostemma*. We also searched the specimens housed in the herbaria of K (thanks are due to Dr. K. Sridith, who checked the specimens personally during his visit to Royal Botanic Garden, Kew) and P (virtual herbarium) but could not find any closely similar species. Hence here we describe it as a new species.


**Fig. 1.** *Argostemma glabra*. — **A**: Habit. — **B**: Glabrous stem. — **C**: Ventral view of plant showing inflorescence. – **D**: Dorsal view of plant showing pale green leaves — **E** and **F**: Adaxial and abaxial view of leaf. — **G**: Stem showing an anisophyllous leaf pair (reduced leaf and petiole of normal leaf). — **H**: Flower showing glabrous calyx. — **I**: Opened flower showing anther cone. — **J**: Non-apiculate corolla lobe.

## ***Argostemma glabra*** Joongku Lee, T.B. Tran & R.K. Choudhary, *sp. nova* (Figs. 1 and 2)

Type: Vietnam. Khanh Hoa Province, Hon Ba Nature Reserve, 11 April 2011, *J. Lee et al*. HIKK 285 (holotype HN; isotype KRIB!). — Paratype: Vietnam. Khanh Hoa Province, Hon Ba Nature Reserve, 1539 m a.s.l, 12°07´03´´N, 108°56´46´´E, 5 September 2012, *J. Lee et al*. HIKK 1530 (KRIB).

Etymology: The specific epithet refers to the glabrous habit of the plant which makes it different from other Indo-Chinese *Argostemma*.

Lithophytic herb, 20–25 cm. Stem unbranched, internode 2.5 to 4 cm, procumbent and rooting with apices ascending, fleshy, subterete, glabrous. Leaves anisophyllous; adaxial surface dark green, whitish green below, both surfaces glabrous; stipules persistent, glabrous, 5–11 × 4–5 mm, ovate to cordate, acute at apex, entire; larger leaf of a pair petiolate to ca. 1 cm, glabrous; lamina 4–8 × 1.3–2 cm, elliptic to obovate, base cuneate to attenuate, basal lobes equal to slightly unequal, margin entire to slightly undulate, apex acute to acuminate; midrib distinct, 10–18 nerved, veins obscure, straight. Inflorescence terminal, laxly corymbiform, 4–6 flowered; peduncle 1–1.2 cm; bracts 3–4 × 1.5–2 mm, triangular; pedicel 1–1.2 mm. Flowers 5-merous; calyx lobes 1.2–1.5 mm long, (sometimes one lobe enlarged), broadly triangular, acute, glabrous; corolla 2–2.3 mm long, oblong-lanceolate,

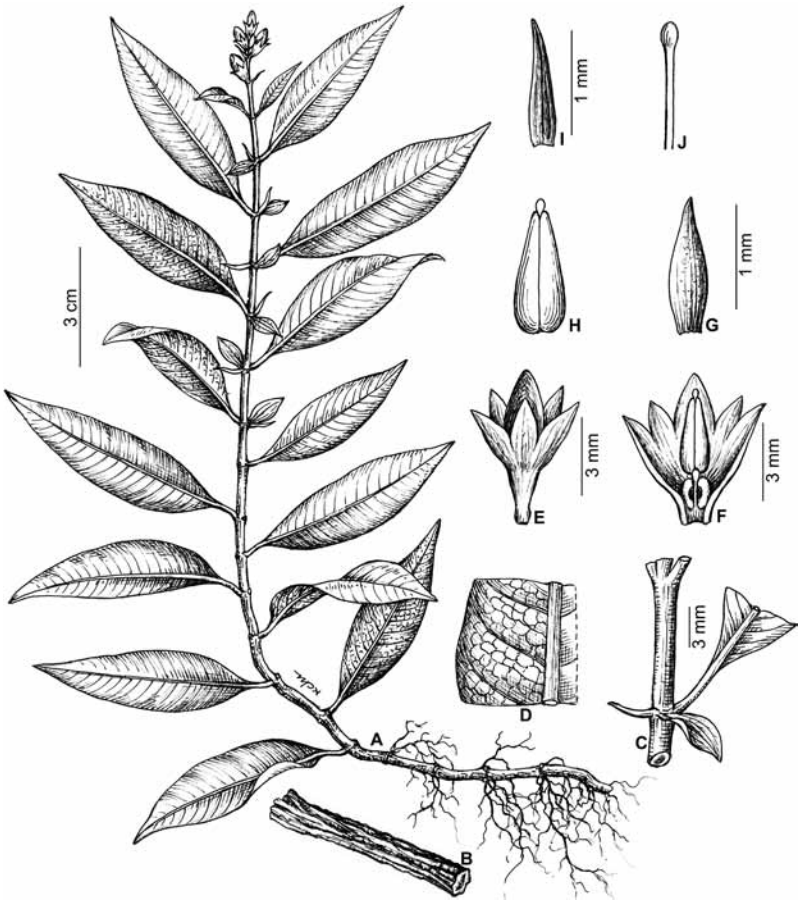


**Fig. 2.** *Argostemma glabra* (drawn from the holotype by Mrs. Kim Chi, IEBR). — **A**: Habit. — **B**: Glabrous stem. — **C**: Stem showing heterophyllous leaves. — **D**: Abaxial view of leaf. — **E**: Flower showing glabrous calyx and corolla in bud. — **F**: Longitudinally opened flower showing stamens and bilocular ovary. — **G**: Non-apiculate petal. — **H**: Anther cone. — **I**: Glabrous calyx. — **J**: Club-shaped stigma.

acute, non-apiculate, white, glabrous. Stamens 5, 5–6 mm long, coherent into an anther cone, inserted at the base of the corolla tube; filaments short, straight, anthers opening by means of longitudinal slits, without apical appendages. Ovary inferior, bilocular, style 5–6 mm long, stigma shortly exerted, club shaped, ovules numerous, globular placenta, inserted along the partition wall. Fruits not seen. Flowering in April.

Distribution and habitat: Occurs in the Hon Ba Nature Reserve in Khanh Hoa Province of Vietnam. We observed at least 50 individuals growing well within the protected boundaries of the reserve. It was found growing in pristine mixed evergreen and sub-temperate forest on a moss-rich hillock at about 1305 m a.s.l. Other associated plants were *Polygala karensium, Pinanga* sp. and *Memecylon* sp. The population is under close monitoring by the forest officials of the reserve.

*Argostemma glabra* closely resembles *A. apiculatum* which is known from Bukit Tibang in Borneo, and also *A. bariense*. However, it differs in several characters (Table 1).

Presence of entire stipules, nodes with opposite heterophyllous leaves, a laxly corymbiform terminal inflorescence, pentamerous flowers and a bilocular ovary clearly indicated our plant to be an *Argostemma*. Scrutiny of the relevant literature revealed that very few *Argostemma* species have been reported to be glabrous and none of them are from Vietnam (Bremer 1989, Sridith & Puff 2000, Ho 2003). Interestingly, out of the twenty-eight *Argostemma* species reported from Borneo (Bremer 1989), *A. apiculatum* is the only glabrous one and supposedly the closest ally of *A. glabra*, however, different in its habit and floral characters (Table 1). Both taxa have the same growth form having a leafy stem with heterophyllous leaf pairs separated by well-devel-

oped internodes (Fig. 1). Some other glabrous species have also been reported from Thailand (Puff *et al*. 2005, Sridith 2007) but they are morphologically very different from *A. glabra*.

The similarity of *A. glabra* with *A. apiculatum*, a Bornean plant, also drew our attention to look into the phytogeography of *Argostemma*. Although the flora of the South Indochinese floristic province is very rich it is poorly studied yet. It is mainly composed of Indomalesian and Sino-Indomalesian elements and has certain affinities with the flora of Malesia (Averyanov *et al*. 2003). The western part of Malesia, which includes the Malay Peninsula and the islands of Sumatra, Java, Bali and Borneo, shares the flora and large mammal fauna of Asia and is known as Sundaland (Wikramanayake 2003). During the last 2.5 million years, this region experienced radical shifts in sea–land distribution, whereby the larger islands (Borneo, Sumatra, Java and Bali) were repeatedly connected to and disconnected from each other and the mainland of SE Asia. This dynamic situation whereby the populations of the different islands were sequentially connected and isolated from each other led to the idea that this process could be very conductive in generating a lot of diversity and even lead to speciation (Den Tex 2011). That notion is supported by a southern transition between perhumid and wet seasonal evergreen dipterocarp rain forests that lies near the Thai–Malay border (Huges *et al*. 2003). That transition is widely and predominantly portrayed as the major Indochinese-Sundaic plant boundary (Steenis 1950, Keng 1970, Whitmore 1984, Wikramanayake *et al*. 2002). Steenis (1950) first characterized this major transition on the basis of distribution maps he prepared for 200 genera of plants. He found that 375 genera of Sundaic plants reach their northern limits, and 200 genera of Indochinese plants reach their southern limits, at a north–south line between Songkhla (Thailand) and Aloe Setar (Malaysia).

An earlier study on the Bornean *Argostemma* has reported them presumably belonging to at least three different monophyletic groups, each having its sister group outside Borneo (Bremer 1989). Morphologically, *A. apiculatum* (the closest ally of *A. glabra*) falls under the *A. parviflorum* group, characterized by radial endothecium, anisophyllous leaves, rotate corollas, a narrowly ovoidal anther cone, thin and smooth apical appendages, and a glabrous style with a hardly widened to slightly capitate stigma. Though we could not check the endothecium characters because of unavailability of fresh samples, the rest of the characters clearly matched and indicated our plant belonging to the *A. parviflorum* group.

Bremer (1989) also pointed out that the distribution of *Argostemma* is influenced by alti-

**Table 1.** A comparison of the diagnostic characters of *Argostemma glabra* with its morphologically closest allies.

| | *A. glabra* | *A. apiculatum* | *A. bariense* |
|---|---|---|---|
| Habit | procumbent | erect | procumbent |
| Stem | glabrous | glabrous | pubescent |
| Leaf | apex acute to acuminate, basal lobe slightly unequal, margin slightly undulate, both surfaces glabrous, primary veins 10–18 pairs | apex acuminate, basal lobes equal, margin entire, both surfaces glabrous, primary veins 10–16 pairs | apex acute, basal lobes equal, margin entire, slightly undulate, both surfaces slightly pubescent, primary veins 5–7 pairs |
| Inflorescence | 4–6 flowered, peduncle 1–1.2 cm long, bracts 3–4 mm long, triangular | 1–4 flowered, peduncle 1.5–2 cm long; bracts up to 0.5 mm long, lanceolate | 1–7 flowered, peduncle ca. 1 cm long; bracts 3–4 mm long, lanceolate |
| Calyx lobes | 1.2–1.5 mm long, broadly triangular, glabrous | ca. 3 mm long, narrowly triangular, glabrous | ca. 1 mm long, oval or subdeltoid, pubescent |
| Corolla lobes | 2–2.3 mm long, oblong–lanceolate, acute, non-apiculate | 10–12 mm long, lobes ovate to broadly so, apiculate | ca. 7 mm long, oblong–lanceolate, subacute, non-apiculate |

tude. In our case, both taxa occur above 1000 m a.s.l. and three species from the *A. parviflorum* group occur in the Malay Peninsula and on other Sunda islands (Bremer 1989). Sridith (2007) also noticed the Malesian *Argostemma* to possess fused anthers forming a cone-like structure that opens longitudinally, with scattered leaves along the stem, and a creeping/erect habit. All of these characters clearly match with *A. glabra* and hence, we think that the occurrence of *A. glabra* in the South Indochinese floristic province and its relatedness with *A. apiculatum* is not unlikely.

### Key to *Argostemma* in Vietnam

1. Plant glabrous ..... *A. glabra*
1. Plant pubescent ..... 2
2. Inflorescence one-flowered ..... *A. uniflorum*
2. Inflorescence 2- to many-flowered ..... 3
3. Leaves verticillate ..... *A. verticellata*
3. Leaves not verticillate ..... 4
4. Leaves anisophyllous ..... *A. bariense*
4. Leaves isophyllous ..... *A. borragineum*

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