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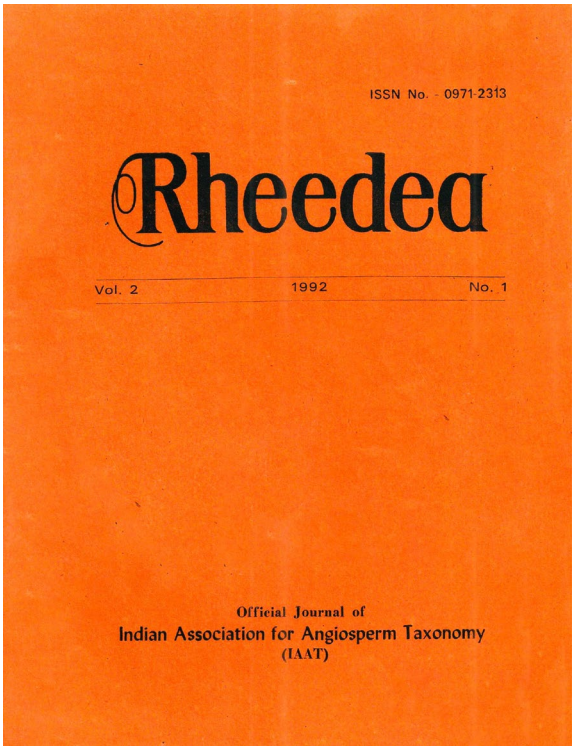

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Notes on the identity and nomenclature of two more herbaceous species of *Hedyotis* L. (Rubiaceae)

S. D. Biju, E. J. George, V. V. Sivarajan & Philip Mathew

Department of Botany, University of Calicut, Kerala-673 635, India

Abstract

The taxonomic status of two closely related species of *Oldenlandia* L. (now included in *Hedyotis* L.), viz. *O. biflora* L. and *O. paniculata* L. has been a matter of controversy. Some authors consider them to be conspecific while others hold that they are distinct. After a careful study of authentic herbarium specimens as well as living material, they have been shown to be separate species and the names are lectotypified. It has also been shown that the epithet 'Paniculata' is not available for our specimen in the genus *Hedyotis* and that the correct name for it would be *H. racemosa* Lam. An artificial key for the diagnosis of the two species, their nomenclatural citations, amended descriptions and illustrations are also provided.

Sivarajan and Biju (1990) and Sivarajan et al. (1992) have focussed our attention on the confusion in the identity and nomenclature of a few species of *Hedyotis* (incl. *Oldenlandia*) in India. *Oldenlandia biflora* L. and *O. paniculata* L., another closely related species pair, belonging to *Oldenlandia* subgen. *Gonotheca* (DC.) Hook. f. (= *Thecagonum* Babu), characterised by broader leaves, 4-angled fruits and globose or subglobose seeds, also present a similar scenario. A perusal of literature reveals that some authors have considered them to be distinct species (Linnaeus, 1753, 1763; Roxburgh, 1820; Wight & Arnott, 1834; J. D. Hooker, 1880) while others have treated them as conspecific (Trimen, 1894; Merrill, 1938; Backer & Bakhuizen van den Brink Jr., 1965; Babu, 1969; Matthew, 1983).

Linnaeus (1753: 119) clearly, even by todays standards, circumscribed *O. biflora*, as "Oldenlandia pedunculis bifloris, petiolo longioribus, foliis lanceolatis", taking the phrase name from his "Fl. Zeyl. 68. Habitat in India".

Roxburgh (1820: 445) described it as having "peduncles solitary, two-flowered, shorter than the narrow lanceolar leaves". He attributed the name to "Linnaeus Sp. Pl. ed. Willd. 1: 676" and cited "*Antirrhinum humile* & c. Burm., Zeyl. 22. t. 11". We have now studied this element, but have doubts over Roxburgh's inclusion of J. Burman's material in *Oldenlandia biflora*, because the original description and illustration depict its corolla as "monopetali, bilabiati, labio superiori bifido, inferiori trifido locantur". However, there is an illustration of Roxburgh's element in Roxburgh's Icones (t. 1324, CAL) which can be considered authentic material of the taxon.

Dr. F. R. Barrie, BM, kindly sent us a photograph of the Herman specimen

(Herm. Herb. 3: 19) annotated with Linnaeus' Flora Zeylanica number (68). This original material (Fig. 1, A) is an exact match for the Linnaean description of the species and those provided by most other subsequent authors. The two other speciments in the Linnaean Herbarium, LINN 155. 5, HU, listed as *O. biflora* and 155.6 listed as "*Sine Inscript*" (Savage, 1945) do not match with the Linnaean description of the taxon and can correctly be identified as *Hedyotis erecta*. So, we select the specimen in the Herman Herbarium (3: 19) as the lectotype of the name, *Oldenlandia biflora* L.

Oldenlandia paniculata was first described by Linnaeus (1763: 1667)-"Oldenlandia pedunculis terminalibus paniculatis, foliis ovali - lanceolatis" and as usual, he did not cite any material under it. Subsequently, in his Systema Naturae (12, 2: 126. 1767), he cited J. Burmen's Thesaurus Zeylanicus, t. 71 f. 2. 1737 in the literature of the species. This caused confusion in the identification of the species. In spite of the fact that this figure of Burman was not cited in the protologue, many subsequent authors seem to have taken it for granted that *O. paniculata* L. is solely based on this figure. Trimen (1894: 317) commented that "*O. paniculata* L. is moreover doubtful, it is entirely based on a figure of J. Burman (Thes. Zeyl. t. 71. f. 2. 1737) which is apparently a *Mollugo* (certainly not an *Oldenlandia*)".

We have now checked Burman's figure and description and are convinced that Trimen's assertion as to its identity is correct. J. Burman himself identified it as *Mollugo zeylanica* and according to the current concept of species in the genus, it is, with some certainity, *Mollugo stricta* L.

However, Trimen's assertion that *O. paniculata* is based entirely on this figure is incorrect. E. D. Merrill (1938) has set the record straight-"Advantage is taken of this opportunity to clarify the situation as to *O. paniculata* Linn. (1763), the generally accepted binomial tor the species. It was based wholly on an actual specimen in Linnaean Herbarium in spite of Trimen's statement...There is no literature reference in the original description of 1763; the Burman citation was added by Linnaeus in Syst. Nat. ed. 12, 2: 126. 1767, which was doubtless the source on which Trimen's erroneous statement was based, but even here, the first reference is to Sp. Pl. 2: 1667. 1763",

In the meanwhile, enough confusion had already been created. Many authors like Roxburgh (1820: 443) have acredited the name *O. paniculata* to N. L. Burman, who described and illustrated the taxon in his Flora Indica (38. t. 15. f. 1. 1768). Many others have cited N. L. Burman in the literature reference. J. D. Hooker (1880: 69) has relied on the Burman's figure of what he assumed to be Linnaeus' plant for the adoption of the name for his material and has observed that the figure is a 'fair one' (see G. Don, 1834. 3: 530). We have examined this figure and would agree with Wight and Arnott (1834: 414), rather than with Hooker, in that it is too poor to ascertain its correct identity. Moreover, N. L. Burman's reference to "*Tsjeru-tsjonganam pullu*, Rheede, Mal. 10. p. 51. t. 26" is erroneous, because the latter is *Mollugo stricta* L. (see Nicolson et. al., 1988: 182) and not an *Oldenlandia*.

In short, none of these earlier authors

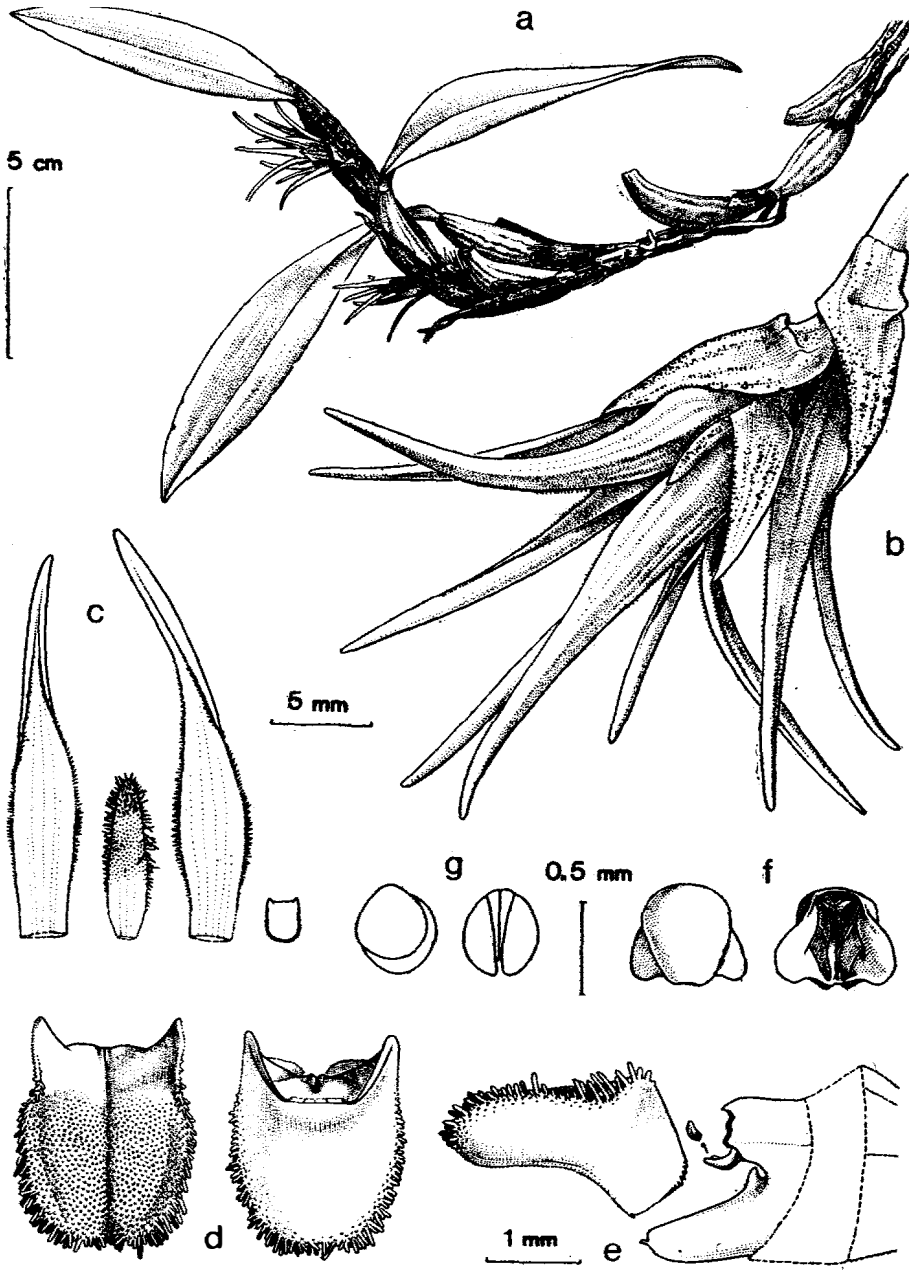

Fig. 5 *Bulbophyllum ankylorhinon* a-whole plant; b-inflorescense; c-flower analysis, from left to right: median sepal, petal, lateral sepal, lip, d-lip, left, adaxially, right, abaxially; e-cloumn and lip, lateral view; f-anther, left: abaxially, right, adaxially; g-pollinia, left, single pair, right, two pairs. (All drawn from the type specimen).

(Roxburgh, 1820; Wight & Arnott, 1834; J. D. Hooker, 1880; Trimen, 1894) had the opportunity to see the Linnaean material of this taxon before attributing his name to their specimens. Merrill (1938) tried to clear the confusion, but did not specifically mention the actual type material in the Linnaean Herbarium. Consequently, the name is still awaiting proper lectotypification. Having had the opportunity to see the syntype of *O. paniculata* (LINN. 155. 10, BM, photograph) which exactly matches the Linnaean description of the species, we choosethe specimen as the lectotype of the name (Fig. 1, B).

There is also difference of opinion as to the taxonomic status of *O. biflora* L. and *O. paniculata* L., as has been mentioned earlier. Trimen (1884. 2: 317) has already said that he could not distinguish the two. (see also Hara & Williams, 1979. 2: 202 and Matthew, 1983. 3: 724). The description of this group by those who consider these two taxa as conspecific, like the one provided by Bakhuizen Van den Brink (1965. 2: 285)—" ... inflorescences axillary or terminal, 3-40 flowered cymes, which at apex of plant often form loose, paniculiform or corymbiform inflorescences"-do not seem to be relevant to the Indian materials. Instead, the ones provided by those who consider them as distinct, seem to be much better and evince more critical examination. Thus, Wight and Arnott (1834: 413-14) commented that *O. biflora* "is exactly intermediate" between *O. alata* and *O. paniculata* and that it differs from the former by the want of wings on the capsules and from the latter, by its size of the capsule and much less branched inflorescence. J. D. Hooker (1880: 70) suggested that *O. biflora* "very closely resembles a a small specimen of *O. paniculata* and is distinguished by the cymes seldom having more than 3 flowers and often reduced to one and by the large fruit more turbinate and angled with usually larger calyx teeth".

But then, there is another name, *H. racemosa* Lam. which is relevant to this discussion. Lamarck (1789. 3: 80) presumably described it on the basis of an Indian specimen sent to him by Sonnerat (Cette espece Croit dans l'Inde, & nous ete communiquee pair M. Sonnerat). He diagnosed it as ' Hedyotis foliis lanceolatis racemis axillaribus & terminalibus nudiusculis" and suggested that it might be the same as Plukenet, Alm. t. 454, no. 2, 1705. ("Voyez dans Plukenet la figure t. 454. no. 2"). He also described another variety in this species with ovate-obtuse leaves ("Elle varie a feuilles ovales-obtuses (v. f.)". Dutta (1985), in her revision of Indian *Hedyotis*, rightly chose Sonnerat's specimen as the type.

J. D. Hooker (1880: 70), however, does not seem to have seen this specimen. Instead, he saw only Plukenet's figure and observed that "Lamarck's *H. racemosa*, usually cited under this (*Oldenlandia paniculata*) is figured as having smooth seeds and is therefore *Eu-Oldenlandia*". He, therefore, excluded the name *H. racemosa* Lam. from the synonymy of *Oldenlandia paniculata*. We have now seen Plukenet's figure. There is only one drawing and that is of a flowering shoot with no illustration of seed; nor there is any mention of the seed characters in Lamarck's description.

We have also seen a photocopy of Sonnerat's specimen (Fig. 1, D) in the

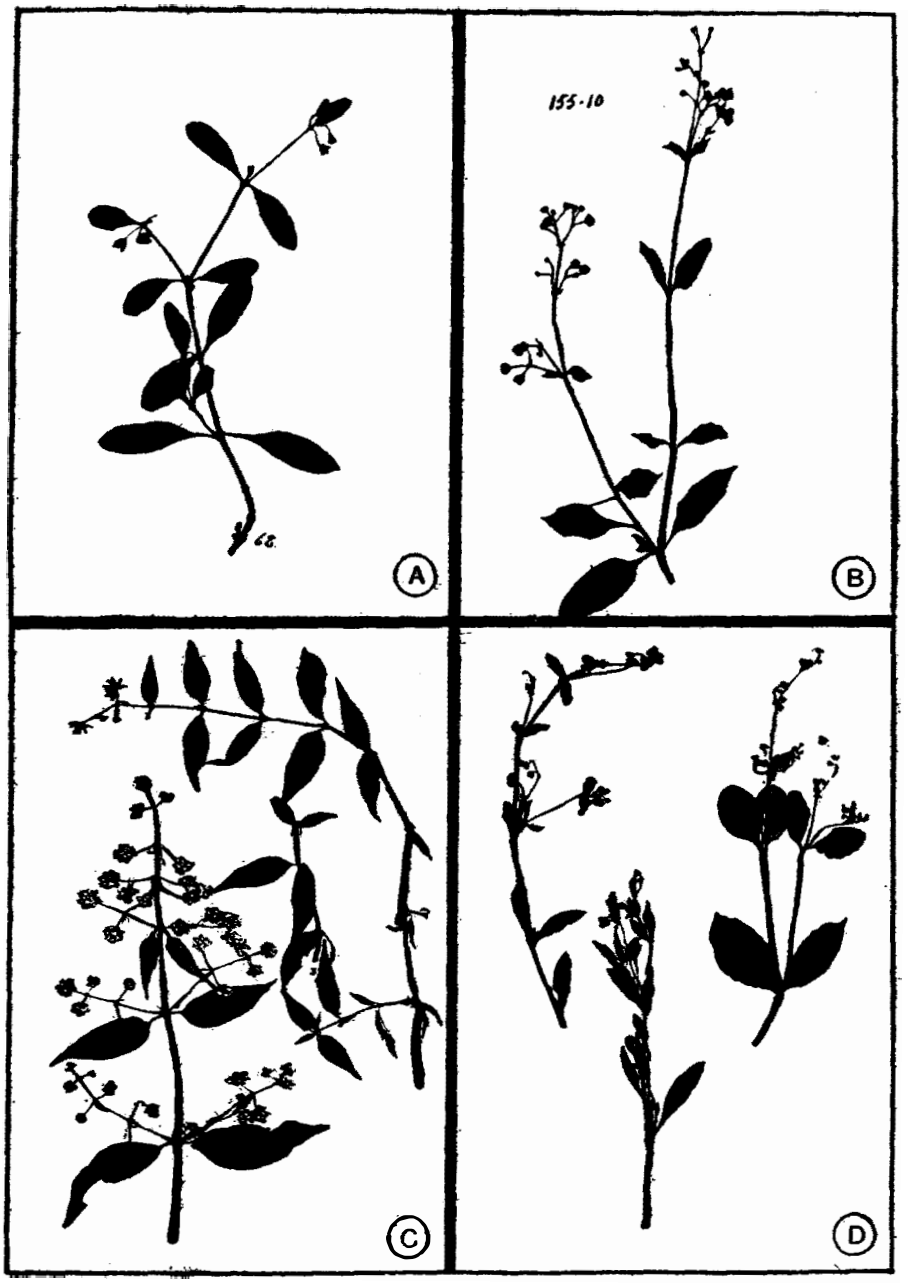

Fig. 1. A, Type of *Oldenlandia biflora* L. (Herm. Herb. 3. 19, BM); B, Type of *Oldenlandia paniculata* L. (LINN. 155. 10 BM); C, Type of *Hedyotis paniculata* Lam. (*Sonnerat* s. n., PLA); D, Type of *Hedyotis racemosa* Lam. (*Sonnerat* s. n., PLA)

Lamarck's Herbarium (kindly sent to us by Dr. Dan H. Nicolson, Washington), and are inclined to consider *Oldenlandia paniculata* L. and *H. racemosa* Lam. as conspecific. But there is some confusion in the nomenclature. Some authors have treated the taxon under *H.* (*O.*) *paniculata* L. (G. Don, 1834; J. D. Hooker 1880), while others have accepted *H. racemosa* Lam. as its correct name (Wight & Arnott, 1834; Dutta, 1985). Wight's illustration of *H. racemosa* (Wt., Icon. t. 312. 1840) with axillary inflorescence shorter than leaves, however, seem to belong to *O. biflora* L., while his description (''flowers pedicelled, disposed in long-peduncle, naked, alternate, axillary and terminal racemes'') seems to pertain to *O. paniculata* L. Dutta (1985) has rightly considered *O. paniculata* L. and *H. racemosa* Lam. as conspecific.

Consequently, the earlier epithet 'paniculata' should have been retained for the species in *Hedyotis*. But the name *H. paniculata* has already been given to a different species by Lamarck (Encycl. 3: 79. 1979; type: *Sonnerat* s. n., PLA, see Fig. 1, C). and is not available for the present material. So, the next earliest name, *H. racemosa* Lam. would be the correct name for the species, as has been accepted by Dutta (1985).

We have now studied these taxa from their types and other Indian materials, live and dried, and are convinced that *O. biflora* L. and *O. paniculata* L. are distinct. Detailed studies have revealed several additional characters useful for the delimitation and circumscription of the two species, besides the ones mentioned by earlier authors. The two can easily be recognised by the following key:

Inflorescence of 1-3 flowered, axillary and occasionally terminal cymes; peduncle stout, never longer than leaves; flowers 4-7 mm long; calyx without raphides; capsules 6-7 mm long, sharply 4-angled with flat sides ....*H. biflora*

Inflorescence of 5- many flowered, terminal or occasionally subterminal panicles; peduncles slender, always longer than leaves; flowers smaller than in *H. biflora*; calyx with raphides; capsules 2.5-3.5 mm long, subterete, faintly 4-ridged at angles with convex sides..... .....*H. racemosa*

Hedyotis biflora (L.) Lam , Encycl. 1: 272. 1783; Wt. & Arn., Prodr. 413. 1834;, Back. & Bakh. f., Fl. Java 2: 286. 1965; Dutta, Rev. Indian *Hedyotis*, 252-253. 1985 (Ph. D. thesis).

Oldenlandia biflora L., Sp. Pl. 119. 1753; Hook. f., Fl. Brit. India 3: 70. 1880; Trim., Handb. Fl. Ceylon 2: 317. 1894, in part; Merr., J. Arn. Arbor. 19: 368 1938; Matthew, Fl. Tam. Carnatic 3: 724. 1983.

Lectotype : Herm. Herb 3: 19, BM (Selected here).

Thecagonum biflorum (L.) Babu, Bull. Bot. Surv. India 11: 214. 1969. **Fig. 2, A-F.**

Erect or diffuse, glabrous herbs; younger stem 4-gonous. Leaves elliptic to oblong, obtuse or subacute at apex, attenuate at base, 1-2.5 × 0.4-0.8 cm. Petiole short, to 4 mm long. Inflorescence of 1-3 flowered cymes in almost all axils and also terminal. Peduncle seldom longer than leaves, stout. Pedicles 5-7 mm long. Flowers 4-7 mm long. Calyx 4-lobed, presistent, prominently 4-angled, tube not

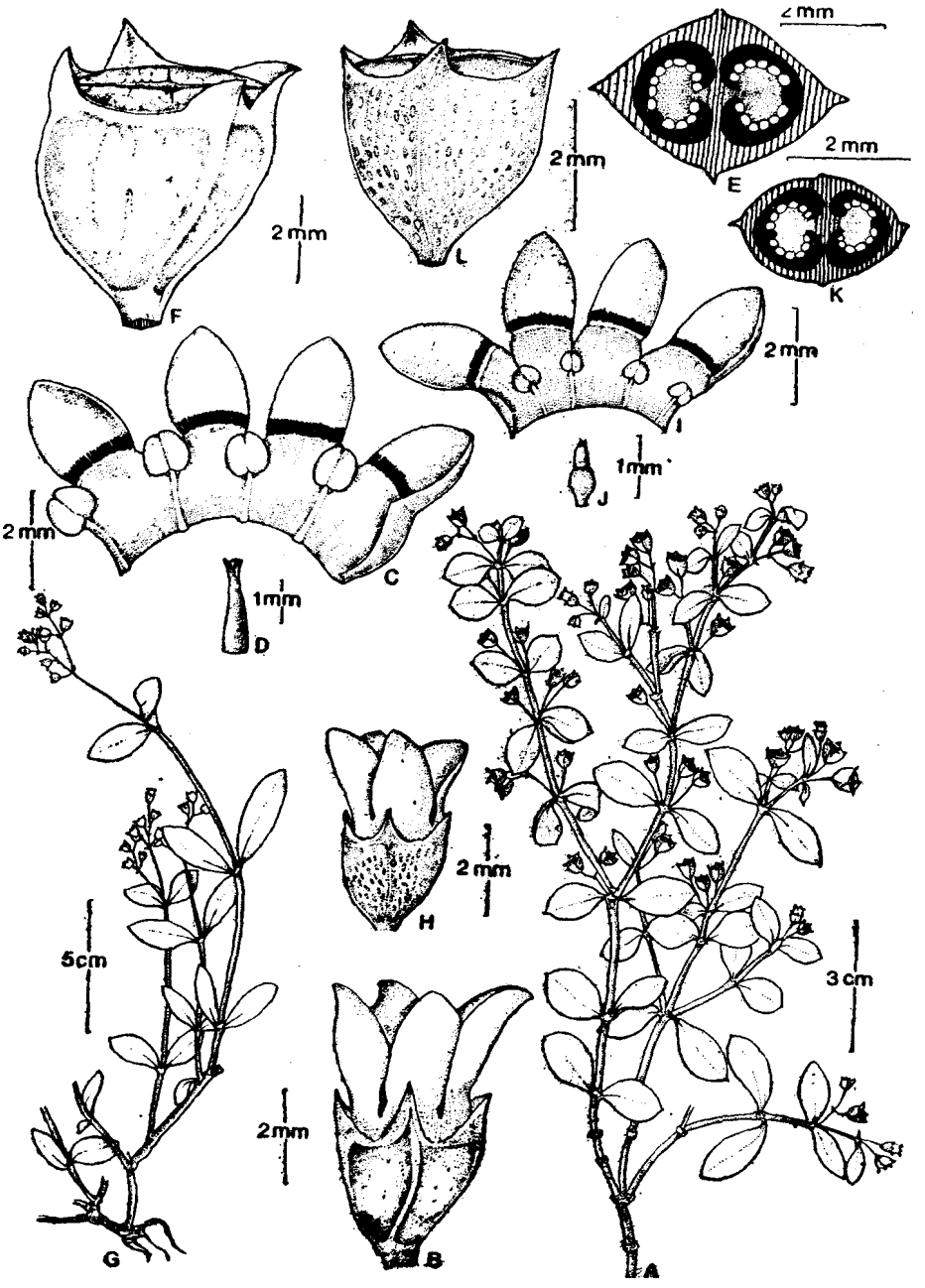

Fig. 2. A-F, *Hedyotis biflora* (L.) Lam. A, Habit; B, Flower; C, Corolla opened; D, Style and stigma; E, C. S. of young fruit; F, mature fruit (drawn from *Biju* 12105)

G-L, *Hedyotis racemosa* Lam. G, Habit; H, Florwer; I, Corolla opened; J, Style and stigma; K. C. S. of young fruit; L, Mature fruit (drawn from *Balakrishnan* 8732)

produced above the ovary and without raphides. Corolla larger than in *H. racemosa*, 4-lobed, with a ring of hyaline hairs at the throat. Stamens 4, inserted at sinuses of corolla. Style and stigma obclavate, minutely notched at apex. Capsules to 6-7 × 4-5 mm, acutely 4-angled with the lateral sides flat. Seeds globose, pitted.

Selected Specimens examined: INDIA: Kerala: *Biju* 12015 (K, CALI); Tamil Nadu: *Barber* 798 (MH.) *Ramamurthy* 24954 (MH).

Hedyotis racemosa Lam, Encycl. 3: 80. 1786; Wt. & Arn., Prodr. 414. 1834; Dutta, Rev. Indian *Hedyotis* 232. 1985 (Ph. D. thesis).

Type: *Sonnerat* s. n. (PLA).

Oldenlandia paniculata L., Sp. Pl. 2: 1667. 1763; G. Don, Gen. Syst. Gard. Bot. 3: 530. 1834; Hook. f., Fl. Brit. India 3: 69. 1880.

Lectotype: LINN. 155. 10 (BM). (Selected here).

Hedyotis paniculata (L.) Kurz, J. As. Soc. Bengal 46 (2): 134. 1877, non Lam. (1783).

Oldenlandia alata sensu Roxb., Fl. Ind. 1: 442. 1820.

O. biflora sensu auctt., in Part, non L., Trimen, Handb. Fl. Ceylon 2: 317. 1894; Gamb., Fl. Pres. Madras 602. 1921; Back. & Bakh. f., Fl. Java 2: 285. 1965; Matthew, Fl. Tam. Carnatic 3: 724. 1983.

Thecagonum biflorum sensu Babu, Bull. Bot. Surv. India 11: 214. 1969, in part, non (L.) Babu, *l. c.* **Fig. 2, G-L.**

Erect or diffuse, glabrous herbs, younger stem 4-angled. Leaves elliptic to ovate-lanceolate, obtuse or subacute at apex, attenuate at base, 1.5-7 × 0.5-2.5 cm. Petiole 9-12 mm long. Flowers in terminal and subterminal, 5-many flowered, peduncled, paniculate cymes, much exceeding leaves, smaller than in O. *biflora*, white. Pedicels 3.5-4.5 mm. Calyx 4-angled in flowers, 4-lobed with dispersed raphides, tube not produced above the ovary. Corolla as in the earlier species, but smaller. Stamens 4, inserted at the sinuses of corolla. Styles and stigma some what cylindric 2-fid above. Capsule terete with 4 ridges, lateral sides arching, 2.5-3.4 mm. Seeds globose, pitted.

Selected Specimens examined INDIA: Andhra Pradesh: *Narayanan* 16816 (MH) Barber 4989 (MH): Bengal: sn. (MH); Karnataka: *Thomson* s. n. (MH;) Tamil Nadu: *Balakrishnan* 8732 (MH).

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