

PLEIOCRATERIUM GENUS NOVUM RUBIACEARUM HEDYOTIDEARUM

by

C. E. B. BREMEKAMP.

Among the most remarkable finds made by Dr. van Steenis in the higher parts of the mountains of North Sumatra are a number of cushion plants. Two of these he recognized as *Rubiaceae* nearly related to *Hedyotis verticillaris* W. et A., a species occurring in similar habitats in the Nilgiri Hills, India, and in Ceylon. Hesitating, however, to express a definite opinion on their taxonomic position, he sent the material to me for further investigation.

As I had occupied myself already for some time with the genus *Hedyotis* L. and its allies, this investigation offered me a wellcome opportunity to test some of the principles which I had laid down for the subdivision of this group. Apart from the characters of the fruit I lay stress on the position of the inflorescence and on the form of the stipules. The name *Hedyotis* itself I wish to restrict to *H. fruticosa* L. and its nearest allies, i.e. to those species that are provided with terminal inflorescences, an ovary not distinctly produced beyond the insertion of the calyx, and fairly large drupes with apically and ventrally dehiscent pyrenes: to a group, therefore, which roughly agrees with *Hedyotis* section *Diplophragma* W. et A.¹

¹ A. S. Hitchcock and M. L. Green recommend the adoption of *Hedyotis auricularia* L. as the generic standard-species, but in my opinion *H. fruticosa* L. should be chosen.

The genus was first described by D a s s a w (Amoen. Acad. I, 1748), who referred two species to it: 1. *H. auricularia* and 2. *H. fruticosa*. His definition of the genus was taken over by L i n n é, who in the first edition of the Species Plantarum quoted three species: 1. *H. fruticosa*, 2. *H. auricularia*, and 3. *H. herbacea*. The last named species may be eliminated at once, in the first place, because it was unknown when the genus was first described, and secondly, because its inclusion in the genus was obviously a mistake: it ought to have been referred to *Oldenlandia*. Of the two other species but one actually fits the generic description. The fruit of *Hedyotis* is described by D a s s a w as "capsula globoso-didyma, bilocularis, dehiscens juxta calycem coronatricem rima transversali". What is meant by „juxta calycem" and "rima transversali" is not quite clear, but I venture to translate

Hedyotis verticillaris W. et A. was referred by its sponsors, and subsequently by Hooker f., to this group, where it occupies, however, a very anomalous position. Its pyrenes, it is true, are dehiscent, but the ovary protrudes distinctly beyond the insertion of the calyx, and the inflorescences are not terminal, but axillary. Its vegetative characters also are strikingly different from those of the other members of this group. The leaves are parallel nerved and quaternate, and at the base they are united in a rather wide amplexicaul cup. The long and narrow interfoliar stipules are inserted near its margin; the product secreted by the numerous marginal glands glues them to the adjacent leaves, and in this way they help to enlarge the cups, which like those found in the genus *Dipsacus* are often filled with water. As the internodes remain very short, the leaf whorls are clustered in rosettes, and the latter in their turn are collected in large hemispherical cushions. The shoots spring from an underground stem, which in old plants reaches a diameter of several centimetres. In the comparatively young stems present in the samples the secondary wood is divided in a number of separate cords, but the structure of the older ones is unknown to me: it

the last part of the sentence by "dehiscing at the height of the persistent calyx by a cross-shaped crack", which would fit *H. fruticosa*. The description of the fruit as "capsula . . . dehiscens" at any rate excludes *H. auricularia*, for the latter has indehiscent fruits. That this species was nevertheless admitted by Dassa w and Linné means probably that they regarded the fruits of their specimen as immature. Linné may have had some doubts of this point, for why should he otherwise have changed the sequence of the species and put *H. fruticosa* first?

Blume seems to have been the only botanist who realized that *H. auricularia* has indehiscent fruits, and that it therefore does not fit the generic description. He himself created for species which other authors, because of their resemblance to *H. auricularia*, would have referred to *Hedyotis* the genus *Metabolos*. It is true that Blume does not mention *H. auricularia*, but that he was well aware of its affinity with his *Metabolos* species, is disclosed by Korthals; the latter tells us (Ned. Kruidk. Arch. II, 2, p. 157, 1851) that Blume "identified the *Hedyotis auricularia* L. in the Herbarium of van Royen as a species of *Metabolos*". I intend to follow Blume's example, and I refer therefore most of the species at present included in the section *Eu-hedyotis* W. et A., and among them *Hedyotis auricularia* L., to the genus *Metabolos*. *Metabolos venosus* Bl., which heads the list of species referred by Blume to this genus, I regard as the standard-species. It is nearly related to *M. auricularius* (L.) Bl. in sched. (*Hedyotis auricularia* L.). With the exception of *Metabolos rugosus* Bl., whose inclusion in the genus I regard as a mistake on Blume's part, any of the other species, however, might have served equally well. The choice, advocated by Hochreutiner, of *M. rugosus* as the standard-species would led to a conception of the genus which I can not accept. Hochreutiner's arguments, which at first sight seem plausible enough, will be discussed in a note on the generic name *Allaeophania* Thw. at the end of this paper.

certainly deserves further study. As none of the characters here enumerated are ever found in *Hedyotis* sensu meo, i.e. in those species possessing a terminal inflorescence, the creation of a new genus is doubtless justified. On account of the numerous cups formed by the connate leaf bases I will call it *Pleiocraterium*.

Pleiocraterium Brem. genus novum *Rubiacearum Hedyotidearum* pyrenis ventro et apice dehiscentibus ad *Hedyotidem* sensu meo (sect. *Diplophragma* W. et A.) et *Dimetiam* accedens, a speciebus recte ad genera ea relatis habitu pulviniformi, foliis curvinerviis quaternis, basi in cupulam circumaxilem connatis, stipulis longis et angustis, margine et interdum facie superiore glandulis mucosis clavatis instructis et ad folia plus minusve adhaerentibus, inflorescentiis axillaribus longe pedunculatis tamen distincte recedens.

Suffrutices glaberrimi, caulibus numerosioribus e caudice lignoso orientibus et in rosellas exeuntibus congestis pulvinum semiglobosum imitantes, stolonibus gracilibus vagantes. *Folia* quaterna, lanceolata vel anguste ovata, curvinervia, basi in cupulam circumaxilem connata. *Stipulae* interfoliales simplices, anguste triangulares, longae, margine et interdum facie superiore glandulis mucosis clavatis instructae, ad folia plus minusve adhaerentes et hoc modo cupulam circumaxilem dilatantes. *Inflorescentiae* axillares, longe pedunculatae, thyrsoidaeae vel subcapitatae. *Flores* breviter pedicellati vel subsessiles, tetrameri, heterostyli vel homostyli. *Ovarium* supra calycis insertionem productum, bi- vel rare tri-loculare, ovulis pluribus in placentas peltatas ad medium septum affixas immersis. *Calyx* tubo brevi, lobis quam ovario longioribus. *Corolla* hypocrateriformis vel subrotata, alba vel rosea, fauce dense barbata, lobis integris. *Stamina* dimidio superiore tubi inserta, inclusa vel exserta, antheris dorsifixis introrsis brevibus. *Discus* quadrisulcatus, glaber. *Stylus* glaber, breviter bilobatus, inclusus vel exsertus. *Fructus* exocarpio dilapso in pyrenas corneas duas vel rare tres dirumpens, pyrenis deinde apice et ventro dehiscentibus. *Semina* angulosa, minute alveolata, nigra.

Habitat regiones sublimas Zeylanicae, Peninsulae Indicae, Sumatrae.

Species quattuor.

Typus genericus: **Pleiocraterium verticillare** (W. et A.) Brem. n. comb. = *Hedyotis verticillaris* W. et A., Prodr. Fl. Ind. p. 409 (1834).

The two following species are new.

Pleiocraterium sumatranum Brem. n. spec.; typus: v. Steenis n. 8560 in herb. hort. bogor.; a *Pl. verticillari* (W. et A.) Brem.

foliis minoribus nervos pauciores exhibentibus, stipulis multo brevioribus, inflorescentiis numquam capitulis lateralibus pedunculatis instructis, floribus homostylis facilliter distinguendum.

Caules primum 4—5 mm. diam.; veteriores multo crassiores, cortice verrucoso obtecti, lignescentes, corpore lignoso speciminum investigatorum in chordas six dirupto, sub rosella foliis siccis interdum permultis, basin versus sensim deficientibus vestiti. *Folia* lanceolata plerumque circ. 7 cm. longa et 1.5 cm. lata, acuta, basi in cupulam 1.5—2 mm. altam connata, supra nitida, subtus nitidula, nervis tredecim, tribus tamen quam aliis multo fortioribus, subtus prominentibus. *Stipulae* 13 mm. longae, basi 5 mm. latae, glandulis clavatis brevioribus sed permultis obtectae. *Inflorescentiae* haud rare quaternae, subcapitatae; capitulum tamen plerumque verticillo florum subsessile praecessum; pedunculus 3—5 cm. longus, valde complanatus, plerumque verticillo foliorum lineari-oblongorum 1.0—1.4 cm. longorum cinctus; capitulum terminale foliis similibus vel linearibus, verticillatis vel oppositis suffultum, floribus 3—9. *Flores* homostyli. *Ovarium* glabrum 1.8 mm. altum et 2.4 mm. diam., utraque placenta ovulis circ. 12 oblecta. *Calyx* glaber tubo 1 mm. longo, lobis anguste ovato-triangularibus 3—6 mm. longis et 1.5 mm. latis, acutis. *Corolla* albida vel rosea, extus glabra, tubo 5.5 mm. longo et 2.5 mm. diam., lobis triangularibus 5 mm. longis, basi 1.5 mm. latis, acutis, recurvatis. *Stamina* ad incisuras corollae inserta, exserta, filamentis glabris 4 mm. longis, antheris 1.5 mm. longis. *Stylus* 13 mm. longus, exsertus; stigmata ovato-orbicularia, 0.2 mm. longa. *Fructus* calycem diu retinens, 4 mm. altus et 3.2 mm. diam. *Semina* utraque pyrena circ. 12, 0.7 mm. alta et 0.5 mm. diam.

Hab. regiones sublimas Sumatrae Septentrionalis.

North Sumatra, Country of the Gajos, G. Losir, alt. 3250—3450 m., leg. v. Steenis n. 8560 Bog., fl. 1. II. '37, type!

"In dry as well as in marshy spots, in dense semi-globose cushions springing from a central underground stem as thick as a wrist. In exposed localities sometimes completely shriveling" v. Steenis in sched.

The flowers are homostylous, with stamens and style both exserted.

Pleiocraterium gentianifolium Brem. n. spec.; typus: v. Steenis n. 9038 in herb. hort. bogor.; maxime ut *Pl. sumatranum* Brem., foliis anguste ovatis minoribus nervos pauciores exhibentibus, inflorescentiis semper ad capitulum terminale redactis, staminibus styloque inclusis facilliter ab eo distinguendum.

Caules primum circ. 3 mm. diam.; veteriores crassiores, subero

crasso, profunde sulcato obtecti, lignescentes, sub rosella foliis siccis interdum permultis, basin versus sensim deficientibus vestiti. *Folia* anguste ovata 1.5—2.5 cm. longa et 4—7 mm. lata, subacuta, basi in cupulam 1.5—2 mm. altam connata, supra nitidula, subtus subopaca, nervis quinque, tribus tamen quam aliis multo fortioribus, supra impressis et subtus prominentibus. *Stipulae* 4 mm. longae, basi vix 1 mm. latae, glandulis clavatis basin versus congestis, apicem versus longioribus. *Inflorescentiae* interdum quaternae, plerumque tamen abortu pauciores, subcapitatae; capitulum numquam verticillo florum praecessum; pedunculus 1—1.5 cm. longus, complanatus; capitulum foliis oppositis linearibus 4 mm. longis, basi saccatis suffultum, floribus 3—5. *Flores* homostyli. *Ovarium* glabrum 1.8 mm. altum et 2.5 mm. diam., utraque placenta ovulis 4—5 obtecta. *Calyx* glaber tubo 0.7 mm. longo, lobis ovato-triangularibus 2.3 mm. longis et 1.5—1.7 mm. latis. *Corolla* albida, extus glabra, tubo 3 mm. longo et 1.5 mm. diam., lobis ovato-triangularibus 2 mm. longis et 1.2 mm. latis. *Stamina* dimidio superiore tubi inserta, inclusa, filamentis glabris 0.2 mm. longis, antheris 0.9 mm. longis, apice orem tubi attingentibus. *Stylus* 1.5 mm. longus, crassiusculus, inclusus; stigmata 0.2 mm. longa. *Fructus* primum calyce coronatus, 2.5 mm. altus et 3 mm. diam., pyrenis duabus vel rare tribus. *Semina* utraque pyrena 4—5, 0.9 mm. alta, et 0.6 mm. diam.

Hab. regiones sublimas Sumatrae Septentrionalis.

North Sumatra, Country of the Gajos, summit of Goh Lembuh, alt. 3000 m., leg. v. S t e e n i s n. 9038 Bog., fl. 20. II. '37, type! "In marshy places".

The flowers are homostylous, but in opposition to those of *Pl. sumatranum* stamens and style are included.

The presence in North Sumatra of two species, each apparently bound to its own mountain, drew my attention to some slight discrepancies between W i g h t's description of the type material of *Pleiocraterium verticillare* collected in the Nilgiri Hills and that given by T r i m e n of the Ceylon plants referred to this species. The investigation of a Ceylon specimen, kindly placed at my disposition by Prof. T h. S t o m p s, confirmed my doubts on the identity of these plants, and I therefore asked Mr. C. E. C. F i s c h e r to compare for me in the Kew Herbarium a larger number of specimens. Mr. F i s c h e r most amiably complied with my request, and sent me moreover, with the assent of the Director of the Royal Botanic Gardens, some material on loan. I can state now that I have found no well-marked points of difference in the vegetative parts of these plants, but that their flowers are utterly unlike.

Those of the Indian plants are heterostylous, either with the stamens exserted and the style included, or with the stamens included and the style exserted; the calyx lobes are erect and contracted in a linear appendix; and the corolla is hypocrateriform, the tube being at least as long as the lobes. The flowers of the Ceylon specimens on the other hand are homostylous, with stamens and style both long-exserted; the calyx lobes are shorter, not distinctly contracted, and more or less patent; and the corolla is subrotate, the tube being much shorter than the lobes.

That homostylous and heterostylous forms may occur in the same species has been shown by Ernst (Ber. Schweiz. Bot. Ges. XLVIII p. 140—149, 1938), who observed this state in *Primula chungensis* Balf. f. et Ward. The presence of homostylous flowers in the Ceylon plants referred to *Pleio craterium verticillare* is therefore no sufficient ground for removing them to another species. When however we take into account that there are also differences in the structure of the calyx and the corolla, we will have to admit that the two forms are too dissimilar to be kept in one species. For the Ceylon plant, which has been described by Arnott (Acta Acad. C. L. C. Nat. Cur. XVIII, part I p. 340, 1836) under the name *Hedyotis plantaginifolia*, I therefore propose the combination ***Pleio craterium plantaginifolium* (Arn.) Brem.**

The following key summarizes the principal differences between the four species:

- 1a. Leaves more than 10 cm. long, with 5 main nerves and more than 10 thinner ones. Stipules at least 4 cm. long. Inflorescences always with pedunculate lateral capitula. — India and Ceylon. 2
- b. Leaves less than 10 cm. long, with 3 main nerves and less than 10 thinner ones. Stipules less than 2 cm. long. Inflorescences consisting of a single terminal capitulum, sometimes preceded by a whorl of sessile flowers. — Sumatra 3
- 2a. Flowers heterostylous. Calyx lobes contracted in a linear appendix, erect. Corolla tube at least as long as the lobes. — India (Nilgiris) 1. *P. verticillare* (W. et A.) Brem.
- b. Flowers homostylous. Calyx lobes not distinctly contracted and more or less patent. Corolla tube less than half as long as the lobes. — Ceylon 2. *P. plantaginifolium* (Arn.) Brem.
- 3a. Leaves lanceolate, more than 5 cm. long; the 3 main nerves accompanied by 10 thinner ones. The terminal capitulum in

most inflorescences preceded by a whorl of subsessile flowers. Stamens and style exserted. *P. sumatranum* Brem.

- b. Leaves narrowly ovate, less than 3 cm. long; the 3 main nerves accompanied by but 2 thinner ones. The terminal capitulum never preceded by a whorl of flowers. Stamens and style included. 4. *P. gentianifolium* Brem.

The geographic distribution of this genus is very peculiar, and I know but one other genus with which in this respect it can be compared. This is *Allaeophania* Thw.¹ It belongs also to the *Rubiaceae*, and comprises a number of nearly related species growing in the mountains of Ceylon and of Sumatra and Java. They resemble each other so closely that Hochreutiner for the moment finds it advisable to regard them as mere subspecies and varieties.

The position of the genus *Allaeophania* is still uncertain. K. Schumann in his monograph of the family in Engler & Prantl puts it in the *Psychotrieae* in the neighbourhood of

¹ Hochreutiner (Candollea V, p. 277, 1934) employs for this genus the name *Metabolos* Bl. with the addition: emend. Hochr. As I have shown above in my note on the standard-species of the genus *Hedyotis* L., the genus *Metabolos* Bl. was created for a number of species which otherwise would have been included in *Hedyotis*. The six species which Blume had referred to it were removed however by Korthals to *Hedyotis*, because he was of opinion that the differences between the two genera were not of sufficient importance. Five of the six have up to now remained in *Hedyotis*, but the sixth, in actual fact it was number three of Blume's list, was recognized by Hooker f. as generically distinct and related to some Ceylon plants for which Thwaites had created the genus *Allaeophania*. The combination *Allaeophania rugosa* (Bl.) was subsequently made by Boerlage. Hochreutiner however is of opinion that this species should have been left in *Metabolos*. Now that the five other species have been removed to *Hedyotis*, the name, he argues, belongs rightfully to the sixth. In general, this is doubtless true, but this case is exceptional. To prove this we will have to show that the five other species are the only rightful claimants to the title, and that *M. rugosus* is a mere changeling, and has therefore no rights at all. This is not difficult.

The fruit of *Metabolos* is described by Blume as "partibilis in cocos 2—4 polyspermos". This excludes *M. rugosus* at once, for in this plant the pyrenes are one-seeded. It is true that the fruits of the five other species contain but two pyrenes, and that one of the characters of *M. rugosus*, the presence of four pyrenes, therefore has been included in the generic description, but Blume apparently considered this as a point of minor importance, for at the end of the description he summarizes his opinion in this way: "Genus ab *Hedyoti* evidenter distinctum fructuum indehiscencia". Not the number, but the indehiscence of the pyrenes (fructuum is evidently a slip of the pen) is for him the all-important point. The name *Metabolos* accordingly must be reserved for *M. venosus* Bl. and its allies, and *M. rugosus*, on account of its one-seeded pyrenes, removed to another genus, in casu to *Allaeophania*.

Lasianthus Jack; B e n t h a m and H o o k e r f. on the other hand considered it as related to *Hedyotis*; and though the gap between the *Hedyotideae* and the *Psychotrieae* is doubtless not so wide as the present subdivision of the family suggests, the two opinions are nevertheless not easily compatible. In my opinion the rodlike placenta rising from the base of the ovary cells points to a relationship with such plants as the Asiatic species somewhat arbitrarily referred by B e n t h a m and H o o k e r f. and by the Flora of British India to the genus *Anotis* DC. The solitary ovules of *Allaeophania* offer no difficulty to this point of view, for in *Anotis* sensu Bth. et Hook. f. the ovules are also sometimes solitary. Whether the genera showing this kind of placentation and those possessing peltate placentas with immersed ovules are rightly referred to the same tribe, is a question which for the moment I will leave undecided. That *Allaeophania* can not be regarded as nearly related to *Pleiocraterium* is at any rate quite sure.
