NOTES ON THE ACANTHACEAE OF JAVA

BY

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The following list gives a survey of the genera of the *Acanthaceae* which are represented in Java either by indigenous, naturalized or commonly cultivated species (cf. BREMEKAMP in BACKER's "Flora van Java"). Those comprising indigenous species have been marked with an asterisk.

Subfamily *Thunbergioideae*: 1. **Thunbergia* Retz.

Subfamily *Acanthoideae*

Tribe *Nelsonieae*: 2. **Staurogyne* Wall.

Tribe *Acantheae*

Subtribe *Aphelandrinae*: 3. *Stenandrium* Nees; 4. *Aphelandra* R. Br.

Subtribe *Acanthinae*: 5. *Crossandra* Sal.; 6. **Blepharis* Juss.; 7. **Acanthus* L.

Tribe *Whitfieldieae*: 8. *Whitfieldia* Hook.

Tribe *Trichanthereae*: 9. Sanchezia Ruiz et Pav.

Tribe *Ruellieae*

Subtribe *Ruelliinae:* 10. *Ruellia* L. emend. Brem.; 11. *Arrhostoxylum* Nees; 12. *Stephanophysum* Pohl; 13. **Dipteracanthus* Nees emend. Brem.; 14. **Pararuellia* Brem.; 15. **Eranthemum* L. emend. Radlk.

Subtribe *Strobilanthinae:* 16. **Hemigraphis* Nees emend. Brem.; 17. **Sericocalyx* Brem.; 18. **Adenostachya* Brem.; 19. *Perilepta* Brem.; 20. **Adenacanthus* Nees; 21. **Tetraglochidium* Brem.; 22. **Pachystrobilus* Brem.; 23. **Goldfussia* Nees; 24. **Diflugossa* Brem.; 25. **Ctenopaepale* Brem.; 26. **Microstrobilus* Brem.; 27. **Strobilanthes* Bl. emend. Brem.; 28. **Parastrobilanthes* Brem.; 29. **Lamiacanthus* O. Ktze; 30. **Echinopaepale* Brem.; 31. **Lissospermum* Brem.

Subtribe *Hygrophilinae*: 32. **Hygrophila* R. Br.; 33. **Nomaphila* Bl.; 34. *Brillantaisia* Pal. Beauv.

Subtribe *Barleriinae*: 35. *Barleria* L.

Tribe *Lepidagathideae*: 36. **Lepidagathis* Willd.

Tribe *Andrographideae*: 37. **Andrographis* Nees; 38. **Gymnostachyum* Nees emend. Benth.

Tribe *Justicieae*: 39. **Asystasia* Bl.; 40. **Pseuderanthemum* Radlk.; 41. *Ruspolia* Lindau; 42. *Graptophyllum* Nees; 43. *Pachystachys* Nees; 44. **Dicliptera* Juss.; 45. **Peristrophe* Nees; 46. **Hypoëstes* R.Br.; 47. *Clinacanthus* Nees; 48. *Fittonia* Coem.; 49. **Polytrema* Clarke; 50. **Leptostachya* Nees emend. Clarke et Stapf; 51. **Strophacanthus* Lindau; 52. *Rhinacanthus* Nees; 53. **Rhaphidospora* Nees; 54. *Cyrtanthera* Nees; 55. *Beloperone* Nees; 56. *Calliaspidia* Brem. n. gen.; 57. *Psacadocalymma* Brem. n. gen.; 58. *Athatoda* Nees; 59. **Calophanoides* Ridl.; 60. **Mananthes* Brem. n. gen.; 61. *Gendarussa* Nees; 62. **Rhyticalymma* Brem. n. gen.; 63. **Rostellularia* Reichenb.; 64. **Rungia* Nees.

The classification adopted above differs from that used by me on previous occasions, in the delimitation of the *Justicieae*: the latter comprise here all *Acanthoideae* provided a. with articulated shoots, leaves united by transverse ridges and an epidermis containing cystoliths, b. a corolla whose lobes show an ascending aestivation, and c. bi-ovular ovary cells. It has, therefore, but little in common with the large and entirely artificial group of genera to which BENTHAM (in BENTH. et HOOK.F., Gen. Pl. II, 1876) and CLARKE (in HOOK. F., Fl. Brit. Ind. IV, 1884) applied the name, but shows a fairly close resemblance to the homonymous group of BENOIST (in LECOMTE, Fl. Gén. de l'Indo-Chine IV, 1935), which, however, includes the *Andrographideae*. It is on the other hand a far more comprehensive group than that of LINDAU (in ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, 1895), for it comprises also the latter's *Asystasieae*, *Graptophylleae*, *Pseuderanthemeae*, *Odontonemeae* and *Isoglosseae*. LINDAU based these groups on the structure of the pollen, but the differences on which he relied, have proved to be for the greater part illusory: in fact, the pollen structure in the first four of these tribes does not show any constant and well-marked points of difference, and that found in the *Isoglossinae*, one of the subtribes of the *Isoglosseae* (the other one is an entirely artificial conglomerate, and may be left out of consideration), differs but slightly from that of LINDAU's *Justicieae*. At one time it seemed to me that the difference between the pollen of the first four groups and that of the *Isoglossinae* and LINDAU's *Justicieae* was of sufficient importance to justify the distinction of two tribes, one in which the pollen grains were 3- or 4-porous with a band on each side of the pores and with oblong shields alternating with the pairs of bands, and the other for the genera provided with 2-porous and flattened pollen grains, usually ornamented with a single, double or treble row of dots, flat knobs or shields on each side of the pores: for the first I proposed to retain the name *Odontonemeae*, and for the second the name *Justicieae*. Subsequently, however, as more and more genera were investigated, it appeared that even this distinction can not be regarded as fundamental. In *Justicia hyssopifolia* L., the species which HITCHCOCK and GREEN selected as type of the genus *Justicia* L., the two pores of the pollen grains are not flanked by rows of dots but by continuous bands, and the same kind of ornament is found in those of *J. orchioides* L.f., one of the group of South African species which are to be regarded as the nearest allies of *J. hyssopifolia*. In the Asiatic representatives of the genus *Rungia* Nees the pollen grains are 2-porous, but whereas the pores in the Javan *R. blumeana* Val. and *R. chamaedryoides* Brem. n. spec. (v. infra) are surrounded by rows of dots, they are in most of the other species flanked by continuous bands.. In *Gendarussa vulgaris* Nees and in **G. montana** (Nees) Brem. n. comb. (*Hemichoriste* Nees) the pores are not only flanked by bands, but there are three of them, and in the American genus *Calliaspidia* Brem. v. infra), which is nearly related to *Beloperone*

Nees, the pollen grains are also 3-porous and provided with bands consisting of rows of large shields and not of dots. In *"Justicia" salsoloides* T. And., a species whose exact position could not yet be ascertained, the pollen shows the same structure as that of the *Gendarussa* species. In fact, it is not at all clear why LINDAU included species like these in *Justicia,* whereas he referred genera like *Rhinacanthus* Nees, *Duvernoia* E. Mey. and his own *Symplectochilus,* whose pollen is indistinguishable from that of the *Gendarussa* species and of *"Justicia" salsoloides* T. And., to the *Odontonemeae.*

That the differences in the structure of the pollen have proved inadequate for the subdivision of the group of genera now brought together in the *Justicieae,* does not mean that the pollen characters are entirely unsuitable for the characterisation of subordinate groups. LINDAU's *Isoglossinae* may be quoted as an example of a natural group readily recognizable by the shape of the pollen grains: the latter are lenticular, and the wall is provided with a thickened marginal zone. The peculiar type of pollen is in this group correlated with the absence of a rugula and the presence of tracheidal thickenings on the walls of the epidermis cells of the testa. This kind of testa, it is true, is not confined to this group, but it is at any rate no general feature of the tribe. As the name of the subtribe was derived from that of OERSTED's genus *Isoglossa,* it will have to be changed, for *Isoglossa* Oerst. was based on the type species of *Rhytiglossa* Nees, and is, therefore, invalid. The restoration of the name *Rhytiglossa* involves, of course, the substitution of the name *Isoglossinae* by *Rhytiglossinae.*

The *Rhytiglossinae* are not the only natural subdivision of the *Justicieae.* The genera 52 — 64 are characterized by a corolla provided with a very short throat and with a rugula and by an androecium consisting of two stamens not accompanied by staminodes. The pollen grains are in this group, to which we will apply the name *Justiciinae,* as a rule 2-porous, flattened and doleiform, but 3-porous grains of the same kind as those found in the groups which I formerly brought together in the *Odontonemeae,* are also present; the 2-porous, flattened and doleiform grains, however, are confined to this group.

Among the genera 39 — 50 a fairly large variety of types is represented, but apart from the *Diclipterinae* (genera 44—46) the latter have not yet been studied in sufficient detail. A satisfactory subdivision of the tribe, therefore, is at present out of the question.

For further information regarding the new genera and species of the *Strobilanthinae* I refer to my paper on this group in "Verhand. Ned. Akad. v. Wet., Afd. Natuurk., Sect. 2, Vol. XLI, pp. 1—306, 1944". The new genera of the Ruelliinae are dealt with in paper by BREMEKAMP and Mrs NANNENGA–BREMEKAMP in "Verhand. Kon. Ned. Akad. v. Wet., Sect. 2, Vol. XLV, N°. 1, pp. 1—39, 1948". The remaining new genera and species are described below.

1. **Thunbergia** Retz.

Th. javanica Gaertn. (De Fruct. et Sem. Pl. III, p. 22, tab. 184, 1805), the only species of this genus which is indigenous in Java, has often, e.g. by CLARKE (in HOOK.F., Fl. Brit. Ind. IV, p. 390, 1884) and by LINDAU (in ENGLER's Bot. Jahrb. XVII, Suppl. p. 38, 1893), been reduced to *Th. fragrans* Roxb. (Fl. Corom. I, p. 47, tab. 67, 1795). In NEES's monograph of the family (in DC., Prodr. XI, p. 56 et 57, 1847), on the other hand, the two species were kept apart. In a note attached to the description of *Th. javanica* NEES expressed himself in this way: "Primo aspectu *T. fragrantis* varietatem censeres. praesertim propter pubescentiae indolem simillimam. Differt autem evidenter: petiolis brevioribus, foliis basi numquam hastato-angulatis sed modico sinu lobisque rotundatis cordatis, inferioribus ovatis aut ovalibus obtusiusculis cum mucronulo, superioribus cordato-lanceolatis magisque acutatis, pedunculis brevioribus, bracteis ovali-oblongis minoribus, calycis dentibus paucioribus latioribus, corollae tubo incurvo semipollicari, limbo quadrilineari." The differences enumerated by NEES are, however, not always so well marked as his words suggest, for part of the leaves at least may be provided with a hastate base, and in the number of calyx teeth there is, in fact, no difference at all. Nevertheless it seems to me that NEES was right, and that subsequent authors relied to much on the resemblance "at first view" against which NEES had so insistently warned. CLARKE himself afterwards recognized that he had gone too far, for in KING and GAMBLE's "Materials for a Flora of the Malay Peninsula" (in Journ. As. Soc. Beng. LXXIV, p. 632, 1908) he granted *Th. javanica* the status of a variety. RIDLEY too in his "Flora of the Malay Peninsula" (II, p. 557, 1923) valued it in this way. I am not fully sure, however, that the specimens collected in the Malay Peninsula are identical with the Javan ones. CLARKE's *Th. fragrans* itself is evidently a mixture of several distinct species. The differences between the species belonging to this group are doubtless very slight, but it seems prudent to adhere for the time being to NEES's view, and to accept *Th. javanica* as a distinct species. After a re-examination of the specimens on which NEES had based his opinion, HOCHREUTINER (in Candollea V, p. 224, 1934) too pronounced himself in favour of this solution.

That the flowers of the Javan species prove to be without any fragrance, should on the other hand not influence our decision, for *Th. fragrans* does not owe its name to the fragrance of the flowers. ROXBURGH l.c. states that "the plant possesses a peculiar and agreeable fragrance, and the beauty of its flowers, although not fragrant, entitles it to a place in the flower garden." Other collectors, however, did not observe any fragrance in the green parts either (cf. e.g. COOKE, Fl. of Bombay II, p. 342, 1905).

The Timor *Th. hastata* Decn. was, on account of the shape of the stigma, referred by LINDAU l.c. to a group which for the rest consists entirely of African species. It differs, however, conspicuously from the latter

in the structure of the calyx, which is provided with 12 teeth. In this respect it resembles *Th. fragrans* and *Th. javanica*. It is rather remarkable that LINDAU, who was, on the whole, inclined to set too much store by the pollen characters, did not avail himself of the latter for the subdivision of this genus, for in this way he would doubtless have arrived at a more satisfactory classification. Unfortunately the structure of the pollen grains of *Th. hastata* is as yet unknown, and it is therefore at present impossible to ascertain its taxonomic position. The decision would not be difficult: in the group of African species in which it is included by LINDAU the pollen grains are small and smooth, whereas those of *Th. fragrans* and *Th. javanica* are much larger and conspicuously tuberculate.

HOCHREUTINER l.c. records the occurrence of *Th. hastata* in Madura, the large island opposite the north coast of East Java, but as he does not mention the difference in the shape of the stigma on which LINDAU laid so much stress, I am not sure that his identification is right. I myself saw in the Leiden herbarium a specimen collected in Madura of which the leaves were partly hastate, but which I nevertheless bring to *Th. javanica*, as its stigma does not differ from that of the latter. The leaves of *Th. hastata*, moreover, are said to be either all subhastate or the upper ones subhastate and the lower ones scutate, and this certainly is not applicable to the leaves of the Madura specimen examined by me.

The extent of the area occupied by *Th. javanica* is not well known, but it seems to me that it is confined to Java and Madura; the specimens collected elsewhere in the Archipelago and in the Malay Peninsula belong probably to distinct species.

In Java itself three varieties could be distinguished, which are apparently all wide-spread:

Thunbergia javanica Gaertn. var. **scabridula** Brem. n. var.; typus varietatis: BACKER 33276 U.

Caulis subglaber. Folia supra scabridula, subtus pubescentia.

Habitat Javam.

Thunbergia javanica Gaertn. var. **scabrida** Brem. n. var.; typus varietatis: BAKHUIZEN V. D. BRINK JR. 2217 U.

Caulis subglaber. Folia supra scabrida, subtus nervis pubescentibus exceptis glabra.

Habitat Javam.

Thunbergia javanica Gaertn. var. **tomentella** Brem. n. var.; typus varietatis: BACKER 16839 U.

Caulis dense pubescens. Folia supra tomentella.

Habitat Javam.

As GAERTNER's description is confined to the characters of the capsule, it is impossible to say to which of the three varieties his type may have

belonged. The description given by NEES was probably based on a specimen belonging to the second variety.

Of the African *Th. alata* Boj. ex Sims several varieties are grown. Some of them merely differ in the orange, yellow or white colour of the corolla; as they are in herbarium material indistinguishable. I am unable to give any information with regard to their occurrence in Java. The following two varieties, which differ from each other and from the type in the nature of the indumentum, prove to be naturalized in Java.

Thunbergia alata Boj. ex Sims var. **velutina** Brem. n. var.; typus varietatis KOORDERS 20402 U.

Caulis primum ubique pilosus. Folia bracteolaeque velutinae.

Habitat Javam, ubi e hortis evasa.

This variety differs from the var. *vixalata* Burkill (in Fl. Trop. Afr. V, n. 16, 1899) in the distinctly winged petioles.

Thunbergia alata Boj. ex Sims var. *reticulata* Burkill (l.c. p. 17).

2. **Staurogyne** Wall.

Four of the five Javan species of this genus were already known to BLUME (Bijdr. Fl. Ned. Ind. p. 756/7, 1826), who referred them to the genus *Adenosma* R.Br., which he included in the *Scrophulariaceae*. One of them, *A. incana* Bl., however, he had previously (Cat. Hort. Bog. p. 85, 1821) described as a species of *Ruellia*. HASSKARL (Cat. Hort. Bog. alter, p. 147, 1844) referred BLUME's *Adenosma* species to the genus *Ebermaiera* Nees, which is identical with *Staurogyne* Wall. *Adenosma elongatum* Bl. was subsequently removed by NEES (in DC., Prodr. XI, p. 78, 1847) to a new genus *Erythracanthus*, which BENTHAM (in BENTH. et HOOK.F., Gen. Pl. II, 2, p. 1074, 1876) reduced to *Ebermaiera*. The differences between *Erythracanthus* and the Asiatic species of *Staurogyne* are doubtless well marked, but so long as the American species of *Staurogyne*, which differ more widely from the Asiatic ones than the latter from *Erythracanthus*, are left in this genus, it seems advisable to follow BENTHAM's example. LINDAU (in ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, p. 288, 1895) accepts *Erythracanthus* as a section. It differs from the Asiatic species of *Staurogyne* in the elongated spikes, the small size of the bracts and the similarity between the upper and lower calyx lobes. In Java it is represented by two species: *St. elongata* (Bl.) O.Ktze and the new one described below.

Apart from the four *Adenosma* species described by BLUME, HASSKARL referred a new species to *Ebermaiera*: *E. subpaniculata* Hassk. (Retzia I, p. 77, 1855), but the latter could not be maintained. It proved to be conspecific with *St. elongata* (Bl.) O.Ktze. A new species described by LINDAU (in FEDDE's Repert. XIII, p. 550, 1915) under the name *St. javanica* proved to be identical with *Pararuellia napifera* (Zoll.) Brem.

Staurogyne (*Erythracanthus*) **prianganensis** Brem. n. spec.; typus: BAKHUIZEN V. D. BRINK JR 3026 U; glabritate partium omnium, foliis angustioribus, calycis lobis lateralibus filiformibus a speciebus aliis ad sectionem *Erythracanthum* pertinentibus distinguenda.

Caulis erectus, circ. 50 cm altus, glaber. Folia in petiolum glabrum, 1—3 cm longum contracta; lamina lineari–lanceolata, 5—11 cm longa et 10—18 mm lata, apice basique attenuata, margine integra, utrimque glabra, discolor, nervis utroque latere costae 9—13, venulis paucis. Inflorescentia racemosa; pedunculus 3 cm longus, basi uno pari foliorum sessilium, magnitudine redactorum (circ. 2 cm longorum) instructus; rachis 7 cm longa; flores circ. 12, omnes sparsi. Bracteae lineares, 5 mm longae. Calycis lobus superior et duo inferiores aequales, lineares, post inflorationem 9 mm longi; laterales filiformes, 7 mm longi. Corolla et fructus nondum noti.

Habitat Javam Occidentalem.

West Java. Priangan Res.: G. Geulis, alt. 1000 m, in silva, BAKHUIZEN V. D. BRINK JR 3026 U, typus; "frequentior".

This new species is easily distinguishable from *St. elongata* (Bl.) O.Ktze, the other Javan representative of the section *Erythracanthus*, by the total absence of hairs on the shoots and leaves, the narrowness of the latter, the small number of flowers in the inflorescence and the small size of the lateral calyx lobes. From *St. papuana* Laut., which it resembles in the shape of the leaves, it differs in its glabrousness and in the small size of the lateral calyx lobes.

6. **Blepharis** Juss.

The description of the genus *Trichacanthus* Zoll. (in Nat. en Geneesk. Arch. v. Ned. Ind. II, p. 572, 1845; id. in Flora XXX, p. 598, 1847 et in WALPERS, Annales I, p. 541, 1848/9) differs but in a single point from that of *Blepharis* Juss.: the retinacula are said to be obsolete. However, as a re-examination has shown that the retinacula are in reality normally developed, *Trichacanthus* can not be kept up. The near affinity between *Tr. exiguus* Zoll., the species on which it was founded, and *Blepharis maderaspatensis* (L.) Roth, was already recognized by BENTHAM (in BENTHAM et HOOK.F., Gen. Pl. II, 2, p. 1089, 1876).

ZOLLINGER's descriptions of Javan *Acanthaceae* in the second volume of the "Natuur- en Geneeskundig Archief van Nederlandsch-Indië" were overlooked by NEES, who two years later based a new species, which he named *Blepharis ablephara*, on a specimen belonging to *Trichacanthus exiguus* Zoll. The identity, however, was not recognized until long afterwards. The new combination *Blepharis exigua* (Zoll.) was first made by VALETON on the labels of the specimens in the Buitenzorg Herbarium. The "*Blepharis exigua* Val." mentioned by KOOPER (in Rec. d. trav. bot. néerl. XXIV, p. 247, 1927) is doubtless this species, but as he does not quote ZOLLINGER's original name, this can not be regarded as a valid publica-

tion of the new combination, and as it is not accompanied by a description either, it must be considered a "nomen nudum": as such it was listed in the 8th Supplement of the "Index Kewensis". The combination was validly published in 1931 by BACKER in his "Onkruidflora der Javasche Suikerrietgronden" (p. 662).

As a second species of the genus *Blepharis* occurring in the Dutch East Indies BOERLAGE (Handl. Fl. Ned. Ind. II, 2, p. 660, 1899) mentions *Bl. boerhaaviifolia* Juss. ex Pers., which is *Bl. maderaspatensis* (L.) Roth (*Acanthus* L.), but the source of his information is not revealed. It is possible, however, that he relied on a communication made bij ANDERSON, who (in Journ. Linn. Soc. VII, p. 34, 1864) says of this species: "*Distr.* India orientali, Ceylania et Java." KOORDERS (Exkursionsfl. v. Java III, p. 222, 1912) too may have noted ANDERSON's remark, for he tells us that this species may be present in Java; he himself, however, had not yet collected it, nor were there at that time any specimens in the Buitenzorg or Leiden Herbaria. BACKER (Onkruidfl. Javasche Suikerrietgr. p. 622, 1931) was the first to give definite dates, a description of the specimens referred by him to this species and an enumeration of the East-Javan localities where they had been collected. His identification, however, can not be accepted: the East-Javan plant proves to be an undescribed species differing from the true *Bl. maderaspatensis* of the Indian Peninsula and Ceylon by its more robust habit, its subglabrous and erect instead of scabrous or puberulous and prostrate shoots, the awned teeth along the margin of the leaves, the absence of small lateral spikes arising from the axils of the lowest pair of bracts, the lanceolate instead of ovate shape and the dentate instead of entire margin of these bracts, the absence of awns along the margin of the bracteoles, the greater size of the lower calyx lobe, which is about 1½ times as long as that of the Indian plant, and the absence of glochidia at the end of the awns found along the margin of the bracts and calyx lobes. It is perhaps not superfluous to add that *Bl. maderaspatensis* is not, as recent floras suggest, a species spread from South Africa to the Malay Archipelago, but one whose area is confined to the Deccan Peninsula and Ceylon. In the African specimens referred to this species the bracteoles are either filiform or absent instead of longer than the bracts, the posticous calyx lobe is 1- instead of 3-nerved and the anticous one has an entire instead of emarginate tip. They apparently belong to a species more nearly related to *Bl. integrifolia* (L.f.) E. Mey. For the Javan species I propose the name *Bl. javanica.*

Blepharis javanica Brem. n. spec.; *Bl. maderaspatensis* (L.) Roth in errore apud BACKER, Onkruidfl. Javasche Suikerrietgr., p. 622, 1931; typus: BACKER 24713 U.

Herba erecta, valde ramosa; ramificatio pseudo-dichotoma; ramuli ultimi penduli et haud raro radicantes. Caulis ramique subglabri. Folia subsessilia, lanceolata, 2.0—5.5 cm longa et 0.5—2.0 cm lata, apice aristata, plerumque

BOTANY

MONOGRAPHS ON YEASTS:

I. STELLING–DEKKER, Die sporogenen Hefen
Out of print.

II. LODDER, H., Die Anaskosporogenen Hefen, 1e Hälfte.
Out of print.

III. DIDDENS, H. A. and J. LODDER, Die Anaskosporogenen Hefen, IIe Hälfte.
1943, 512 p. *f* 25.—.

BEIJERINK, W., Calluna. A monograph on the Scotch heather.
1940, 180 p., 29 photoplates, 141 figures *f* 7.90.

BREMEKAMP, C. E. B., Materials for a Monograph of the Strobilanthinae (Acanthaceae).
1944, 306 p. and 6 tables *f* 15.—.

DUPONT, F. and W. ROEPKE, Heterocera Javanica.
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JONGH, PH. DE, On the symbiosis of Ardisia Crispa (Thunb) A.Dc.
1938, 748 p. *f* 3.70.

POSTHUMUS, O., Malayan Fern Studies.
1937, 67 p. *f* 2.10.
1938, 34 p. *f* 2.10.

GEOLOGY

BROUWER, H.,

Geological expedition of the University of Amsterdam to the Lesser Sunda Islands in the South Eastern part of the Netherlands East Indies.

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WESTERVELD, J.,

On the origin of the acid volcanic rocks around Lake Toba, North Sumatra 1947, 52 p. with one map and 10 figures *f* 5.—

utroque latere dentibus 2, rarius 1 vel 3, in aristam exeuntibus instructa, raro integra, supra glabra, subtus setis aliquibus sparsa. Spicae simplices, uniflorae. Bracteae infimae 7.5 mm, supremae 14 mm longae, haud ciliatae, omnes in aristam 1—3 mm longam exeuntes, dimidio superiore utroque latere dentibus 1—3 etiam in aristas 1—3 mm longas exeuntibus instructae; aristae apice haud glochidiatae. Bracteolae 14 mm longae, integrae, in aristam 3 mm longam exeuntes. Calycis lobus anticus bilobatus, 15 mm longus, nervis 2 fortioribus et insuper marginem versus utroque latere nervo tenuiore instructus; lobuli apicales 4 mm longi, breviter aristati; lobus posticus mucronatus, 18 mm longus, nervis 3 fortioribus et insuper marginem versus utroque latere nervis 2 tenuioribus instructus; lobi laterales in aristam plus quam 4 mm longam exeuntes et ea inclusa 12 mm longi. Corolla 24—26 mm longa, nervis violaceis notata, ceterum alba, extus puberula; tubus obovoideus 4 mm longus et 3 mm diam.; fauces infundibuliformes 2.5 mm longae et ad orem 4 mm diam., chondraceae, postice emarginatae; labium obovatum 17.5 mm longum et 13 mm latum, truncatum, 3-lobatum, dimidio inferiore ad medium incrassatum et chondraceum, ibi glabrum, replicatum, dimidio superiore ad medium nervis 3 fortioribus instructum, nervis in lobo mediano obtuso, 3 mm longo latoque exeuntibus; lobi laterales nervis 5 multo tenuioribus instructi. Stamina superiora filamentis subulatis 5.5 mm longis, glabris; inferiora filamentis crassioribus in apicem obtusum productis etiam 5.5 mm longis; antherae 3.5 mm longae. Granula pollinis 29—30 μ longa et 17—19 μ diam. Discus urceolaris vix 0.5 mm altus. Ovarium 2.5 mm altum et 1 mm diam., utroque loculo ovulo singulo instructum. Gynobasis 0.3 mm alta; stylus 9.5 mm longus, glaber, apice in lobulos appressos 0.5 mm longos divisus.

Habitat Javam Orientalem.

East Java. Besuki Res.: G. Petjaron, west of Panarukan, alt. 0—60 m, BACKER 24713 U, typus, L, dupl. typi; south-east of Situbondo, alt. 50 m, id. 37238; Sumber Waru, alt. 50—150 m, KOORDERS 43898 L.

So long as the other Asiatic representatives of this genus have not been studied in detail, the exact position of the new species is difficult to determine, but it seems to me that it comes nearer to *Bl. exigua* than to *Bl. maderaspatensis*, from which it differs in several important points, e.g. in the absence of glochidia at the top of the awns which are inserted along the margin of the bracts and of the calyx lobes, and in the entire bracteoles. *Bl. exigua* and *Bl. javanica* differ, however, conspicuously in habit.

26. **Microstrobilus** Brem.

Microstrobilus is the only genus of the *Strobilanthinae* of which since the appearance of my monograph of this group a new Javan species has come to light. Its accommodation demands a slight extension of the generic limits. In the description of group U given on p. 62 of my monograph at the end of the first line before "internodio" the word "plerumque" should

be inserted; in line 3 the bracts should be described as "obtusae vel acutae" instead of "obtusae", and in line 5 the hairs by which the style is attached to the corolla should be qualified as "in series vel fasciculos duos dispositi". In the characterisation of the group on p. 249 the words "and in the hairs by which the style is retained against the wall of the corolla forming bundles instead of rows" should be erased. In the description of the genus on the same page the lower bracts should be characterized as "plerumque" foliaceous, and the other ones as "obtusae vel acutae", and the hairs by which the style is kept in its place should be described as "in series vel fasciculos binos dispositi".

Microstrobilus stenurus Brem. n. spec.; typus: LOOGEN 7 BZ; a congeneribus bracteis bracteolisque necnon lobis calycinis acutis, pilis stylum retinentibus in series duas dispositis faciliter cognoscenda; capitulis numerosis ad *M. paniculatum* (Nees) Brem. et *M. orthostachyum* Brem. accedens, caule alato et corolla longiore *M. alato* (Bl.) Brem. similior.

Planta valde ramosa. Rami quadri-alati, alis internodio subaequilatis, ad nodos et in sulcis hirsuti, ceterum glabri. Folia quoque pari inaequalia, majora bis longiora quam minora, omnia sessilia, basin versus tamen in pseudo-petiolum usque ad 3.5 cm longum contracta, apice in caudam 2—3 cm longam et ad medium 1.5—3 mm latam attenuata, ceterum nunc ovato-lanceolata et pseudo-petiolo et cauda exceptis usque ad 15 cm longa et 9 cm lata, nunc lanceolata et usque ad 13 cm longa et 5.5 cm lata, margine plerumque callosodentata, utrimque glabra, nervis utroque latere costae 4—7, cystolithis supra ad nervos venulosque solum dense lineolata. Spicae capituliformes 1.5—2 cm longae et 7—9 mm diam., in cymas paniculatas dispositae; spicae centrales cymarum sessiles vel breviter pedunculatae, aliae pedunculis anguste alatis, usque ad 3 cm longis elatae; omnes bractearum paribus 5 vel 6 instructae et foliis parvis mox deciduis suffultae. Bracteae infimae spicarum centralium nondum visae, spicarum lateralium aliis similiores, minores tamen, omnes lanceolatae, infimae 1 cm, aliae 1.5—2 cm longae, acutae, plurinerviae. Bracteolae 13—16 mm longae et 3—3.5 mm latae, ceterum ut bracteae. Calyx bracteolis aequilongus, tubo 1.5 mm longo, lobis bracteolis similioribus. Corolla dilute violacea, 3.2 cm longa, extus glabra, tubo 10 mm, faucibus 15 mm, lobis 7 mm longis, pilis stylum retinentibus in series duas dispositis. Filamenta omnia glabra, longiora 5 mm, breviora 2 mm longa; antherae 3 mm longae. Granula pollinis subglobosa, 55 μ diam., numero virgarum septatarum nondum determinato. Capsula nondum nota.

Habitat Javam Centralem.

Central Java. Semarang Res.: Dieng Tableland, G. Prahu, alt. 2100—2500 m, LOOGEN 7 BZ, typus, fl. XII.

32. **Hygrophila** R.Br.

The name *Hygrophila* is used by me in the same way as by NEES, i.e. it is restricted to the unarmed species whose flowers are either axillary or

arranged in axillary fascicles and provided with a 5-fid calyx and four perfect stamens. It is represented in Java by the following four species:

1. *H. pusilla Bl.* (v. infra);
2. *H. salicifolia* (Vahl) Nees (syn.: *H. angustifolia* R.Br.; *H. difformis* Bl., syn. *Ruellia difformis* L.f. excl.);
3. *H. erecta* (Burm.) Hochr. (syn.: *Ruellia erecta* Burm.; *R. undulata* Vahl; *H. undulata* Bl.; *Ruellia barbata* Vahl; *H. barbata* Steudel; *Ruellia obovata* Roxb.; *H. obovata* Nees; *H. quadrivalvis* Nees);
4. a species for which I provisionally use the name *H. meianthos* Clarke.

Of the last-named species no authentic material was available to me, and as the description is too brief to allow a reliable identification, the application of the name to the Javan specimens must be regarded as provisional only.

H. pusilla Bl. is described in BLUME's "Bijdr. Fl. Ned. Ind., p. 804, 1826" in the following way:

„**Hygrophila? pusilla**, Bl.

H: caule herbaceo inferne repente, foliis subsessilibus lineari-lanceolatis angustis pube minute adpressis, floribus subsolitariis axillaribus sessilibus.

Crescit in Moluccis.

Floret: Augusto, etc."

BLUME does not quote the name of the collector, and that MIQUEL (Fl. Ind. Bat. II, p. 779, 1858) attributes it to REINWARDT rests probably on no better ground than that he found the type specimen in REINWARDT's herbarium.

On the label of the type specimen in the Leiden herbarium the locality is given as "Lontar", but this does not solve the question of its origin, for "Lontar" is the name of a wide-spread palm and recurs as indication of localities in various parts of the Archipelago. There is, however, good reason to assume that this "Lontar" is to be looked for in West Java. There are, namely, both at Leiden and at Utrecht specimens of *H. pusilla* collected by KUHL and VAN HASSELT, which are not mentioned by MIQUEL and which have apparently been overlooked by all subsequent authors. They look so exactly like the sprigs in the REINWARDT herbarium that there is every reason to assume that they belong to the same collection. No locality is given on the labels of these specimens, but as KUHL and VAN HASSELT never collected outside West Java, they must have been found in West Java. On the label of a specimen of *Staurogyne elongata* (Bl.) O.Ktze in the Leiden herbarium the locality is given as "Lontar R. Megamendon R.", and as this sheet bears a diagnosis drawn up by KUHL and VAN HASSELT, this is to be regarded as evidence that the latter were acquainted with a locality called "Lontar". In recent years *H. pusilla* has been collected at Rantja Badak, south of Leuwiliang, alt. 450 m (BAKHUI-

ZEN V. D. BRINK 7041 L) and on the G. Wiru, west of Leuwiliang, alt. 500 m (BAKHUIZEN V. D. BRINK JR. 988 U). For its occurrence in the Moluccas, on the other hand, there is no definite indication. In RUMPHIUS's "Herbarium Amboinense" I have not been able to find a plant which could possibly be identified with this species, and it is not represented either in ROBINSON's collection of Ambon plants nor among the specimens collected by the Dutch collectors in various parts of the Moluccas.

H. saxatilis Ridl. (in Trans. Linn. Soc. III, p. 333, 1893) is probably conspecific with *H. pusilla*. I know this plant, however, from the description only. It was founded on specimens collected in the Malay Peninsula, but CLARKE states that it occurs also in Borneo, Ceylon and the Philippines, and according to RIDLEY himself it should be present in Cambodja. It is not mentioned, however, in the Supplement to TRIMEN's "Handbook of the Flora of Ceylon", and MERRILL reports in his "Enumeration of Philippine Flowering Plants" (III, p. 470) that he has seen no Philippine specimens. BENOIST (in LECOMTE, Fl. Gén. de l'Indo-Chine IV, p. 642) mentions specimens collected in Tonkin and Annam, but as he refers *H. saxatilis* as a variety to *H. angustifolia* R.Br., i.e. to *H. salicifolia* (Vahl) Nees, their identity with the specimens from the Malay Peninsula appears to be dubious, for the latter apparently differ so much from the ordinary *H. salicifolia* that they can not be regarded as a mere variety. If I am right in assuming that *H. saxatilis* is conspecific with *H. pusilla*, it occupies on account of the slightly unequal calyx lobes a somewhat isolated position in the genus. The Bornean specimens distributed under the name *H. saxatilis* belong to a habitually very similar, as yet undescribed species of *Dyschoriste* Nees.

As BLUME's description of *H. pusilla* is rather summary, I will give here a more detailed one.

Hygrophila pusilla Bl., Bijdr. Fl. Ned. Ind., p. 804, 1826; Miq., Fl. Ind. Bat. II, p. 779, 1858; Boerl., Handl. Fl. Ned. Ind. II, 2, p. 657, 1899; — anne *H. saxatilis* Ridl. in Transact. Linn. Soc. III, p. 333, 1893, Clarke in Journ. As. Soc. Beng. LXXIV, p. 645, 1908 quoad specimina in Peninsula Malayana lecta, Ridl., Fl. Mal. Pen. II, p. 566, 1923 eodem modo, adhuc incertum sed probabile; non Sp. Moore in Gibbs in Journ. Linn. Soc. XLII, p. 119, 1914 nec Merrill in Univ. Cal. Publ. Bot. XV, p. 272, 1929, quae est *Dyschoriste* species indescripta.

Herba caespitosa caulibus simplicibus vel parce ramosis, 7.5—15 cm altis. Caules obtuse quadrangulares, sicc. nigricantes, cystolithis minimis vix conspicue striati, internodiis 6—14 mm longis, quadrisulcatis, glabris, ad nodos fimbriati. Folia sessilia, linearia, 2—3 cm longa et 4.5—5 mm lata, apice obtusa, basi cuneata, margine integra recurvata, utrimque subglabra, sicc. supra saturate olivacea vel subnigra, subtus dilute olivacea, cystolithis gracilibus utrimque numerosis, nervis utroque latere costae 4—6. Flores solitarii vel in triades dispositi. Bracteae florum lateralium lineares,

3.0—5.5 mm longae, glabrae. Calyx 5—6.5 mm longus, lobo mediano 3 min, aliis 2.5 mm longis, omnibus sparse et breviter ciliatis; calycis segmenta post anthesin dehiscentia et recurvantia, brunnea, cystolithis dense lineolata. Corolla alba, 8 mm longa, tubo 2.5 mm, faucibus 2.5 mm, limbo bilabiato 3 mm longo, lobis labii superioris 0.5 mm, labii inferioris 1.0 mm longis, palato pilis longis sparso. Stamina 4 basi inter se et cum staminodio membranis connecta; filamenta glabra, parte libera exteriorum 2.8 mm, interiorum 1.7 mm longa; antherae staminum exteriorum 1.3 mm, interiorum 1.0 mm longae, omnes apice mucronatae, thecis basi mucronulatis; granula pollinis breviter ellipsoidea, 32 μ longa et 29 μ diam.; staminodium angustissime triangulare 1 mm longum. Discus parvus. Ovarium 2.5 mm altum et 0.8 mm diam., glabrum, utroque loculo ovulis 10; stylus subglaber 5 mm longus; stigmatis lobus inferior dorsiventraliter applanatus 0.5 mm longus, fortiter incurvatus; superior parvus. Capsula glabra 10 mm longa, valvulis 10-seminalibus.

Habitat Javam Occidentalem et forsitan Peninsulam Malayanam.

West Java. Buitenzorg Res.: Rantja Badak, south of Leuwiliang, alt. 450 m, BAKHUIZEN V. D. BRINK 7041 L; G. Wiru, west of Leuwiliang, alt. 500 m, BAKHUIZEN V. D. BRINK JR. 788 U; loco incerto "Lontar" dicto, coll. ign. in herb. REINWARDT L, typus; s.l., KUHL et VAN HASSELT s.n. L, cotypus meus.

According to BAKHUIZEN V. D. BRINK the plant grows on stones in the bed of a rivier. In this respect too it agrees with *H. saxatilis* Ridl.

33. **Nomaphila** Bl.

This genus is represented in Java by a single species, the wide-spread *N. stricta* (Vahl) Nees (syn.: *N. corymbosa* Bl.; *Echinacanthus javanicus* O.Ktze).

Apart from the ordinary form I found among the Javan specimens two as yet undescribed varieties:

Nomaphila stricta (Vahl) Nees var. **tomentosa** Brem. n. var.; *N. pubescens* Teysm. et Binn. et *Hygrophila pubescens* (Teysm. et Binn.) Kds in Koorders–Schuhmacher, Syst. Verz. I § 1, p. 41, 1912, nomina nuda; typus: KOBUS s.n. L.

Caule tomentoso, foliis utrimque pubescentibus a typo recedens.

Habitat Javam Centralem et Orientalem.

Central Java. Djocjakarta Res.: Tirto near Djocjakarta, KOBUS s.n. L. typus var.

East Java. Besuki Res.: Puger, KOORDERS 20419 L.

Nomaphila stricta (Vahl) Nees var. **hirtisepala** Brem. n. var.; typus BACKER 36417 L.

Caule foliisque glabris, calyce pilis patentibus longis vestito a typo recedens.

Habitat Javam Orientalem.

East Java. Surabaja Res.: Surabaja, DORGELO 602 et 1962 L; Malang Res.: Redjoso near Pasuruan, BACKER 36417 L, typus var.

As VAHL's type needs a name to distinguish it from the two varieties described above, I will call it **Nomaphila stricta** (Vahl) Nees var. **vahliana** Brem. n. nom.

34. **Brillantaisia** Pal. Beauv.

A representative of this West-African genus has maintained itself for many years in the neighbourhood of Buitenzorg, where is was collected for the first time in 1888 by BOERLAGE (cf. BACKER in Ann. Jard. Bot. Buitenz. Suppl. III, p. 396, 1910). BOERLAGE identified it as *Br. owariensis* Pal. Beauv., but a reinvestigation of the specimens has shown that they belong to another species: the leaves are too wide for *Br. owariensis* and moreover on both sides hairy instead of glabrous. I bring them to *Br. leonensis* Burkill. This species and *Br. lamium* Benth. have long been in cultivation, whereas the other ones, including *Br. owariensis,* are outside the country of origin apparently known from herbarium specimens only. *Br. leonensis* and *Br. lamium* were both figured under the name *Br. owariensis* on tab. 4717 of the "Botanical Magazine", which probably accounts for BOERLAGE's misidentification.

36. **Lepidagathis** Willd.

In BOERLAGE's "Handleiding" (II, 2, p. 660, 1899) the following *Lepidagathis* species are mentioned as indigenous in Java: *L. straminea* Miq., *L. parviflora* Bl., *L. javanica* Bl., *L. billardieriana* Nees, *L. setigera* Bl., *L. incana* (Bl.) Nees and *L. repanda* Bl., and as *L. hyalina* Nees is said to occur in "Nederlandsch Indië", by which BOERLAGE probably means that it is found throughout the Dutch East Indies, the latter's name may be added to this list. Several of these names, however, will have to be expunged, either because they do not occur in Java or because they belong to other genera. *L. incana* and *L. repanda* fall in the second category, for *L. incana* (Bl.) Nees *(Adenosma* Bl.) is *Staurogyne incana* (Bl.) O.Ktze, and *L. repanda* Bl. is *Adenacanthus repandus* (Bl.) Brem. *L. setigera* Bl. is, as I have shown elsewhere (in Verh. Ned. Akad. v. Wet., Afd. Natuurk., 2e Sect. Vol. XLI, p. 95, 1944), to be regarded as a "nomen confusum", for the description has been based partly on a shoot of *Hemigraphis serpens* (Nees) Boerl. ex Backer and partly on a shoot of a *Lepidagathis* species, probably *L. javanica* Bl. var. *brevispica* Brem. v. infra. *L. straminea* Miq. was based on a specimen grown in the Buitenzorg Botanic Garden. The origin of this specimen was unknown. MIQUEL thought that it might be a Javan plant, but this is probably a mistake, for our herbaria possess no specimens that have been found here. Some specimens col-

lected in Celebes, however, agree with MIQUEL's type: the latter may have been obtained from seed collected by TEYSMANN on his travels in that country. *L. hyalina* Nees is a synonym of *L. incurva* Hamilt. ex Don, a species of Northern India and the adjacent countries; the specimens collected in the Malay Archipelago and in New Guinea belong to other species, the Javan ones to *L. javanica* Bl.

Of *L. billardieriana* Nees I have seen no authentic material, but the description mentions two points in which it differs from the plants which I refer to *L. javanica* Bl. (v. infra), namely eglandular bracts, bracteoles and calyx lobes and a deep incision of the anticous calyx lobe, which is said to be bipartite. The few specimens in which I found these characters were insufficiently labelled, so that it remains uncertain in which part of Java this species occurs. It is, however, probably identical with *L. javanica* Bl. var. *b*, which was collected on the G. Tjerimai. The latter's bracts and calyx lobes are said to be outside glabrous, and this is a character which I have met only in the specimens provided with eglandular bracts and bracteoles and with a deep incision in the anticous calyx lobe, i.e. in those which I refer to *L. billardieriana*.

L. javanica Bl. is taken by me in a wider delimitation than by my predecessors, for it comprises apart from BLUME's type, which I designate as var. *longispica* Brem., a var. *brevispica* Brem., which is identical with *L. javanica* Bl. var. *a*, a var. *parviflora* (Bl.) Brem., which comprises the plants formerly referred to *L. parviflora* Bl., and a var. *montana* Brem. created for a recently collected specimen which does not agree with any of the previously recognized species or varieties.

Lepidagathis javanica Bl. var. **longispica** Brem. n. nom. = *L. javanica* Bl., Bijdr. Fl. Ned. Ind. p. 801, 1826, var. excl.; typus BLUME s.n. L. "ad pedem montis Burengerango".

Habitu erecto, foliis 5—24 cm longis, spicis minime 4 cm, plerumque circ. 10 cm longis a varietatibus aliis diversa.

Habitat Javam Occidentalem.

West Java. Buitenzorg Res.: G. Sodong, west of Leuwiliang, alt. 250 m, BAKHUIZEN V. D. BRINK JR 822 U; G. Burangrang, BLUME s.n. L. typus.

Lepidagathis javanica Bl. var. **brevispica** Brem. n. nom. = *L. javanica* Bl. var. *a* Bl., l.c.; typus: KORTHALS s.n. L, Telaga Bodas.

Spicis 1.5—4 cm longis, bracteis 6 mm longis et 2.3 mm latis, 3-nerviis, foliis 5—10 cm longis et 2—3.5 cm latis a varietatibus aliis distinguenda.

Habitat totam Javam, inter 600 m et 1600 m.

West Java. Batavia Res.: Wanajasa, alt. 650 m, BAKHUIZEN V. D. BRINK 4651 L; Priangan Res.: Telaga Bodas, KORTHALS s.n. L, typus var.; Papandajan, id. s.n. L; G. Palasari, alt. 1600 m, WISSE 1007 L; Tjinjiruan, SMITH et RANT 666 L.

Central Java. Madioon Res.: Ngebel, KOORDERS 29145 L; Surakarta Res.: G. Lawu, Sarangan, alt. 1000 m, DORGELO s.n. L.

East Java. Malang Res.: Bodo, alt. 900 m, MOUSSET 1078 L; Besuki Res.: Pantjur, alt. 1150 m, KOORDERS 28480 L.

Magnitudine foliorum inter varietatem precedentem et sequentem intermedia, caule ad nodos inferiores radicante et spicis maxime 4 cm longis ad varietates sequentes accedens.

Lepidagathis javanica Bl. var. **parviflora** (Bl.) Brem. n. comb. = *L. parviflora* Bl., Bijdr. Fl. Ned. Ind. p. 801, 1826; typo a BLUME descripto amisso KOORDERS 20413 L typum novum legi.

Spicis 1—1.5 cm longis, corolla 7 mm longa, foliis ovatis vel ellipticis 3—6 cm longis et 1.5—3 cm latis a varietatibus precedentibus distinguenda, a varietate sequenti foliis majoribus et tenuioribus diversa.

Habitat totam Javam inter 0 et 600 m.

West Java. Buitenzorg Res.: G. Gedeh, JUNGHUHN s.n. L.

Central Java. Semarang Res.: Kedung Djati, KOORDERS 28182 L.

East Java. Surabaja Res.: Surabaja, DORGELO 740 L; Malang Res.: Djatiroto, BACKER 7820 L; Besuki Res.: Puger, KOORDERS 20413 L, lectotypus meus.

Lepidagathis javanica Bl. var. **montana** Brem. n. var.; typus KARSTEN 89 L.

Foliis parvis, 2—3.5 cm longis et 1.4—2.2 cm latis, coriaceis a varietatibus aliis recedens, floribus parvis ad varietatem precedentem accedens.

Habitat Javae Centralis regionem sublimam.

Central Java. Semarang Res.: Dieng Tableland, alt. 2000 m, KARSTEN 89 L, typus var.

KOORDERS–SCHUHMACHER (Syst. Verzeichn. I § 1, p. 47, 1912) reports the presence in Java of *L. eucephala* Miq., a species which previously was known from the Lesser Sunda Islands only. The type was collected in Lombok, and a var. *lanceolata* Miq., differing from the former in the shape and size of the leaves, was found in Sumbawa. KOORDERS's specimens prove to differ from both: they belong to a new variety. More recently another variety was detected in the same part of the island in which KOORDERS had secured his specimens.

Lepidagathis eucephala Miq. var. **glandulosa** Brem. n. var.; typus varietatis: CLASON 1681 L.

Bracteis, bracteolis, apicibus loborum calycinorum pilis capitatis vestitis, calycis lobo antico breviter 2-fido, corolla extus pilis retrorsis dense pubescente a typo recedens.

Habitat Javam Orientalem.

East Java. Surabaja Res.: Sidaju, DORGELO 1877 L; Besuki Res.: Bondowoso, northern slope of G. Ringit, CLASON 1681 L, typus var.; Puger, KOORDERS 20407 et 21552 L; s.l., REINWARDT 251 L.

Lepidagathis eucephala Miq. var. **linearifolia** Brem. n. var.; typus varietatis: CLASON 1682 L.

A varietate precedente quam comitat foliis linearibus usque ad 11 cm longis et 1.2 cm latis distinguenda.

Habitat Javam Orientalem.

East Java. Besuki Res.: Bondowoso, northern slope of G. Ringit, CLASON 1682 L, typus var.

In *Lepidagathis eucephala* Miq. var. *lanceolata* Miq. the leaves are more rigid and much shorter than in the var. *linearifolia*, and the bracts, bracteoles and calyx lobes are shorter than in the two Javan varieties, but covered with the same kind of hairs. In this respect all three differ from the type, for which I propose the name var. **zollingeriana**.

The following species named in honour of Dr. BACKER, who was the first to collect it, is entirely new. It agrees with *L. eucephala* Miq. and with the Timor *L. humifusa* Decn. in the small size of the capitula and in the presence of a flower in the axil of each bract. They form a well-defined group, which apparently is confined to the Malay Archipelago.

Lepidagathis Backeri Brem. n. spec.; typus CLASON 1683 L; floribus capitatis, bracteis omnibus fertilibus, bracteis bracteolisque necnon lobis calycinis in aristas exeuntibus, corollae labio superiore integro, seminibus pilis longis vestitis ad *L. eucephalam* Miq. accedens, capitulis in spicas dispositis et e numero minore florum compositis, bracteis involucralibus aristatis, granulis pollinis longioribus tamen ab ea valde diversa.

Herba erecta, parce ramosa, 30 cm alta. Caulis internodiis 2—5 cm longis et 1.5 mm diam., primum sparse pubescentibus, deinde glabris et cortice albo vestitis, superioribus apicem versus quadri-alatis, aliis quadricostatis. Folia basi subito in pseudo-petiolum alatum, usque ad 1.5 cm longum contracta, parte cetera ovata, usque ad 4 cm longa et 2.5 cm lata, apice aristata, margine integra vel vix conspicue denticulata, subcoriacea, supra primum setulis sparsa, deinde plus minusve glabrescente, subtus sparse et breviter pubescente, cystolithis supra plerumque conspicuis, nervis utroque latere costae 4—6. Flores in capitula parva, quae basi bracteis quattuor, 5—6 mm longis et 3—3.5 mm latis, supra medium recurvatis, apice aristatis involucrata sunt, congesti; capitula a bracteis aristatis bracteis involucralibus paulo majoribus sed ceterum similioribus suffulta et in spicas terminales et axillares, 1.5—4 cm longas disposita; capitula quaeque floribus 2—8. Bracteae florales 7 mm longae et 1.8 mm latae, aristatae, dorso et margine longe pilosae sed haud glandulosae, apicem versus virides, basin versus hyalinae. Bracteolae 6 mm longae et 1 mm latae, totae hyalinae, ceterum ut bracteae florales. Calycis lobus posticus 7 mm longus et 1 mm latus; lobi laterales 6 mm longi et 0.4 mm lati; lobus anticus 6.5 mm longus et 2 mm latus, breviter 2-fidus, omnes characteris ceteris bracteolis similiores. Corolla rosea, 7.5 mm longa, tubo glabro 2 mm longo et 0.5 mm diam., faucibus infundibuliformibus 2 mm longis et ad orem 1.3 mm diam., extus pilis retrorsis sparse pubescentibus, limbo 3 mm longo, labio superiore integro, lobis lateralibus extus pilis erectis pubescentibus,

omnibus subaequalibus, oblongis, 3 mm longis et 1.5 mm latis. Stamina filamentis 0.2 mm longis, sub antheris latentibus; antherae 0.7 mm longae, apice emarginatae, thecis basi muticis. Granula pollinis 30 μ longa et 14 μ diam. Discus urceolaris parvus, margine lobatus. Ovarium apice dense comosum. Stylus glaber, 12 mm longus, apice vix incrassatus. Stigma 0.3 mm longum, cylindricum. Capsula 4 mm longa et 1.2 mm diam., extus puberulo-pubescens. Semina pilis longis vestita.

Habitat Javam Orientalem.

East Java. Besuki Res.: Bondowoso, northern slope of G. Ringit, CLASON 1683 L, typus. The specimens collected by Dr. BACKER were found in the same region, but were not available.

37. **Andrographis** Nees.

The *Andrographideae* are the only *Acanthoideae* with articulated shoots and an epidermis provided with cystoliths in which a bilabiate corolla with ascending aestivation of the lobes is found in combination with pluri-ovular ovary cells. Their pollen grains, moreover, show a structure which is met nowhere else. They form, therefore, a well defined group. The delimitation of the genera belonging to this tribe, however, is as yet unsatisfactory.

ANDERSON (in Journ. Linn. Soc. IX, p. 502, 1867) included in *Andrographis* Nees a species which he called *A. tenuiflora* T. And., but which in reality is conspecific with *Haplanthus tener* Nees, the type of NEES's genus *Haplanthus*. The latter was separated by NEES from *Andrographis* on account of the subactinomorphous corolla and of the supposedly monothecous anthers. The anthers afterwards appeared to be dithecous, and the remaining point of difference was in the eyes of ANDERSON not sufficiently important to justify the preservation of the genus. The generic name, however, was retained both by him and by all subsequent authors for the species which NEES at a later occasion had referred to it, and which differ from the type and from the species which NEES placed in *Andrographis* in the nature of the inflorescence, the flowers being surrounded by tufts of cladodes. That this is a nomenclatural transgression has apparently so far been overlooked.

KUNTZE mentions in his "Revisio Generum Plantarum" the presence of *Andrographis tenera* (Nees) O.Ktze (*Haplanthus* Nees) in Java, but this was not the first time that the plant was collected there. In fact, it had already long ago been described bij BLUME (Bijdr. Fl. Ned. Ind., p. 789, 1826) under the name *Justicia laxiflora* Bl. The correct name for this species, therefore, is *Andrographis laxiflora* (Bl.) Lindau.

A. laxiflora is a remarkably wide-spread species, for it occurs from Assam to Java. It also shows a large degree of climatic adaptability, for it is found in Java at altitudes varying between 0 and 2000 m. HOCHREUTINER (in Candollea V, p. 233, 1934) distinguishes two varieties, but as I did not see his material, I am unable to express an opinion on their value.

A second species of *Andrographis* found in Java is the very bitter *A. paniculata* (Burm.) Nees. It is probably an introduced species, originally cultivated on account of its medicinal properties, but now completely naturalized and wide-spread. As its nearest allies are found in the Indian Peninsula, the latter must probably be considered its country of origin.

38. **Gymnostachyum** Nees emend. Benth.

The genera *Cryptophragmium* Nees and *Gymnostachyum* Nees were united by BENTHAM (in BENTH et HOOK.F., Gen. Pl. II, 2, p. 1099, 1867) under the name *Gymnostachyum*. The choice of this name was criticized by KUNTZE (Rev. Gen. Pl. I, p. 483, 1891). Three arguments were brought forward by him in favour of *Cryptophragmium*: 1° although published in the same paper and even on the same page, it came before *Gymnostachyum*; 2° it contained more species; and 3° the name *Gymnostachyum* had adready been used by R. BROWN for another genus. None of these arguments, however, is compulsive. It is true that *Cryptophragmium* was described a few lines before *Gymnostachyum*, but their position is determined by the fact that they are referred to different divisions of the subtribe *Justicieae*: In DC., Prodr. XI the original sequence was reversed, so that no value can be attached to their relative position. The number of species would have been an argument in favour of *Cryptophragmium*, but is it not of sufficient importance to reject BENTHAM's choice. KUNTZE's third argument has no value at all, because the name used by BROWN is only somewhat similar, not identical. There is, therefore, no sufficient reason to go back upon BENTHAM's decision. The latter, moreover, was accepted by most of the authors who since then have occupied themselves with these plants. The only ones who followed KUNTZE's example are LINDAU (in ENGL. u. PRANTL, Nat. Pranzenfam. IV 3 b, 1895) and BENOIST (in Lecomte, Fl. Gén. de l'Indo-Chine IV, 1935). That BENTHAM preferred the name *Gymnostachyum* may have been due to the fact that *Cryptophragmium* owes its origin to an error of observation: NEES thought that the anthers were provided with a poorly developed connective, so that the thecae were in front united and opened with a single slit, but this is not so: the thecae are in reality completely separated and each of them opens separately.

The genus *Gymnostachyum* is, apart from the often cultivated *G. ceylanicum* Nees, represented in Java by some indigenous species, but only two of the latter are as yet sufficiently known. The first of these is *G. glomeratum* (Bl) Brem. n. comb. (*Justicia* Bl.) v. infra and the second *G. subacaule* (Zoll.) Brem. n. comb. (*Odontostigma* Zoll.). *Petracanthus Junghuhnii* Nees is usually quoted as a synonym of the latter, but their identity is not absolutely sure. The type of *P. Junghuhnii* Nees var. *hirsutior* Nees bears the same number as the type of ZOLLINGER's species, but this is no conclusive evidence. In HASSKARL's private herbarium, now at Leiden, there

is a specimen of ZOLLINGER bearing this number which does not answer the description either of *Odontostigma subacaule* Zoll. or of *Petracanthus Junghuhnii* Nees var. *hirsutior* Nees: in fact, it belongs to *Pararuellia napifera* (Zoll.) Brem. (*Ruellia* Zoll.). The Leiden Herbarium possesses a duplicate of the specimen collected by JUNGHUHN on which NEES based his *Petracanthus Junghuhnii*, but there are neither at Leiden nor at Utrecht specimens collected by ZOLLINGER which answer the description of the latter's *Odontostigma subacaule* nor are there any recent collections which can be referred either to this species or to *Petracanthus Junghuhnii*. That the descriptions given by ZOLLINGER and NEES point to congeneric species, can hardly be doubted, but that the latter should be identical, remains uncertain: ZOLLINGER describes the petiole as very short, NEES as nearly an inch long, and whereas the leaves are according to the first on the underside villous, they are according to NEES powdery-scabrous on the midrib and nerves. Nevertheless, so long as ZOLLINGER's type is not available and no recently collected material can be compared, it seems advisable to follow the earlier authors and to consider them conspecific.

G. javanicum Nees is unknown to me: it may be conspecific with *G. subacaule*, but as the inflorescence is described as a simple spike, it may turn out to be identical with *Pararuellia napifera* (Zoll.) Brem. However, as the two collections of ZOLLINGER (n. 828 et n. 1392) are unknown to me, and as I did not see any Javan *Gymnostachyum* referable to this species, the question can at present not be solved. Is is also possible that it is identical with *G. ceylanicum* Nees: in that case it must have been based on cultivated specimens.

As BLUME's description of *Justicia glomerata* is but short and incomplete, I will insert here a more detailed one.

Gymnostachyum glomeratum (Bl.) Brem. n. comb.; *Justicia glomerata* Bl., Bijdr. Fl. Ned. Ind., p. 786, 1826; Boerl., Handl. Fl. Ned. Ind. II, 2, p. 663, 1899; Koorders, Exkursionsfl. v. Java III, p. 230, 1912; *Adhatoda glomerata* (Bl.) Miq., Fl. Ind. Bat. II, p. 831, 1858.

Herba ascendens, 20—30 cm alta, simplex vel parce ramosa. Caulis sympodialis, glaber, internodiis plerumque 2 cm longis, primum 2 mm, deinde 3—4 mm diam., obtuse quadrangularibus et bisulcatis. Folia in petiolum canaliculatum, glabrum, 2.5—7 cm longum contracta; lamina oblongo-lanceolata, 7—18 cm longa et 2.8—6.5 cm lata, apice acuminata, basi contracta, margine subintegra paulum incrassata, herbacea, utrimque glabra, sicc. supra saturate, subtus dilute brunnea, margine costa nervisque nigricantibus, cystolithis parvis utrimque distinguendis, nervis utroque latere costae 7—11, venulis paucis. Inflorescentia pedunculo glabro, circ. 5 cm longo elata, rachide glabra ex internodiis usque ad 1 cm longis composita, floribus in axillis bractearum cymosis. Bracteae cymas suffulcientes subulatae, infimae 4 mm longae, aliae apicem versus breviores; cymae infimae 5- vel 7-florae, aliae e floribus paucioribus compositae vel ad

florem singulum redactae. Bracteae florum lateralium bracteis cymarum forma similiores, 1.2 mm longae. Bracteolae nullae. Pedicelli usque ad 1 mm longi. Calyx glaber, 3.3 mm altus, segmentis subulatis aequalibus in tubum 0.5 mm altum connatis. Corolla extus glabra, 15 mm longa, tubo cylindrico 5 mm longo, faucibus orem versus sensim sed paulum dilatatis, vix incurvatis, 8 mm longis, facie postica sine rugula, facie antica palatifera, limbo bilabiato, 2 mm longo, labio superiore emarginato, labio inferiore 3-partito. Stamina inclusa filamentis brevibus hirtellis 3.5 mm longis, basin versus paulum dilatatis instructa; antherae 3.3 mm longae, thecis linearibus parallelis et appressis, basi calcare 0.3 mm longo instructis, connectivo apiculato, dorso pilis capitatis brevissimis vestito. Granula pollinis 43 μ longa et 23 μ diam. Discus urceolaris glaber. Ovarium subglabrum, 2 mm altum, utroque loculo ovulis circ. 10. Stylus hirtellus, 11 mm longus. Stigma primum crateriforme, deinde bilabiatum, lobulo superiore 0.4 mm, inferiore 0.7 mm longo. Capsula nondum nota.

Habitat Javae Centralis partem australem.

Central Java. Banjumas Res.: Nusa Kambangan, in shady spots, BLUME 1667 L, typus, fl. X.

It is rather amazing that none of the authors who previously examined this plant, noticed the large number of ovules, the character which excludes it from the *Justicieae* and assigns it a place in the *Andrographideae*. The included stamens and the absence of a rugula are also characters which should not have been overlooked. Its reference to *Gymnostachyum* rests on the following grounds: the absence of staminodes excludes it from *Phlogacanthus* Nees, the absence of long hairs on the outside of one of the thecae from *Andrographis* Nees and *Haplanthus* T. And., the shortness of the corolla limb and the absence of lateral spurs beneath the incisions between the lips from *Diotacanthus* Benth., and the non-ventricose throat and distinctly bilabiate limb from *Cystacanthus* T. And., so that only the genus *Gymnostachyum*, which in its present delimitation is rather negatively characterized, is left for its reception. LINDAU (in ENGL. u. PRANTL, Nat. Pfanzenfam. IV 3b, p. 323) ascribes in his key a rosulate habit to the species of this genus, but his own groups Ab and B (op. cit. p. 324) consist exclusively of caulescent plants. In fact, the habit varies in this genus so much, that it can hardly be considered a natural group. As the genus, however, is but poorly represented in the Malay Archipelago, I will leave the splitting to botanists who have to deal with a larger number of species.

The *Andrographideae* are probably represented in Java by a third genus. Dr. BACKER informs me that he has found in the southern part of the Priangan Residency a species with inflated corolla which will have to be referred either to *Cystacanthus* or to *Phlogacanthus*, but as the views on the delimitation of these genera are at variance, and some species which previously were included in *Cystacanthus* have recently been removed to

Phlogacanthus, a decision will have to be postponed untill the material, which is preserved in the Buitenzorg Herbarium, becomes available.

39. **Asystasia** Bl.

The genus *Asystasia* was founded bij BLUME in his "Bijdragen tot de Flora van Nederlandsch Indië" (p. 796, 1826) on a plant which he identified with *Ruellia intrusa* Forsk. (Fl. Aegypt. Arab. p. 113, 1775; see also: VAHL, Symb. Bot. I, p. 45, 1790). NEES (in WALL., Pl. As. Rar. III, p. 90, 1832) already recognized that this identification is wrong. In a note attached to his description of *A. coromandeliana* Nees he declares: "*Ruellia intrusa* Forsk. huius loci esse videtur. — *Asystasia intrusa* Blume Bijdr. p. 796, "foliis ovato-oblongis acuminatis" alia est species: *A. nemorum* nobis, quam vide." In the description of the latter he quotes, apart from a number of specimens which are indicated by the aid of their manuscript names, "*Asystasia intrusa* Blume Bijdr. p. 796". It is clear, therefore, that *A. nemorum* Nees is the oldest legitimate name of the species described by BLUME. That the specimens quoted bij NEES do not belong to this species, is of no importance: by referring to BLUME's description NEES automatically accepted the plant described by BLUME as the type. *A. nemorum* Nees, therefore, is not to be considered a new species but merely a new name replacing the invalid one used by BLUME. The matter is complicated by the circumstance that NEES afterwards (in DC., Prodr. XI, p. 167, 1847) introduced another species, which he calls *A. Blumei* Nees, in the description of which he also referred to BLUME's description of *A. intrusa*. This new species, therefore, is clearly conspecific with *A. nemorum*, and the name an illegitimate synonym of the latter. As I have pointed out at an earlier occasion (Rec. d. trav. bot. néerl. XXXV, p. 162, 1938) *A. intrusa* (Forsk.) Bl. is the Arabian species described by FORSKAL; *A. nemorum* Nees the Javan one described by BLUME under the name *A. intrusa*, and *A. Blumei* an illegitimate synonym of the latter, whereas the plants from the Indian Peninsula quoted by NEES in his description of *A. nemorum* belong according to CLARKE to *A. crispata* Benth.

The generic description of *Asystasia* given by BLUME l.c. reads:
"*Calyx* quinquepartitus, aequalis. *Corolla* infundibuliformis; limbo quinquelobo, parum inaequali. *Stamina* quattuor, didynama, inclusa; *antherae* loculis parallelis. *Ovarii* loculi bispermi. *Capsula* clavata, bivalvis, dissepimento adnato. *Semina* retinaculis subtensa.

Herbae oppositifoliae, caulescentes, spicis laxis secundis, floribus alternis tribracteolatis."

NEES made a few additions to this description: he states, for instance, that the stamens are at the base united in pairs, that the stigma is capitate, 2-lobed or 2-toothed, and that the seeds are lobate.

MIQUEL described in his "Fl. Ind. Bat." (II, p. 822, 1858) a new genus *Isochoriste*, which differs but in a single point from *Aystasia*, namely in

the slightly protruding anthers: the stamens of *Asystasia* were described by BLUME as included. BLUME's description, however, is inaccurate: the anthers of the type species are in reality, exactly like those of the plant described by MIQUEL, slightly protruding.

A reinvestigation of the specimen on which MIQUEL had based his new genus, has shown that it is conspecific with the type of *A. nemorum* Nees, the plant originally described by BLUME under the illegitimate name *A. intrusa*. The only point in which *Isochoriste javanica* Miq. differs from the latter are the slightly longer pedicels, but as the length of the pedicels appears to be a rather variable character, no weight can be attached to this difference. *Isochoriste javanica* Miq., therefore, is to be considered a mere synonym of *Asystasia nemorum* Nees.

The Buitenzorg taxonomists, to whom the type of *Isochoriste javanica* was not available and who had to rely on MIQUEL's description, referred to this species a number of specimens collected in the eastern part of the Archipelago, which differ from *Asystasia nemorum* in the greater length of the corolla tube and in the narrowness of the throat. They were doubtlessly lead to this identification by the "corollae tubulosae ringentis tubus rectiusculus" of MIQUEL's generic description. In reality, however, the corolla of the type specimen is by no means tubular, but consists exactly like that of BLUME's type of a terete tube widening into a nearly equally long campanulate throat and a spreading limb. The species from the eastern part of the Archipelago, whose area extends from East Java to the Moluccas and New Guinea, is not only different but also unnamed. A description, however, has been given by BACKER in his "Onkruidflora der Javasche Suikerrietgronden" (p. 667, 1931) under the name *Isochoriste javanica* Miq. In the latter's key to the genera the distinction between *Isochoriste* and *Asystasia* is based on the two characters discussed above: the exserted anthers of the longer stamens and the narrow corolla tube. These differences, however, are not present in the original types, and they can, moreover, not be considered sufficiently important to justify the distinction of two genera.

Asystasia oppositiflora Brem. n. spec.; *Isochoriste javanica* Miq. in errore apud Backer, Onkruidfl. Javasche Suikerrietgr., p. 667, 1931, non Miq., Fl. Ind. Bat. II, p. 822, 1858, quae est *Asystasia nemorum* Nees; typus florifer: BACKER 37687 L; co-typus fructifer: id. 31161 L; maxime ut *A. nemorum* Nees, sed corollae tubo longiore, floribus omnibus vel minime inferioribus oppositis faciliter ab ea distinguenda.

Herba erecta, ramosa, 0.50—1.25 m alta. Caulis ramique quadrangulares, internodiis quadrisulcatis 4—14 cm longis et usque ad 2 mm diam., primum pilis longioribus sparsi, mox nodis exceptis glabrescentes. Folia in petiolum gracilem, 0.5—5 cm longum, marginibus primum pubescentem contracta; lamina ovata, 3.5—10 cm longa et 2—6.5 cm lata, acuminata, basi contracta, tenuis, primum utraque facie setulis paucis sparsa, deinde costa

utraque facie et nervis subtus solum sparse pilosa, cystolithis punctiformibus supra plerumque conspicuis, nervis utroque latere costae 5. Racemi spiciformes interdum solitarii, interdum ad apices ramorum lateralium in triades dispositi. Pedunculus 1.5—3.5 cm longus; rachis 2.5—5 cm longa; flores haud secundi sed inferiores vel omnes oppositi. Bracteae 1.0—1.5 mm longae; bracteolae ad basin pedicelli insertae 0.7—1.0 mm longae. Pedicelli 2—4 mm longi, apicem versus incrassati, densius puberuli. Calyx 6—7 mm altus; lobi lineares acuti, pilis brevibus partim capitatis vestiti. Corolla gracilis, 2.5—3 cm longa, dilute violacea vel rarius alba, extus puberula, tubo 17—20 mm longo et 1 mm diam., apicem versus paulum dilatato, faucibus infundibuliformibus 8—10 mm longis et ad orem circ. 6 mm diam., lobis 4—5 mm longis et 3—4 mm latis. Stamina basi 1.5 mm connata; pars libera filamentorum exteriorum 6 mm, interiorum 3 mm longa: antherae staminum exteriorum 1.4 mm, interiorum 1.2 mm longae, thecis apice basique vix conspicue mucronulatis. Granula pollinis forma pro generic typica, 60—70 μ longa et 32—40 μ diam. Discus urceolaris. Ovarium apice vix conspicue hirtellum. Stylus subglaber. Capsula 2—2.5 cm longa, subglabra. Semina margine dentata, lateribus muricatis, 4—4.5 mm diam.

Habitat partes orientales Indiae Aquosae, ubi usque ad altitudinem 400 m reperta est; fl. I—VI.

East Java. Surabaja Res.: Grissik, DORGELO 3314 L; Surabaja, id. 28 L; between Modjokerto and Lumadjang, id. 1852 L; Malang Res.: Kepooh near Pasuruan, BACKER 37687 L, typus florifer, et 31161 L, co-typus fructifer.

Madura: Bangkalan, BACKER 18960 L; Tamberu, id. 20550 L; Sumenep, id. 20620 U.

Kangean: between Ardjåså and Pabean, BACKER 27176 L.

Sumba: s.l. IBUT 181 L et U.

Timor: Kupang, R. BROWN "April 1803" L, ZIPPELIUS s.n. L; s.l. FORBES 4083 L; JONKER 314 U.

Celebes: Minahassa, KOORDERS 15785/6 L; Malino, BÜNNEMEYER 10764 L; Gulf of Boni, WEBER s.n. L; Makassar, id. s.n. L; Madjene, RACHMAT 129 U; Kaju-adi, DOCTERS v. LEEUWEN 1321 U; Saleyer, alt. 400 m. id. 1847 U.

Obi: HULSTEYN 2 L.

Ambon: Ema, TEYSMANN s.n. L.

Buru: s.l. TOXOPEUS 620 L.

Ceram: Kilmoori, RUTTEN 755 U; Kaibobo, FORSTEN s.n. L; Boano, RUTTEN 1286 U; Wahai, id. 94 U.

New Guinea: South Merauke, Koch s.n. L; island of Sorong, GIBBS 6286 L.

A variety of this species differing from the type, which I will designate as **Asystasia oppositiflora** Brem. var. **subglabra** Brem., in the tomentellous

shoots and in the character of the indumentum of the leaves, which are on the upper side rather densely, on the underside sparsely villous, was collected near Surabaja.

Asystasia oppositiflora Brem var. **tomentella** Brem. n. var.; typus varietatis: DORGELO 268 L.

Varietas a typo recedens caule ramisque tomentellis, foliis supra densius, subtus sparsius villosis.

Habitat Javam Orientalem.

East Java. Surabaja Res.: Surabaja, DORGELO 268 L, typus var.

A. oppositiflora is a remarkably wide-spread species, probably covering a larger area than *A. gangetica* (L.) T. And. The distribution of the latter is not well known. Is is doubtless indigenous in India, but in some of the other regions from which it has been reported, e.g. in Java, it was apparently introduced as a medicinal plant. The African specimens which have been referred to this species, belong at least partly to other species.

40. **Pseuderanthemum** Radlk.

This genus is represented in Java by some indigenous species, one of which is fairly common, and by a few highly esteemed garden plants. Of the latter I have seen four: *Ps. bicolor* (Schrank) Radlk. (syn.: *Eranthemum fasciculatum* Bl.); *Ps. kewense* L. H. Bailey (syn.: *Ps. atropurpureum* Radlk. = *Eranthemum atropurpureum* Hook. non Hort. Bull.); *Ps. reticulatum* (Hook.) Radlk. and *Ps. malaccense* (Clarke) Lindau.

Of *Ps. reticulatum* two varieties are grown in Java: one with very small leaves, of which, so far as I know, no mention has been made in the literature, and one with very wide leaves, which is well known to horticulturists under the names *Eranthemum* and *Pseuderanthemum Eldorado*.

Pseuderanthemum reticulatum (Hook.) Radlk. var. **parvifolium** Brem. n. var.; typus varietatis in horto bogoriensi cultus sub XV K A V 11.

Foliis lanceolatis vel anguste ovato-lanceolatis, 3.5—7 cm longis et 1.3—1.8 cm latis, calyce 7 mm longo a typo et a varietate sequenti recedens.

Pseuderanthemum reticulatum (Hook.) Radlk. var. **ovatifolium** Brem. n. var.; *Eranthemum* et *Pseuderanthemum Eldorado* Hort.; typus varietatis in horto bogoriensi cultus sub II P 4.

Foliis late ovatis vel ellipticis, 4.5—7.5 cm longis et 3.5—5.5 cm latis, calyce 3.5 mm longo a typo et a varietate precedenti recedens.

In order to distinguish the type from the two varieties described above I propose to designate it with the name **Pseuderanthemum reticulatum** (Hook.) Radlk. var. **magnifolium** Brem.

The specimens of *Ps. malaccense* (Clarke) Lindau grown in Java show a curious malformation consisting in a very strong ramification of the inflorescence which is provided with an uncommonly large number of buds; the latter are separated from each other by very short internodes and develop but rarely into flowers.

Ps. diversifolium (Miq.) Radlk. is by far the most common of the wild-growing species. It is the plant originally described by BLUME under the name *Eranthemum diantherum* Roxb., and the Javan specimens quoted by MIQUEL under *Eranthemum crenulatum* Wall. belong partly to this species and partly to *Ps. zollingerianum* (Nees) Radlk. The latter, which has been found in East Java only, comes very near to *Ps. diversifolium,* and is perhaps not more than a variety differing from the type in the shape of the leaves.

Ps. acuminatissimum (Miq.) Radlk. was found by JUNGHUHN on the G. Ungaran, but has never again been collected. The Javan specimens which subsequent authors referred to this species, belong to *Ps. diversifolium.* CLARKE (in Journ. As. Soc. Beng. LXXIV, p. 679, 1908) records its presence in the vicinity of Singapore, but according to RIDLEY (Fl. Mal. Pen. II, p. 592, 1923) the plants meant by CLARKE are not indigenous in the Malay Peninsula, and although already for a long time in cultivation, they have not even run wild. CLARKE's description shows that the plant was wrongly identified, for its bracts are much shorter than in MIQUEL's type, where they overtop the apex of the young inflorescence. His synonymy too is wrong. It is probably *Ps. Andersonii* (Mast.) Lindau, which was described and figured by HOOK.F. in Bot. Mag. tab. 5771, and is quoted in CLARKE's synonymy. It is easily distinguishable from *Ps. acuminatissimum* by the shortness of the bracts, which do not overtop the young buds at the top of the inflorescence.

Ps. paniculatum (Bl.) Brem. n. comb. (*Eranthemum* Bl.) too is apparently a very rare plant, for the only Javan specimen I have seen, is the plant collected by BLUME in the neighbourhood of Tjandjur, on which the species was based. A specimen collected by FORBES in the southern part of Sumatra (Bukit Tinggi, alt. 1000 m, FORBES 2190 L) may represent the same species, but the inflorescences are too immature to allow a reliable identification.

41. **Ruspolia** Lindau.

So far but one species of this African genus, which differs from *Pseuderanthemum* in the monothecous anthers and in the relief of the seedcoat, has been cultivated in the Javan gardens. This is *R. pseuderanthemoides* Lindau. The specimens grown in Java differ slightly from the type by their subglabrous shoots, leaves and bracts.

44. **Diclíptera** Juss.

In a paper dealing i.a. with the delimitation of the *Diclipterinae* (in Boissiera VII, pp. 182—201, 1943) I stated that the genus *Diclíptera* is represented in Java by two species only, to wit *D. javanica* Nees and *D. canescens* Nees. Since then, however, I have seen Javan representatives of two more species, *D. Zollingeri* S. Moore and *D. leonotis* Dalz. ex Clarke,

and I am inclined to accept the specific diversity of *D. Horsfieldii* Clarke ex S. Moore, of which I saw no specimens, but whose description shows slight differences in the shape and size of the leaves and in the size and hairyness of the bracts from *D. javanica*. *D. Zollingeri* is a well-marked species, easily recognizable by the lax inflorescences; is appears to be confined to East Java.

The identity of the plants which I refer to *D. leonotis* Dalz. ex Clarke is not absolutely certain. They belong to an apparently wide-spread species, for I have seen specimens from Celebes and the Philippines which are undoubtedly conspecific with the Javan ones. The Philippine specimens were identified by CLARKE and MERRILL (Fl. Manilla, p. 435, 1912) as *D. leonotis* and by USTERI (Beitr. Kenntn. Philipp. Veg. p. 123, 1905) as *D. Burmanni* Nees. HOCHREUTINER (in Candollea V, p. 239, 1934), who had an opportunity to study BURMAN's specimens, came to the conclusion that they belong partly to *D. chinensis* (L.) Nees and partly to *D. Burmanni* Nees, and that the var. *laxior* Nees of the latter corresponds to *D. javanica* Nees. The Philippine specimens which CLARKE and MERRILL referred to *D. leonotis*, differ, however, so fundamentally from *D. javanica* that they certainly can not be regarded as representing a mere variety of the latter, and it is therefore improbable that they should be identical with *D. Burmanni* Nees. Provisionally, i.e. untill they can be compared with DALZELL's type, I will designate the corresponding Javan specimens with the name *D. leonotis*. The localities in which these plants were collected, suggest that this species may prove to be an anthropochorous weed.

Of *D. interrupta* Bl. I said l.c. that it does not belong to this genus, but this is a slip which I want to correct. Is is doubtless a true *Dicliptera*, but what I ought to have said is that it does not occur in Java: it is indigenous in Timor.

45. **Peristrophe** Nees.

Peristrophe tinctoria (Roxb.) Nees (*Justicia* Roxb.), based on "*Folium tinctorum*" of RUMPHIUS, is a species with regard to whose identity there can be no doubt. To the specific epithet, however, from two sides objections have been raised. MERRILL (Interpret. Herb. Amboin., p. 476, 1917) wants the name to be replaced by *P. bivalvis* (L.) Merr. (*Justicia* L.), and HOCHREUTINER (in Candollea V, p. 234, 1934) breaks a lance for *P. purpurea* (L.) Hochr. (*Justicia* L.). *Justicia purpurea* L. was published in Linné's "Species Plantarum" ed. 1, p. 16, 1753, whereas the name *J. bivalvis* L. appears for the first time in the reprint of STICKMAN's "Herbarium Amboinense" in Amoenitates Academicae IV, p. 134, 1759, without description, and in the same year, provided with a short description, in LINNÉ's "Systema Naturae", ed. 10, p. 850. As the claims of *J. purpurea* L. have priority, we will consider them first.

Justicia purpurea L. was based on a specimen collected by OSBECK in China, and in the original description no other references are given. There is one point in the description which appears to exclude the possibility that *Peristrophe tinctoria* was meant. The inflorescences, namely, are described as "spicae..... secundae".

The specimen of *Justicia purpurea* in the Linnean herbarium was examined by R. BROWN, who in his "Prodromus Florae Novae Hollandiae" (p. 474, 1810) discussed it in connection with his description of the genus *Hypoëstes*. "Species sunt *Justicia fastuosa, Forskalii, purpurea, aristata, verticillaris,* et *serpens. Vahl, enum.*" Subsequent authors often quoted "*Hypoëstes purpurea* (Vahl) R.Br.", but this is incorrect. BROWN merely referred to VAHL because the latter's work gives a good survey of the *Justicia* species which up to that time had been described. VAHL (Symb. II, p. 13, 1891) did not describe a new species, but merely referred to one which had already been described by LINNÉ. It is therefore difficult to see how NEES (in WALL., Pl. As. Rar. III, p. 114, 1832 et in DC., Prodr. XI, p. 509, 1847) could quote "*Justicia purpurea* Vahl symb. 2. p. 13 (nec Linné)", but it is even more incomprehensible how he could state in DC., Prodr. XI, p. 438: "*J. purpurea* Linn. = *Rostellularia diffusa*" for LINNÉ's description of the corolla plainly excludes this possibility. In a note attached to the description of *Hypoëstes floribunda* BROWN l.c. states: „*Justicia purpurea* differt praesertim spicis brevioribus simplicibus; huius folia in specimine Herbarii Linnei utrinque pube brevissimo sunt instructa." The latter remark has obviously been added in order to correct a misstatement made by LINNÉ, who described the leaves as "glabra". The specimen in the Linnean herbarium was afterwards examined by ANDERSON, who (in Journ. Linn. Soc. VII, p. 118, 1864) confirms BROWN's identification. It is evidently the plant collected by OSBECK in China, and its name has to be definitely accepted as *Hypoëstes purpurea* (L.) R.Br. That both BURMAN and LOUREIRO had misinterpreted LINNÉ's description and applied the name to *Peristrophe tinctoria,* probably because in the second edition of LINNÉ's "Species Plantarum" and in the twelfth of the "Systema" RUMPHIUS's "Folium tinctorum" is quoted as a synonym, is in this connection, of course, without importance.

The correct interpretation of *Justicia bivalvis* L. offers greater difficulties. MERRILL l.c. indentified it with *Peristrophe tinctoria* because it appeared in the reprint of STICKMAN's "Herbarium Amboinense" as the Linnean appellation of RUMPHIUS's "*Folium tinctorum*", but it seems to me that greater value must be attached to the description and the references given by LINNÉ himself in the same year in the tenth edition of his "Systema". In the latter RUMPHIUS's "*Folium tinctorum*" is referred to his *Justicia purpurea,* and although we now know that this was a false identification, it is in so far of importance to us as it proves that LINNÉ's *J. bilvalvis* must have been a different plant. Why LINNÉ allowed this name to appear

in the reprint of STICKMAN's dissertation is difficult to say, but I suppose that it must be regarded as a mere slip. In the original edition of STICKMAN's "Herbarium Amboinense" "*Folium tinctorum*" was, according to MERRILL l.c., referred to "*Jussiaea purpurea* Linn.", but this was obviously a mere misprint for "*Justicia purpurea* Linn." caused by the circumstance that the preceding species is a *Jussiaea*. As, moreover, in all subsequent works LINNÉ referred "*Folium tinctorum*" to *Justicia purpurea*, we may safely assume that its reference to *J. bivalvis* in the second edition of STICKMAN's dissertation was due to a mistake.

LINNÉ's description of *Justicia bivalvis* in the tenth edition of his "Systema" (p. 850, 1759) refers to "Rumph. VI t. 29", which, as MERRILL l.c. rightly remarks, is erroneous. In the second edition of the "Species Plantarum" RUMPHIUS's "*Bungum*" (*Lepidagathis Rumphii* Merr.) is quoted, which is figured on the same plate as "*Folium tinctorum*". This is an altogether incomprehensible reference, for the Rumphian "*Bungum*" does not show the slightest resemblance to any of the other plants which LINNÉ had in view. It is therefore no wonder that this reference is omitted in the next edition of the "Systema". In every instance, however, LINNÉ refers in the first place to the "*Adel-odagam*" of VAN RHEEDE's "Hortus Malabaricus" and to specimens collected by BURMAN. As to the identity of "*Adel-odagam*" there can, in my opinion, be little doubt: the plate of the "Hortus Malabaricus" is a tolerable representation of *Adhatoda vasica* Nees. LINNÉ's description, however, clearly points to one of the *Dicliptera-rinae*, and as the lower corolla lip is described as ovate, very probably to a species of *Dicliptera*: according to ANDERSON l.c. the specimen in LINNÉ's herbarium is in fact a *Dicliptera*. BURMAN's specimens, on the other hand, belong according to HOCHREUTINER l.c. to *Peristrophe tinctoria*. HOCHREUTINER, therefore, was right in proclaiming that *Justicia bivalvis* should be regarded as a "species plane confusa". This was apparently also the conclusion to which CLARKE had arrived at an earlier occasion, for the latter quotes *Dicliptera bivalvis* (L.) Nees as a synonym of *D. zeylanicum* Nees, rejecting the name because he regarded *Justicia bivalvis* L. as founded on the figure and description of "*Adel-odagam*". His suggestion that the latter might be *Peristrophe montana*, however, can not be accepted, as the lateral inflorescences with their long peduncles and large bracts clearly point to *Adhatoda vasica* Nees: under this name it was quoted a few pages earlier by CLARKE himself, but it is possible, of course, that he merely repeated at that occasion the opinion of the earlier interpreters of the "Hortus Malabaricus". In the shape of the inflorescence, in the large size of the outer involucral bracts and in the considerable length of the corolla *Dicliptera zeylanica* shows a superficial resemblance to *Peristrophe tinctoria*, and it is therefore no wonder that the two species were sometimes confused.

P. tinctoria occurs in Java as a cultivated plant only, which never produces fruits.

Another species of *Peristrophe* which apparently occours in Java as a cultivated plant only, was described bij BLUME under the name *Justicia salicifolia*. HASSKARL (Cat. Hort. Bogor. ed. 2, p. 152, 1844) transferred it to *Peristrophe*, and NEES (in DC., Prodr. XI, p. 454, 1847) described it once more as a new species under the name *P. angustifolia*. It has, however, a much older name than either of these, for is was known already to BURMAN, who described it in his "Flora Indica" (p. 11, tab. V fig. 2, 1768) as *Dianthera hyssopifolia* Burm. MIQUEL (Fl. Ind. Bat. II, p. 847, 1858) suggested that BURMAN's plant might be conspecific with *P. albiflora* (Bl.) Hassk., but this is impossible, for the latter has much larger and wider leaves. **P. hyssopifolia** (Burm.) Brem. n. comb. (*Dianthera* Burm.) is often provided with variegated leaves, which finds its expression in the vernacular name "*Djukut mas*" reported by HASSKARL l.c.

The longest and best known of the indigenous species is *P. albiflora* (Bl.) Hassk. (*Justicia* Bl.), which occurs in two varieties. For the typical form described bij BLUME I propose the name **P. albiflora** (Bl.) Hassk. var. **glabrescens** Brem. n. nom., and for the other one, which is identical with *P. blumeana* Hassk. n. nom. (*Justicia roxburghiana* Roem. et Sch. in errore apud Bl., Bijdr. p. 786, 1826, non Roem. et Sch., Mant. I, p. 140, 1822, quae est *P. tinctoria*), the name **P. albiflora** (Bl.) Hassk. var. **blumeana** (Hassk.) Brem. n. comb. The specimen collected by HOCHREUTINER at Tjampea near Buitenzorg and identified by him (in Candollea V, p. 234, 1934) as *P. montana* Nees var. *silvestris* Nees, probably belongs to the first-named variety of *P. albiflora*.

HOCHREUTINER l.c. p. 235 describes a new species *P. pantjarensis* Hochr., of which he distinguishes two varieties, which I consider specifically distinct. His var. *taroemensis* Hochr. is raised by me to specific rank under the name **P. taroemensis** (Hochr.) Brem. It differs from *P. pantjarensis* Hochr. s.s. in the much greater size of the outer involucral bracts and in the smaller size of the leaves.

The following new species, differing from the other Javan ones in the small size of the bracts, was discovered by me among the specimens preserved in the Leiden herbarium.

Peristrophe brevibractea Brem. n. spec.; typus: BAKHUIZEN V. D. BRINK 472 L; a congeneribus omnibus bracteis quam calycis lobi plus quam dimidio brevioribus faciliter distinguenda.

Herba robustior. Caulis primum puberulus, mox glabrescens, sexangularis, internodiis usque ad 11 cm longis et 4 mm diam. Folia in petiolum puberulum, 0.5—2 cm longum contracta; lamina lanceolata, 4—12 cm longa et 1.5—4 cm lata, apicem versus contracta vel sensim attenuata, basi subacuta, margine integra, supra glabra, subtus costa puberula, cystolithis utrimque distinguendis, nervis utroque latere costae 4—7. Inflorescentiae

terminalis et ex axillis foliorum supremorum laterales, bis trichotomae vel pentachotomae, i.e. utroque latere ramulis duobus superpositis instructae. Pedunculus circ. 1 cm longus, puberulus; ramuli 0.5 cm longi. Capitula e floribus 3—5 normalibus et interdum aliquibus rudimentariis composita. Bracteae involucrales ovato-triangulares, 2.5 mm longae et 1.5 mm latae, acutae; bracteolae quattuor 2 mm longae et 1 mm latae, acutae. Calyx 6 mm altus, 5-partitus, segmentis linearibus acutis 0.6 mm latis, glanduloso-puberulis. Corolla colore ignoto, 4.5 cm longa, extus pubescens, tubo torto 2 cm longo, faucibus dilatatis et recurvatis 3 mm longis, limbo bilabiato 2.2 cm longo, labio superiore 11 mm lato, margine undulato, apice plus minusve cucullato, labio inferiore 6 mm lato, apice 3-lobato, lobis quadrato-oblongis, 2 mm longis et 1.7 mm latis. Stamina filamentis hirtellis 14 mm longis, antheris 5 mm longis, thecis curvis 3 mm longis, inferiore basi apiculata. Granula pollinis 4-pora, 47 μ longa et 42 μ diam. Discus late urceolatus. Ovarium puberulum 2 mm altum. Stylus glaber, 4.5 cm longus. Stigmata aequalia, lineari-oblonga, circ. 1 mm longa. Capsula nondum nota.

Habitat Javam Occidentalem.

West Java. Batavia Res.: Wanajasa, south of Purwakarta (G. Burangrang), alt. 800 m, BAKHUIZEN V. D. BRINK 472 L, typus, fl. VII.

In the shortness of the involucral bracts *P. brevibractea* reminds me of the Moluccan *P. commutata* (Roxb.) Nees, from which it differs conspicuously in the much less strongly ramified inflorescence, in the larger size of the flowers, and in the 4- instead of 3-porous pollen grains. In the last-named character it resembles the Javan species *P. albiflora* and *P. taroemensis*. The pollen grains of *P. pantjarensis* are as yet unknown, but in view of its near affinity to *P. taroemensis* I have little doubt that in this species too they will prove to be 4-porous. Of the non-Javan species which I could investigate, *P. acuminata* Nees, a species from Assam and Burma, is so far the only one, in which the pollen grains proved to be 4-porous. The pollen grains of *P. brevibractea* differ from those of the other species in the large size of the alveoles with which the surface is ornamented: they are in this species so large that the shields alternating with the pairs of bands by which the pores are flanked, contain but a single row of them.

46. Hypoëstes Sol. ex R.Br.

The genus *Hypoëstes* is represented in Java by several species falling into two natural groups, which might perhaps better be raised to generic rank. In the first of them the involucre consists of six free leaflets (two bracts and four bracteoles), the capitula themselves are either axillary or combined in axillary and sometimes also in terminal fascicles, the calyx is 5-partite, the lips of the corolla are towards the top enlarged, and the stigmata are about 1 mm long and spreading. In the other group the involucre consists of two bracts which are on both sides for at least a quarter of their length united, and two bracteoles adhering with their backs to the

inside of the tube formed by the bracts, the capitula are much more numerous and arranged either in superposed axillary pemptades or, more often, in spikes which in their turn are combined in contracted or ample panicles, the calyx is 5-fid, the upper lip of the corolla narrowed towards the top, and the stigmata are very short and never spreading. To the first group belong: 1. *H. Kuntzei* Clarke ex Ridl. (syn.: *H. peristrophoides* Hochr.), and 2. *H. mollior* Clarke ex S. Moore. A somewhat dubious species is *H. bantamensis* S. Moore, of which I have seen no material. As its involucral bracts are described as free, it is either a member of this group or else a *Peristrophe*. The second group is represented by: 3. *H. tomentosa* Miq.; 4. *H. decaisneana* Nees (= *H. rosea* Decn. non Pal. Beauv.; syn.: *H. Forskalii* (Vahl) R.Br. in errore apud Bl.; *H. Blumei* Nees in syn. *H. rosea* apud Miq.; *H. malaccensis* R.W.); 5. *H. psilostachys* Clarke ex S. Moore, of which I have seen no specimens, but which, judged from the description, can hardly be specifically distinct from the next species; 6. *H. polythyrsa* Miq. (syn.: *Justicia bicalyculata* Vahl in errore apud Bl.; *Peristrophe bicalyculata* Nees in errore apud Miq.); 7. *H. pedunculosa* Brem. n. spec. (v. infra); and 8. *H. trichochlamys* Brem. n. spec. (v. infra). *H. decaisneana* is often grown as a garden plant, but is probably not indigenous in Java. *H. teysmanniana* Miq., *H. populifolia* Miq. and *H. zollingeriana* Miq. are not included in the list, because they are known only from specimens grown in the Buitenzorg Botanical Gardens. *H. teysmanniana* comes very near to *H. polythyrsa*, and *H. populifolia* to my new *H. pedunculosa*, but *H. zollingeriana* is not so nearly related to other species: in the form of the inflorescence it resembles *H. polythyrsa*, but in the great length of the bracts subtending the capitula it reminds one of *H. decaisneana*. It is unknown from where these three species were obtained, but that they are of Malesian origin can hardly be doubted.

Hypoëstes pedunculosa Brem. n. spec.; typus: BACKER 24771 U; maxime ut *H. populifolia* Miq. sed foliis utrimque nitidis, ab initio glabris, numero minore nervorum instructis, longius petiolatis, rachidibus panicularum et spicarum rectis, bracteis involucralibus externis in aristam haud tortam exeuntibus ab ea recedens.

Herba robustior, glabra. Rami subteretes, internodiis leviter bisulcatis, usque ad 7 cm longis et 4.5 mm diam., isophylli. Folia in petiolum usque ad 10 cm longum contracta; lamina elliptica, 15—18 cm longa et 9—10 cm lata, utroque extremo contracta, margine integra vel indistincte crenata, tenuior, utraque facie nitida, costa nervisque subtus cystolithis dense lineolata, nervis utroque latere costae 6—7, ad basin folii tamen 1 vel 2 brevioribus et tenuioribus praecessis, venulis reticulatis haud prominulis. Capitula solitaria ad nodos spicarum quae in paniculas longius pedunculatas terminales et axillares, 10—15 cm longas dispositae sunt, paniculis lateralibus et terminali in inflorescentiam paniculiformem amplam confluentibus; pedunculi panicularum rachidibus subaequilongi; ramuli princi-

pales oppositi et plerumque utroque axillo duo superpositi, a foliis parvis, mox deciduis suffulti; bracteae ramulos ultimos et capitula suffulcientes anguste lineares, sensim attenuatae, 2—5 mm longae, apicem versus puberulae, oppositae paulum inaequales. Capitula subsessilia, 10—11 mm longa, extus intusque puberulo-glandulosa; foliola externa involucri (bracteae) basi in tubum 4.5—5 mm longum, apice 2.5 mm diam. connata; lobi liberi triangulares, arista circ. 3 mm longa, haud torta comprehensa 5—6 mm longi; foliola interna (bracteolae) 8—9 mm longa, acuta. Calyx 4 mm longus, 5-partitus. Corolla 18 mm longa. Stamina filamentis glabris. Granula pollinis nondum visa. Ovarium glabrum. Stylus glaber. Capsula glabra et nitida 6.5 mm longa, plerumque 1-seminalis. Semen vix applanatum, brunneum, 3 mm altum, 2 mm latum, 1.7 mm crassum.

Habitat Javam Orientalem.

East Java. Besuki Res.: G. Baluran, alt. 500 m, BACKER 24771 U, typus; fl. VI.

The flowers of the only specimen available to me, were badly preserved; their characters, therefore, could not well be made out.

Hypoëstes trichochlamys Brem. n. spec.; typus: BAKHUIZEN V. D. BRINK 4490 U; bracteis capitula subtendentibus involucro dimidio brevioribus a speciebus aliis, ubi nunc longiores (*tomentosa, zollingeriana, decaisneana*) nunc multo breviores (*psilostachys, polythyrsa, teysmanniana, populifolia, pedunculosa*) sunt, distinguenda, inflorescentiae natura, praesertim squamis involucralibus nonaristatis ad *H. psilostachym, H. polythyrsam* et *H. teysmannianam* vergens, involucro ciliato maxime ut *H. psilostachys,* foliis basi acutis et filamentis glabris ab ea tamen certe diversa.

Herba robustior. Rami obtuse quadrangulares et quadrisulcati, ad nodos parce pilosi. Folia superiora sola preservata in petiolum sparse pubescentem contracta; lamina lanceolata, apice caudato-acuminata, basi acuta vel contracta, supra costa canaliculata puberula, subtus costa densius, nervis sparsissime pubescens, ceterum utraque facie glabra, cystolithis vix distinguendis, nervis utroque latere costae circ. 5. Capitula in paniculas longius pedunculatas, terminales et axillares disposita, solitaria ad nodos, paniculis axillaribus cum panicula terminali in inflorescentiam paniculiformem amplam confluentibus. Ramuli panicularum plerumque foliis parvis mox deciduis suffulti. Bracteae capitula suffulcientes paulo longiores quam bracteae vacuae, lineares, involucro fere dimidio breviores, longe sed tenuissime et sparse ciliatae; vacuae eciliatae. Foliola involucri omnia 10 mm longa; externa (bracteae) latiora, usque ad medium connata, lobis lineari-lanceolatis, acuminatis et mucronatis, longe sed tenuissime ciliatis, dense glanduloso-puberulis, ciliarum seriebus in tubo involucri descendentibus; interna (bracteolae) sparsissime ciliata vel eciliata. Bracteolae floris rudimentarii filiformes, 1.5 mm longae. Calyx 4.5 mm longus, 5-partitus. Corolla 2 cm longa, extus glanduloso-puberula. Stamina filamentis

glabris. Ovarium glabrum. Stylus glaber. Stigmata 0.2 mm longa. Capsula puberula 1-seminalis.

Habitat Javam Occidentalem.

West Java. Priangan Res.: G. Lembang (Burangrang), alt. 1700 m, BAKHUIZEN V. D. BRINK 4490 U, typus; L, dupl. typi; fl. VII.

49. **Polytrema** Clarke.

This genus, which is still very imperfectly known, was created by CLARKE (in Journ. As. Soc. Beng. LXXIV, p. 692, 1908). In some of the species which he and afterwards RIDLEY (Fl. Mal. Pen. II, p. 605, 1923) refer to this genus, the opposite leaves are distinctly unequal, whereas in some others they do not show any appreciable difference in shape or size. The heterophyllous species, to which the new one described below belongs, remind one of the genus *Hallieracantha* Stapf, from which they differ, however, conspicuously in the nature of the pollen grains, which are globose and, probably, sparsiporous, whereas those of *Hallieracantha* are ellipsoidal and 3-porous with bands flanking the pores.

The species described below resembles the type species, *P. vulgare* Clarke, so closely that there can hardly be any doubt that it is congeneric with the latter, which can not be said of all the species which have been referred to this genus. Like *P. vulgare* it belongs to the group of heterophyllous species. As its flowers were badly preserved, they did not shed any new light on the position of the genus. The structure of the testa, however, revealed a particularity which may be of importance: the epidermis cells proved to be provided with walls showing tracheidal thickening. A similar epidermis was also observed in the testa of *Leptostachya* Nees emend. Clarke et Stapf and in that of *Strophacanthus* Lindau, and will probably be present in all the genera of the *Rhytiglossinae* (*Isoglossinae* Lindau): at least in the two other genera of which material was available to me, *Rhytiglossa* Nees emend. Brem. v. infra (syn.: *Isoglossa* Oerst.) and *Hansteinia* Oerst., the tracheidal thickenings proved to be well developed.

Polytrema javanicum Brem. n. spec.; typus: BAKHUIZEN V. D. BRINK 5760 L; maxime ut *P. vulgare* Clarke, sed foliis multo minoribus, nervis paucioribus instructis ab ea distinguenda.

Herba ascendens, simplex, 20—25 cm alta. Caulis internodiis primum bisulcatis et in sulcis puberulis, deinde subteretibus, plerumque 2.5—3 cm longis et 1—1.5 mm diam. Folia opposita plerumque valde inaequalia, interdum tamen aliquae subaequalia; majora petiolo 2—5 mm longo instructa, lamina lanceolata vel elliptica, 6—8.5 cm longa et 2.3—4.4 cm lata, apice acuminata, basi acuta vel plus minusve contracta, margine integra, utrimque glabra, cystolithis utrimque numerosis, nervis utroque latere costae 6; minora subsessilia, ovato-elliptica, 0.4—1.5 cm longa, nervis utroque latere costae 4—6, plerumque mox decidua. Cymae plerumque 5-florae; flores

aliqui tamen solitarii. Pedunculus cymarum 1—4 mm longus. Bracteae bracteolaeque 1.5—2 mm longae. Pedicelli 1—2 mm longi. Calyx 7 mm altus, post anthesin usque ad 9 mm accrescens. Corolla circ. 10 mm longa. Granula pollinis 37 μ diam. Ovarium glabrum. Stylus glaber. Fructus 13 mm longus.

Habitat Javam Occidentalem.

West Java. Buitenzorg Res.: Depok, BAKHUIZEN V. D. BRINK 5760 L, typus; fl. X; ibidem BAKHUIZEN V. D. BRINK JR 2480 U, fl. III—IV.

50. **Leptostachya** Nees emend. Clarke et Stapf.

The genus *Leptostachya* was founded by NEES (in WALL., Pl. As. Rar. III, p. 76 et 105, 1832) on two closely related Asiatic species, *L. virgata* Nees and *L. Wallichii* Nees. In his monograph of the family (in DC., Prodr. XI, p. 306 et 376, 1847) NEES considerably widened its scope by the inclusion of groups of American, African and Asiatic species, which apparently, apart from a certain similarity in habit, have but little in common with each other and with the two species on which the genus was based. NEES himself was bound to confess: "Genus hoc magis inflorecentia et habitu quam characteris scriptis definitum." A more detailed investigation has shown that the genus in this wide delimitation is to be regarded as an entirely artificial conglomerate.

T. ANDERSON (in Journ. Linn. Soc. IX, p. 516, 1867) referred the two Indian *Leptostachya* species to *Justicia*, but the latter is in his delimitation such a vague concept that not much value can be attached to this reduction.

BENTHAM (in BENTH. et HOOK.F., Gen. Pl. II, 2, p. 1113, 1876) referred the old-world *Leptostachya* species to *Dianthera*, and this example was followed by CLARKE (in HOOK.F., Fl. Brit. Ind. IV, p. 541, 1885), who, however, extended the scope of this genus still farther by the inclusion of two species which NEES erroneously had referred to *Rhaphidospora*, but which LINDAU a few years later removed to a new genus *Strophacanthus*.

ANDERSON's and BENTHAM's large and vaguely defined genera can no longer be upheld. *Justicia* will, as I will show elsewhere, have to be confined to HITCHCOCK and GREEN's lectotypus, *J. hyssopifolia* L., and perhaps a few species occurring on the African continent, and *Dianthera*, which was based on *D. americana* L., is to be restricted to the latter and its nearest allies, an exclusively American group of swamp plants provided with spikes which are axillary and, as a rule, solitary at the nodes, five calyx lobes, obtuse or shortly apiculate lower thecae, a recurved anticous stigma lobe, and strongly flattened, smooth seeds with an epidermis consisting of straight-walled, conspicuously pitted cells. The pollen grains of the two species which I could investigate (*D. obtusifolia* and *D. crassifolia*), proved to be 2-porous with a single row of large and flat protuberances on each side of the pores (cf. BREMEKAMP in Rec. d. trav. bot. néerl.

XXXV, tab. XVI G, 1938). As stated above, but a small part of the species which have been described in this genus, are to be retained in it. They are brought together in the following list:

***americana** L., Sp. Pl. p. 27, 1753, typus (syn.: *Justicia americana* (L.) Vahl; *Dianthera ensiformis* Walt.; *Justicia linearifolia* Lam., *J. pedunculosa* Michx.; *Rhytiglossa pedunculosa* (Michx.) Nees)

anagallis (Nees) Hemsl., Biol. Centr. Am., Bot. II, p. 517, 1881/2 (syn.: *Rhytiglossa anagallis* Nees in DC., Prodr. XI, p. 337, 1847

crassifolia Chapman, Fl. South. United States, p. 304, 1865

ensiformis Walt., Fl. Carol. p. 63, 1788 (syn.: *Justicia ensiformis* (Walt.) Ell.; *Rhytiglossa ensiformis* (Walt.) Wood) = **americana**

humilis (Michx.) Engelm. ex A. Gray in Bost. Journ. Nat. Hist. V, p. 230, 1847 (syn.: *Justicia humilis* Michx., Fl. Am. Bor. I, p. 143, 1803; *Rhytiglossa humilis* (Michx.) Nees) = **ovata**

laevilinguis (Nees) Lindau (subgenus *Dianthera*) in Engl., Bot. Jahrb. Beibl. n. 48, p. 20, 1894 (syn.: *Rhytiglossa laevilinguis* Nees in DC., Prodr. XI, p. 338, 1847)

obtusifolia (Nees) Griseb. in Mem. Am. Acad. N. S. VIII, p. 525, 1863; Morong in Ann. N. Y. Acad. Sc. VII, p. 195, 1893 (syn.: *Rhytiglossa obtusifolia* Nees in Mart., Fl. Bras. IX, p. 120, 1847; *Justicia obtusifolia* (Nees) Lindau)

ovata Walt., Fl. Carol. p. 63, 1788 (syn.: *D. humilis*)

paludosa S. Moore in Trans. Linn. Soc. Ser. 2 IV, p. 432, 1895.

Of uncertain position is:

graminifolia Rusby in Mem. N. Y. Bot. Gard. VII, p. 366, 1927.

NEES referred the species of this group to his genus *Rhytiglossa*, which had been based on a few African species. The latter differ conspicuously from the American ones, and have been separated from them by OERSTED, who referred the African species to a new genus *Isoglossa* (v. supra). The two following American *Rhytiglossa species* described by NEES may also belong to *Dianthera*. If so, they will have to be renamed, for their specific epithets have already been used for other species.

Rh. repens Nees in Mart., Fl. Bras IX, p. 119, 1847; non *D. repens* Ruiz et Pav., Fl. Per. I, p. 10, tab. 15 fig. b, 1798.

Rh. sarmentosa Nees l.c.; non *D. sarmentosa* Sessé et Moç., Fl. N. Hisp. ed. l, p. 5. 1887/90.

As the characters of the genus *Dianthera* as defined above, differ considerably from those of the two Asiatic species on which the genus *Leptostachya* was founded, it is clear that the latter will have to find a place elsewhere. The only reasonable solution of this problem would be the revival of the generic name *Leptostachya*. CLARKE, according to a note added by HOSSEUS (in ENGL., Bot. Jahrb. XLI, p. 73, 1907) to the latter's description of three new species collected in Siam, discussed the question with STAPF and arrived, as a result of this consultation, to the same con-

clusion. According to HOSSEUS, CLARKE and STAPF included in this genus the following seven species:

axillaris Clarke in Engl., Bot. Jahrb. XLI, p. 72, 1907 — Siam

debilis (Clarke) Clarke et Stapf ex Hosseus op. cit. p. 73 (*Dianthera* Clarke) — Khasia

oblongifolia Clarke op. cit. p. 72 — Siam

spathulifolia Clarke op. cit. p. 73 — Siam

tonkinensis (Clarke) Clarke et Stapf ex Hosseus op. cit. p. 73 (*Dianthera* Clarke inedit. forsitan = *Ophiorhizophyllon laxum* Lindau v.infra)

***virgata** Nees in Wall., Pl. As. Rar. III, p. 105, 1832, typus — Burma

Wallichii Nees l.c. — Burma.

In 1885 *L. Wallichii* had been referred by CLARKE (in HOOK.F., Fl. Brit. Ind. IV, p. 542) to *Dianthera* under the illegitimate name *D. leptostachya*, which he credits to BENTHAM by quoting "Gen. Pl. II 1114", but as the new name is not to be found at the indicated place, it must be written on CLARKE's own account. Since that time the plant has thrice been removed to another genus, and by a remarkable coincidence each time CLARKE's illegitimate specific epithet was used for the new combination. Each time, moreover, the fact was overlooked that it was one of the two nearly related species on wich the genus *Leptostachya* had been based, and that the name of the latter was older than the generic name by which it was replaced.

The first of the three transfers meant in the preceding paragraph was carried out by LINDAU (in ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, p. 336, 1895), who removed this species to his genus *Odontonemella*. The latter was up to that moment a monotypic genus based (in ENGL., Bot. Jahrb. XVIII, p. 56, 1893) on *Thyrsacanthus indicus* Nees (syn.: *Asystasia thyrsacanthus* T. And. and *Eranthemum indicum* Clarke), but as there is a considerable difference between this plant and *Leptostachya Wallichii*, and as even the agreement in the structure of the pollen grains is by no means complete, it is difficult to see on what grounds LINDAU may have considered them congeneric. *Odontonemella indica* (Nees) Lindau is a plant with racemes of large flowers provided with staminodes and with pollen grains whose relief is much more pronounced than that of the pollen grains of the *Leptostachya* species, whose small flowers are arranged in spikes and always lack staminodes.

At about the same time that CLARKE was occupying himself with the Siamese *Acanthaceae* collected by HOSSEUS, he was working on a revision of the *Acanthaceae* of the Malay Peninsula for KING and GAMBLE's "Materials for a Flora of the Malay Peninsula". Although this revision was published a year later, it is not impossible that it was in reality finished before the other paper. At any rate the attitude taken up by him in these two publications towards the species which he had formerly referred to *Dianthera*, is different, but as in neither of them reference is made to the

other opinion, it is impossible to decide which of the two was the final one. In the revision of the Malayan species (in Journ. As. Soc. Beng. LXXIV, p. 690, 1908) CLARKE published a new genus *Leda*, which, he says, is partly identical with *Leptostachya* Nees. As the first of the species which he refers to this genus, *Leda subcordata* Clarke, is said to be close to the Khasian *Leda debilis* (Clarke) Clarke (*Dianthera* Clarke), i.e. to *Leptostachya debilis* (Clarke) Clarke et Stapf ex Hosseus (v. supra), and the second, *Leda obovata* Clarke, is declared to be near *Dianthera leptostachya*, i.e. *Leptostachya Wallichii* Nees, it is clear that he meant the group of species which in the publication dealing with the Siamese *Acanthaceae* are designated as those to which the name *Leptostachya* should be restricted. As the latter comprise the type of the genus, the name *Leda* is obviously a superfluous innovation. Even if it should appear that the *Leda* species proposed by CLARKE do not all five belong to *Leptostachya*, this verdict will have to stand, for on account of his remark that *Leda* is identical with a part of *Leptostachya* (to wit the part which comprises the type species), the name *Leda* must be regarded as a full synonym of the latter.

In a paper published in the Journal of Botany (LX, p. 355, 1922) SPENCER LE M. MOORE removed the species which CLARKE and STAPF in 1907 had referred to *Leptostachya* and CLARKE in 1908 to *Leda*, together with the species which LINDAU included in his genus *Strophacanthus*, and three new ones of which two belong to the first-named group and one to the second, to the up to then monotypic genus *Ptyssiglottis* T. And. (in THWAITES, Enum. Pl. Zeyl., p. 235, 1860). The Bornean species which HALLIER (in Ann. Jard. Bot. Buitenz. XIII, p. 289, 1896 et in Nov. Act. Acad. Nat. Cur. LXX, p. 212, 1897) had referred to *Ptyssiglottis*, had at that time already been removed by STAPF (in Journ. Linn. Soc. XXXVIII, p. 6, 1907) to a new genus *Hallieracantha*. From the point of view of nomenclature, MOORE's adoptation of the name *Ptyssiglottis* for this group of species, was, as indicated above, a mistake, for the group comprises the type species of *Leptostachya*, and as the name of that genus is much older than that of *Ptyssiglottis*, it should have received preference. However, as from a taxonomic point of view the combination of the three genera *Leptostachya* Nees emend. Clarke et Stapf, *Ptyssiglottis* T. And. and *Strophacanthus* Lindau is in no way justified, MOORE's sin against the rules of nomenclature need not trouble us.

The genus *Ptyssiglottis* T. And. was created for a Ceylonese plant described by NEES (in DC., Prodr. XI, p. 344, 1847) under the name *Rhytiglossa radicosa*. MOORE remarks on this species (l.c. p. 356): "This not very well known plant is represented both at the British Museum and at Kew by unsatisfactory material; but when one compares Beddome's figure (Ic. Plant. Ind. Or. tab. CCLXVII.) with some of the quondam *Diantheras*, it seems necessary to regard *Ptyssiglottis* as the proper re-

ceptacle for these plants, seeing that, besides identical structural characters, the pollen, as shown in a drawing at Kew, is precisely that of the *Ledas*." To this must be objected: 1° that the pollen of the *Strophacanthus* species which MOORE united with *Pt. radicosa* (Nees) T. And. in his section *Euryantheae*, is of an entirely different type, for it is neither globose nor 3-porous nor ornamented with fissures, but lenticular and 2-porous with the pores in the centre of the flattened sides and with a distinct marginal zone but without a trace of fissures; and 2° that CLARKE (in HOOK.F., Fl. Brit. Ind. IV, p. 543, 1885) and TRIMEN (Handbook Fl. of Ceylon III, p. 340, 1895) describe the upper lip of the corolla in *Ptyssiglottis* as "shortly 2-fid" and "deeply 2-lobed", the lower lip as 3-lobed, and the seeds as "verrucose-scaly" or "scaly-tubercular", whereas in the species belonging to *Leptostachya* Nees emend. Clarke et Stapf the upper lip is emarginate or bidentate, the lower lip 3-partite, and the seeds wrinkled, so that the "structural characters" can hardly be regarded as "identical". The similarity between *Ptyssiglottis*, *Strophacanthus* and *Leptostachya*, therefore, can not be considered sufficiently close to justify the fusion of these genera.

As MOORE's section I *Euryantheae* will be discussed below in connection with the genus *Strophacanthus*, I will confine myself here to his section II *Spicatae*, which comprises the *Leptostachya* species recognized by CLARKE and STAPF with the exception of the Siamese ones described in 1907 by CLARKE. The paper in which the latter were described, was apparently overlooked by MOORE. Apart from *L. Wallichii* Nees, which appaers here once more with CLARKE's illegitimate specific epithet "*leptostachya*", *L. virgata* Nees and *L. debilis* (Clarke) Clarke et Stapf ex Hosseus MOORE includes in this section *Leda obovata* Clarke and two new species which he calls *Ptyssiglottis tonkinensis* S. Moore and *Pt. bantamensis* S. Moore. The first was founded on two collections of BALANSA (n. 3488 et n. 4267) which had served already as base for the description of LINDAU's *Ophiorhizophyllon laxum* (in Bull. Herb. Boiss. V, p. 645, 1897). BENOIST (in LECOMTE, Fl. Gén. de l'Indo-Chine IV, p. 755, 1935) recognized that this species does not belong to *Ophiorhizophyllon*, and removed it to *Ptyssiglottis* sensu S. Moore under the name *Pt. laxa* (Lindau) R. Ben. This epithet can, however, not be used in *Leptostachya*, as there is already a *L. laxa* Nees (see below under *Psacadocalymma antirrhinum*). *Ptyssiglottis tonkinensis* S. Moore is obviously a synonym, and it is not improbable that the plant mentioned above under the name *Leptostachya tonkinensis* (Clarke) Clarke et Stapf ex Hosseus, which was based on an unpublished "*Dianthera tonkinensis* Clarke", may also prove to belong to this species. BENOIST (in Not. Syst. 1935) created another *Ptyssiglottis tonkinensis*, but there is so little difference between its description and that of the plant to which MOORE applied this name, that I regard them as conspecific.

Leda obovata Clarke becomes **Leptostachya obovata** (Clarke) Brem. n. comb. and *Ptyssiglottis bantamensis* S. Moore **Leptostachya bantamensis** (S. Moore) Brem. n. comb; both species were placed by MOORE in the section *Spicatae*.

RIDLEY (Fl. Mal. Pen. II, p. 604/ 5, 1923) described some more species under the generic name *Ptyssiglottis*, but as he apparently did not study the pollen structure, their position remains uncertain. Of *Pt. subcordata* (Clarke) S. Moore (*Leda* Clarke) he says that the panicle is cymose. MOORE referred it to his section *Euryantheae*, and it might, therefore, belong to *Strophacanthus* but without a re-examination of the pollen structure the question of its taxonomic position can hardly be decided.

To exclude all doubt with regard to the manner in which the name in future is to be used, I will give a new description of the genus.

Leptostachya Nees in Wall., Pl. As. Rar. III, p. 76 et 105, 1832; id. in DC., Prodr. XI, p. 306 et 376, 1847 quoad species n. 8 et n. 9; non in Mart., Fl. Bras. IX, p. 93 et 149, 1847; Clarke et Stapf ex Hosseus in Engl., Bot. Jahrb. XLI, p. 72, 1907; *Dianthera* L. apud Clarke in Hook.f., Fl. Brit. Ind. IV, p. 541, 1885 quoad species 1—3; *Leda* Clarke in Journ. As. Soc. Beng. LXXIV, p. 690, 1908, minime quoad *L. obovata* Clarke; *Ptyssiglottis* T. And. ext. S. Moore sect. 2: *Spicatae* S. Moore in Journ. of Bot. LX, p. 356, 1922; Benoist in Lecomte, Fl. Gén. de l'Indo-Chine IV, p. 755, 1935.

Herbae graciles, ascendentes vel erectae. Folia opposita aequalia, longe petiolata; lamina basi plerumque inaequali, cystolithis parvis rectis utrimque lineolata. Inflorescentia terminalis, spici- vel paniculiformis, casu quo panicula e spicis composita, bracteis bracteolisque parvis, calyce breviori-bus. Calyx aequaliter 5-partitus. Corolla alba, luteola vel viridula, labio inferiore maculis purpureis notato, tubo tereti brevi, intus puberulo, in fauces infundibuliformes dilatato, limbo bilabiato, labio superiore late ovato, sine rugula, apice emarginato vel bidentato, quam labium inferius longiore, labio inferiore 3-partito. Stamina fertilia 2; antherae bithecae, thecis parallelis oppositis vel suboppositis, basi muticis. Granula pollinis breviter ellipsoidea vel subglobosa, fissuris 3 poriferis brevibus ornata. Staminodia nulla. Discus urceolaris, subregularis. Ovarium utroque loculo ovulis 2. Stigma didymum. Capsula unguiculata. Semina rugulosa, testa cum epidermide e cellulis tracheidalibus composita.

Habitat Asiam Tropicalem ab India Boreali usque ad Javam.

Typus: *L. virgata* Nees.

In the absence of a rugula and in the presence of tracheidal thickenings on the walls of the epidermis cells of the testa *Leptostachya* resembles *Strophacanthus* Lindau, from which it differs conspicuously in the structure of the inflorescence and in that of the pollen grains.

As the original description of the Javan *Leptostachya bantamensis* (S.

Moore) Brem. is not fully satisfactory, I will insert here a new one:

Leptostachya bantamensis (S. Moore) Brem. n. comb.; *Ptyssiglottis bantamensis* S. Moore in Journ. of Bot. LX, p. 357, 1923.

Herba ascendens, 30—50 cm alta, simplex vel parce ramosa. Caulis primum pubescens, internodiis bisulcatis, mox glabrescens et teres; internodia 3.5—7 cm longa, primum 1 mm, ultimo circ. 2 mm diam. Folia petiolo gracili, 1.5—4 cm longo, primum puberulo instructa; lamina lanceolata, 7—13 cm longa et 2.5—5 cm lata, caudato-acuminata, basi uno latere longior, utroque latere acuta, margine integra, sparse ciliolata, tenuiter herbacea, costa nervisque subtus primum puberula, mox tota glabrecens, cystolithis utrimque vix distinguendis, nervis utroque latere costae 4—7. Inflorescentia plerumque spica simplex, usque ad 15 cm longa, pedunculo usque ad 5 cm longo elata, rachide puberula, interdum basi spica secundaria instructa, floribus ad nodos plerumque singulis. Bracteae bracteolaeque calyce dimidio breviores. Calyx 2.5 mm longus, post anthesin usque ad 3 mm accrescens. Corolla alba, 5.5 mm longa, tubo cum faucibus 3 mm longo, limbo circ. 2.5 mm longo. Stamina filamentis glabris. Capsula 12 mm longa, glabra, stipite 6 mm longa. Semina 2 mm diam.

Habitat Sumatram australem et Javam occidentalem ad altitudines inter 100 et 1100 m, fl. VI—VIII.

Sumatra. Bencoolen Res.: Rimbu Pengadang, alt. 1000 m, AJOOB (Exped. JACOBSON) 95 L; Lampongs: Tanang Talu, alt. 1050 m, BÜNNEMEYER 1030 L (the inflorescence of this specimen is paniculate: it may be specifically distinct, but the material is too incomplete to allow a final decision).

West Java. Bantam Res.: Kosala, alt. 150 m, FORBES 533, typus, n.v.; Batavia Res.: G. Batu near Tjanten, south of Leuwiliang, alt. 1000 m, BACKER 25767 L; Tjikandas near Wanajasa, alt. 100 m, BAKHUIZEN V. D. BRINK 4334 L; G. Burangrang, alt. 1000 m, BACKER 14491 L.

51. **Strophacanthus** Lindau.

The type species of LINDAU's genus *Strophacanthus* is a plant occurring in Sikkim and Bhutam; it was originally known as *Justicia collina* T. And. CLARKE (in HOOK.F., Fl. Brit. Ind. IV, p. 532, 1885) referred it to *Dianthera* sensu Benth., but as the pollen grains proved to be lenticular with a pore in the middle of each of the two sides and a marginal zone with a somewhat different relief, LINDAU (in ENGL., Bot. Jahrb. XVIII, p. 58, 1893) separated this species from the other ones which CLARKE had placed in this genus and which afterwards were transferred to *Leptostachya* Nees emend. Clarke et Stapf. The new genus differs from the latter not only in the structure of the pollen grains but also in the paniculiform inflorescences consisting of cymes, and in the nature of the incisions of the corolla lips, that of the upper lip being deeper and those of the lower lip less deep than the corresponding ones in the other genus. In the structure of the corolla it is not unlike *Ptyssiglottis* T. And., with which

it was afterwards united by MOORE. It differs, however, conspicuously from that genus in the structure of the inflorescence, the pollen grains and the testa. In ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, p. 344, 1895, LINDAU transferred two more species to this new genus, namely *Justicia dichotoma* Bl. (syn.: *Raphidospora dichotoma* Nees) and *Dianthera terminalis* Fawcet.

S. MOORE (in Journ. of Bot. LX, p. 355, 1922) was certainly not ignorant of LINDAU's remarks on the taxonomic position of these species when he referred them to the section *Euryantheae* of the amplified genus *Ptyssiglottis*, but he was apparently not sufficiently acquainted with the structural peculiarities of the pollen grains to appreciate their taxonomic value. The section *Euryantheae* comprised, apart from the type species of the genus, *Pt. radicosa* (Nees) T. And., the three species which LINDAU had referred to *Strophacanthus*, further *Leda subcordata* Clarke and a presumably new species, which he called *Pt. Zollingeri*. In basing the latter on ZOLLINGER n. 2210, he apparently overlooked that NEES had founded his *Rhaphidospora tenella* on a specimen of ZOLLINGER bearing the same number and evidently identical with the specimen in the herbarium of the British Museum on which he himself based his new species. No example of this plant was available to me, but HOCHREUTINER (in Candollea V, p. 242, 1935) after a re-examination of the type came to the conclusion that it must be regarded as a variety of *Strophacanthus dichotomus* (Bl.) Lindau (syn.: *Raphidospora dichotoma* Nees), differing from the type of the latter in a somewhat greater length of the inflorescence and in the absence of the glandular pubescence on the rachis and branchlets of the inflorescence and on the calyx.

As the reduction of the genus *Strophacanthus* to *Ptyssiglottis* is in no way justified, the genus is to be restored. The following species belong to it:

***collinus** (T. And.) Lindau in Engl., Bot. Jahrb. XVIII, p. 58, 1893 et in Engl. u. Prantl, Nat. Pflanzenfam. IV 3 b, p. 334, 1895 (syn.: *Justicia collina* T. And. in Journ. Linn. Soc. IX, p. 515, 1867; *Dianthera collina* (T. And.) Clarke in Hook.f., Fl. Brit. Ind. IV, p. 543, 1885)

membranifolius (Miq.) Brem. n. comb. (syn.: *Rhaphidospora membranifolia* Miq., Fl. Ind. Bat. II, p. 850, 1857; — *Justicia dichotoma* Bl., Bijdr. Fl. Ned. Ind., p. 783, 1826, nom. illeg. nam non Rottl. in Nov. Act. Acad. Nat. Cur. IV, p. 221, 1803 quae est *Rhinacanthus nasutus* (L.) Lindau; *Peristrophe dichotoma* (Bl.) Hassk. (comb. illeg.), Cat. Hort. Bog. ed. 2, p. 152, 1844 et in Tijdschr. Nat. Gesch. V, p. 129; *Leptostachya dichotoma* (Bl.) Nees (comb. illeg.) in DC., Prodr. XI, p. 379, 1847; *Rhaphidospora dichotoma* (Bl.) Nees (comb. illeg.) op. cit. p. 500, specimine filippino excl. quod. ad *Rh. luzonensem* (Clarke) Brem. n. comb. (*Justicia* Clarke) pertinet; *Dianthera dichotoma* (Bl.) Clarke (comb. illeg.) in Hook.f., Fl. Brit. Ind. IV, p. 543, 1885; *Strophacanthus dichotomus*

(Bl.) Lindau (comb. illeg.) in Engl. u. Prantl, Nat. Pflanzenfam. IV 3 b, p. 344, 1895; *Ptyssiglottis dichotoma* (Bl.) S. Moore (comb. illeg.) in Journ. of Bot. LX, p. 358, 1922)

terminalis (Fawc.) Lindau in Engl. u. Prantl, Nat. Pflanzenfam. IV 3 b, p. 344, 1895 (syn.: *Dianthera terminalis* Fawc. in Forbes, Nat. Wand. East. Archip., p. 513, 1885).

celebicus Brem. in Blumea V, p. 566, 1945.

bonthainensis Brem. n. nom. = *Dianthera celebica* Rolfe in Kew Bull. 1896, p. 164.

When I described *Str. celebicus*, I unfortunately overlooked the existence of *Dianthera celebica* Rolfe, so that I was now bound to find a new specific epithet for the latter. The two Celeban species are, like all the *Strophacanthus* species occurring in the Malay Archipelago, very similar, but the plant described by Rolfe has wider, distinctly petiolate leaves and a much shorter corolla, and looks more like *Str. membranifolius*, from which it differs, however, in the smaller size of the leaves and in the shorter panicles. The Utrecht herbarium possesses material from an as yet undescribed species collected in Ceram.

In view of fact that the genus is represented in Sikkim and Bhutan (*Str. collinus*) and in Java, Celebes, Timor and the Moluccas, it would not be surprising if it proved to be represented in the Malay Peninsula and in Indo-China too. It is not impossible that one or more of the species which have been referred to *Ptyssiglottis*, may belong to this genus. *Pt. subcordata* (Clarke) S. Moore (*Leda* Clarke) is, according to RIDLEY (Fl. Mal. Pen. II, p. 604, 1923), provided with cymose panicles, and as this structure is quite unknown in the inflorescences of *Leptostachya*, the genus to which most of CLARKE's Leda species belong, it is, as stated before, not impossible that this species may prove to be a representative of the genus *Strophacanthus*. So long as the structure of the pollen grains is unknown, the question must remain undecided.

Of *Str. membranifolius* apparently two varieties are to be distinguished. The form described by BLUME and by MIQUEL may be indicated as **Strophacanthus membranifolius** (Miq.) Brem. var. **glandulosus** Brem. n. nom. and the other one as **Strophacanthus membranifolius** (Miq.) Brem. var. **tenellus** (Hochr.) Brem. n. comb. The latter's synonymy is as follows: *Str. dichotomus* (Bl.) Lindau var. *tenellus* Hochr. in Candollea V, p. 242, 1935; *Rhaphidospora tenella* Nees in DC., Prodr. XI, p. 501, 1847; — *Ptyssiglottis Zollingeri* S. Moore in Journ. of Bot. LX, p. 357, 1922. Both forms are apparently confined to Java.

53. **Rhaphidospora** Nees.

NEES referred his genus *Rhaphidospora*, probably on account of the presence of a few sterile bracts at the base of the flowers, to the *Diclipteri-*

nae, but neither ANDERSON nor BENTHAM attached any value to this character, and both reduced the genus to *Justicia*. It was revived by RADLKOFER (in Sitzungsber. d. math.-phys. Classe d. bayer. Akad. d. Wiss. XIII, p. 301, 1883) on account of the presence of 3-porous pollen grains provided with a relief consisting of bands flanking the pores and of oblong shields alternating with the pairs of bands. LINDAU (in ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, p. 327, 1895) referred it for the same reason to his tribe *Graptophylleae*, but this is, as I have already stated in the introduction to this paper, an artificial group.

LINDAU l.c. includes in this genus a species which he calls *Rh. dichotoma* (Bl.) Nees, stating that this was one of the three species of which he had studied the pollen structure. This proves, however, that the material on which he based his conclusion must have been mis-identified, for the specimens on which this species was founded, are provided with lenticular, 2-porous pollen grains of the type which LINDAU considers characteristic for his subtribe *Isoglossinae* or, to give it the name with which it should be designated according to the rules of nomenclature, the *Rhytiglossinae*. BLUME's *Justicia dichotoma* belongs as a matter of fact, as we have seen, to LINDAU's genus *Strophacanthus*. As this was originally the only species quoted under *Rhaphidospora* of which material was available to me, it seemed to me that *Rhaphidospora* and *Strophacanthus* ought to be considered identical, and accordingly I ascribed (in Boissiera VII, p. 196, 1943) to *Rhaphidospora* the kind of pollen which I had observed in this species. In reality, however, the pollen grains of *Rhaphidospora* are, as stated above, of an entirely different type.

The descriptions of the genus *Rhaphidospora* given by NEES (in WALL., Pl. As. Rar. III, p. 77 et 115, 1832 et in DC., Prodr. XI, p. 464 et 499, 1847) and by LINDAU (in ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, p. 327, 1895) are in several respects incomplete and in some inaccurate. NEES e.g. describes the calyx as "quinquefidus", whereas it is in reality 5-partite, and whether he is right in describing the corolla as resupinate, seems dubious: if it is, the torsion must be effected by the branchlets of the inflorescence, for the corolla tube shows no sign of it, and the pedicels are, at least in most species, too short. WIGHT's figure of *Rh. glabra* (Koen. ex Roxb.) Nees (in Ic. Pl. Ind. On IV, tab. 1554) shows part of the corollas in the normal, and part in the resupinate position, so that it can not be regarded as conclusive, and in the subsequently published descriptions no attention has been paid to this point. The solution of this question is not without importance, for resupinate corollas are in the *Justiciinae*, the group to which the genus is provisionally referred by me, entirely unknown.

LINDAU l.c. describes the inflorescence as a cymose panicle, but the ramification is in reality throughout of the racemose type. The pseudo-dichotomous branching noted by LINDAU, is not brought about by the sup-

pression of the central flowers of cymes, but by the circumstance that but a single branchlet develops at the node and that this branchlet develops in the same way as the axis, pushing the latter slightly aside.

Neither NEES nor LINDAU mention the presence of a rugula at the posticous side of the corolla and of a palate at the anticous side. Both are shown, however, quite clearly in WIGHT's figure of *Rh. glabra*, and I myself found them in each of the four Malesian species dealt with below.

On account of these short-comings a new description will be wellcomed.

Rhaphidospora Nees in Wall., Pl. As. Rar. III, p. 77 et 115, 1832, id. in DC., Prodr. XI, p. 464 et 499, 1847; Radlk. in Sitzungsber. d. math.-phys. Classe d. bayer. Akad. d. Wiss. XIII, p. 301, 1883; Lindau in Engl., Bot. Jahrb. XVIII, p. 55, 1893 et in Engl. u. Prantl, Nat. Pflanzenfam. IV 3 b, p. 327, 1895, *Rh. dichotoma* (Bl.) Nees excl.; Lemée, Dict. Pl. Phan. V, p. 786, 1934.

Herbae robustiores, caule ramisque articulatis subteretibus. Folia opposita aequalia, in petiolum contracta, utrimque cystolithis parvis lineolata. Inflorescentiae axillares et interdum insuper terminales, paniculiformes sed propter evolutionem ad nodos aliquos ramuli unius qui axi aequaliter excrescit, pseudo-dichotome ramificatae, floribus plerumque bracteis aliquibus sterilibus praecessis. Bracteae bracteolaeque subulatae vel setaceae, calyce breviores. Calyx 5-partitus, lobis subulatis aequalibus. Corolla parva, alba vel dilute colorata, palato rubro-notata, tubo tereti ampliore in fauces infundibuliformes dilatato, limbo bilabiato, labio superiore erecto, apice emarginato, rugula pilosa instructo, labio inferiore 3-fido, recurvato, palatifero; tubus sub palato bullis duabus invaginatus. Stamina 2, ex ore faucium exserta; filamenta glabra; antherae connectivo angusto; thecae superioris dimidium inferius et dimidium superius thecae inferioris opposita; theca superior basi interdum breviter, inferior semper longius calcarata. Granula pollinis doleiformia, 3-pora, poris utroque latere rima longitudinali comitatis, rimarum paribus cum scutellis oblongis alternantibus. Staminodia nulla. Ovarium glabrum vel subglabrum, utroque loculo ovulis 2. Stylus glaber vel subglaber. Stigma vix incrassatum, subintegrum. Capsula unguiculata; valvulae seminibus duobus superpositis instructae. Semina complanata, appendicibus e basi conica attenuatis, acutis, e cellulis pluribus parallelis compositis dense vestita.

Habitat speciebus pluribus Asiam et Africam Orientalem Tropicales.

Typus generis: *Rh. glabra* (Koen. ex Roxb.) Nees.

The pollen grains of this genus show the structure which I at one time regarded as typical for the *Odontonemeae*: they are doleiform and 3-porous; the three pores are situated in longitudinal fissures flanked by thickened bands, and the three pairs of bands alternate with three oblong shields. In most other respects, for instance in the superposed and spurred thecae and in the presence of a palate and of a rugula, these plants are similar to the *Justiciinae*, and now that we know that pollen grains of

exactly the same type are also found in genera whose place in this subtribe is by no one disputed, there appears to be no reason to refer this genus to another subtribe. The seeds are not unlike those of *"Justicia" tranquebarensis* T. And., a species whose exact position could not yet be ascertained, but which belongs undoubtedly to the *Justiciinae*, for its pollen grains are doleiform and 2-porous with a single row of knobs on each side of the pores. The spinous excrescences of the seedcoat are in *"Justicia" tranquebarensis* contracted at the base, whereas those of *Rhaphidospora* remind one of stalactites, i.e. they are inserted with a broad base and drawn out into a sharp point. These excrescences of the seedcoat are doubtless the best diagnostic character of the genus, but they shed no light on its taxonomic position, for the plan on which they are built, is not different from that of the less conspicuous excrescences found elsewhere in the *Justicieae*: they mereley consist of groups of strongly elongated epidermis cells.

The presence of the genus *Rhaphidospora* in Java was up to now doubtful. It is true that NEES (in DC., Prodr. XI, p. 500, 1847) had referred BLUME's *Justicia dichotoma* to this genus, but this was, as I have shown above, a mistake: BLUME's species belongs to *Strophacanthus*. CLARKE (in Hook.f., Fl. Brit. Ind. IV, p. 535, 1885), however, quotes Java as a part of the area in which *Rhaphidospora glabra* (Koen. ex Roxb.) Nees occurs This record has never been confirmed. Is may have been based on a wrongly labelled specimen or on a misidentification. If CLARKE's specimen belonged to *Rh. javanica*, one of the two new species described below, the misidentification would be comprehensible enough, for this species is at first sight not unlike *Rh. glabra*. *Rh. javanica*, however, is a very rare plant, which, so far as I know, has been collected only in a single locality in East Java. The occurrence of *Rh. glabra* in Java is very improbable. It is true that this species has also been recorded from the Philippines and from East Africa, but it seems to me that it is in reality confined to the Deccan Peninsula and Ceylon. The Philippine specimens which USTERI (Beitr. Kenntn. Philipp. Veg., p. 123, 1905) and subsequent botanists referred to this species, were re-examined by me, and proved to belong to an undescribed species, for which I propose the name *Rh. glabrituba* Brem.

Rhaphidospora glabrituba Brem. n. spec.; *Justicia glabra* Koen. ex Roxb. in errore apud Usteri, Beitr. Kenntn. Philipp. Veg., p. 123, 1905 et apud Merrill, Enum. Philipp. Fl. Pl. III, p. 489, 1923, non Koen. ex Roxb., Fl. Ind. I, p. 132, 1821; typus: MERRILL 218 U.

Habitu *Rh. glabrae* similior, sed absentia pilorum in corollae tubo sub palato insertorum necnon thecis ambobus calcaratis ab ea recedens.

Habitat insulam Luzon dictam.

The African specimens referred by CLARKE to *Rh. glabra*, were originally described as *Rh. abyssinica* Nees. CLARKE's description (in Fl. Trop.

Afr. V, p. 208, 1900) shows in the dimensions of the various parts considerable deviations from the Indian type, and as the really important characters, like the presence or absence of hairs in the corolla tube, are not mentioned, it seems to me that his reduction can not be accepted as final.

The Philippine species separated from *Rh. glabra* is not the only representative of this genus in the Philippines. NEES l.c. recorded the presence of *Rh. dichotoma* (Bl.) Nees in the Philippines, but MERRILL (Enum. Philipp. Fl. Pl. III, p. 489, 1923) refers this specimen (CUMING n. 548) to *Justicia luzonensis* Clarke (in Govt. Lab. Publ. Philipp. nº 35, p. 91, 1906), and a re-investigation of this species, in which special attention was paid to the structure of the pollen grains and of the testa, proved this to be a true *Rhaphidospora*. Its name, therefore, becomes **Rh. luzonensis** (Clarke) Brem. n. comb.

The two Javan species described below, differ from their Asiatic allies in the exclusively axillary inflorescences.

Rhaphidospora javanica Brem. n. spec.; typus: BACKER 36341 L; tubo sub palato glabro a *Rh. glabra* (Koen. ex Roxb.) Nees cui habitu similior recedens et ad *Rh. glabritubam* Brem. et *Rh. luzonensem* (Clarke) Brem. accedens, a speciebus filippinis floribus in ramulis ultimis solitariis vel binis, haud fasciculatis diversa, a speciebus omnibus asiaticis, *Rh. medullosa* Brem. n. spec. v. infra sola excepta, inflorescentiis omnibus axillaribus distinguenda, a *Rh. medullosa* inflorescentiis multo longioribus et laxioribus, caulibus tenuioribus faciliter noscenda.

Herba erecta ramosa. Caulis ramique primum dense puberuli, mox glabrescentes, subteretes, viridi-striati, internodiis usque ad 11 cm longis. Folia in petiolum gracilem, usque ad 8 cm longum contracta; lamina elliptica vel ovato-elliptica, usque ad 21 cm longa et 7.5 cm lata, apice caudata, margine subintegra, tenuior, primum nervis utrimque puberula, mox glabrescens tamen, cystolithis subtus distinguendis, nervis utroque latere costae 4—8. Inflorescentiae omnes axillares; inferiores trichotomae, ramulis bis pseudo-dichotomis; superiores ut ramuli primarii inflorescentiarum inferiorum; ramuli trichotomiarum foliis redactis suffulti; alii bracteis subulatis minimis. Pedunculi inflorescentiarum infimarum usque ad 8 cm longi, glabri; ramuli inflorescentiarum trichotomarum et pedunculi inflorescentiarum reliquarum puberuli et interdum insuper pilis longioribus albo-pubescentes. Bracteae bracteolaeque subulatae; bracteae 4 mm, bracteolae 3 mm longae, puberulae vel puberulo-pubescentes. Calyx 5 mm longus, puberulus, tubo 1 mm longo, lobis subulatis subaequilongis circ. 4 mm longis. Corolla 8 mm longa, tubo intus glabro 3.5 mm, faucibus 1 mm, labiis 3.5 mm longis; labio superiore viridulo, inferiore albo, purpureo-maculato. Filamenta 2.5 mm longa; antherae 2 mm, theca inferiore calcare conico 0.5 mm longo, superiore calcare minuto instructa. Granula pollinis 40 μ longa et 24 μ diam. Discus glaber, hypocrepiformis. Ovarium puberulum, 1.5 mm altum. Stylus 5.5 mm longus, sparse et brevissime

hirtellus. Capsula stipite 7 mm longa inclusa 14 mm longa, parte incrassata 4 mm lata, puberula.

Habitat Javam Orientalem.

East Java. Malang Res.: Lawang, ravine of Kali Welang near G. Baong, alt. 425 m, BACKER 36341 L, typus, fl. VI.

Rhaphidospora medullosa Brem. n. spec.; typus: BACKER 37007 L; *Justicia* spec. C ex Koorders–Schumacher, Syst. Verz. I, § 1, p. 55, 1912; inflorescentiis omnibus axillaribus ad *Rh. javanicam* accedens, inflorescentiis minoribus et ramis crassioribus ab ea tamen faciliter distinguenda.

Herba erecta. Caulis subglaber, internodiis 1.5—7.5 cm longis, primum 1 mm, deinde usque ad 5 mm diam. et medulla voluminosa repletis, primum bisulcatis, ultimo subteretibus, subero brunneo viridi-striato vestitis. Folia in petiolum gracilem, usque ad 5 cm longum contracta; lamina lanceolata, 12—18 cm longa et 3.5—5 cm, raro usque ad 6 cm lata, apice basique contracta, margine subintegra, utrimque glabra et cystolithis parvis dense lineolata, nervis utroque latere costae 6—9 utrimque prominulis. Inflorescentiae omnes axillares, pedunculo tenui 5—10 mm longo instructae, trichotomae; ramuli semel vel bis pseudo-dichotomi. Ramuli bracteis subulatis 1.5 mm longis suffulti, pilis capitatis sparsi. Bracteae florales triangulares, 1.8 mm longae; bracteolae basi connatae, 2.0 mm longae, ceterum bracteis similiores. Flores pedicello 0.5 mm longo instructi. Calyx 3.5 mm longus, pilis capitatis puberulus, tubo 0.5 mm longo, lobis lanceolatis subaequalibus 3 mm longis. Corolla 7 mm longa; tubo intus bullis duabus piloso, 3.5 mm longo, faucibus 0.5 mm longis, labiis 3 mm longis. Filamenta 1.5 mm longa, pilis capitatis perbrevibus sparsa. Antherae 2 mm longae; theca inferior calcare conico 0.5 mm longo, superior calcare breviore instructa. Granula pollinis 34 μ longa et 21 μ diam. Discus urceolaris unilateraliter in lobum brevem productus, glaber. Ovarium dense hirtellum, 1.5 mm altum. Stylus hirtellus 3.5 mm longus. Capsula stipite 12 mm longa inclusa 16 mm longa, rostrata, puberula.

Habitat Javam Orientalem.

East Java. Besuki Res.: Mrawan, alt. 500 m. BACKER 37007 L, typus, fl. III; Tjuramanis, KOORDERS 20858 L ("*Justicia* C"), fl. XI.

54. **Cyrtanthera** Nees; 55. **Beloperone** Nees and 56. **Calliaspidia** Brem. n. gen.

In the introduction to this paper I have pointed out that LINDAU's attempt to base the subdivision of the group to which here the name *Justicieae* is applied, on the pollen characters, must be regarded as unsuccessful, but that some of his smaller groups nevertheless are well characterized. As an example I quoted the *Rhytiglossinae* (*Isoglossinae* Lindau), which are provided with lenticular, 2-porous pollen grains.

Another type of pollen which may prove to be of taxonomic importance are the 2-porous, doleiform grains with at least two rows of knobs on

each side of the pores. Genera in which this type of pollen occurs, are apparently confined to America and Africa, and they appear to agree with each other also in the great length of the lips and in the smooth or but faintly granulate or cerebrose-marked testa. To this group belong the American genera *Beloperone* Nees, *Cyrtanthera* Nees and some species like "*Justicia*" *carthagenensis* Jacq., of which the exact position could not yet be determined, and the African genera *Macrorungia* Clarke and *Monechma* Hochst., the first differing from the others by the way in which the capsule opens, which reminds one of *Rungia* Nees, and the second by the rather small size of the corolla. A somewhat aberrant type of pollen is met with in LINDAU's genus *Rhacodiscus*, which in its other characters shows an unmistakable affinity to *Beloperone* Nees. The tuberculated strips flanking the pores are in these grains so wide that they meet each other. As the wall, therefore, is everywhere of the same thickness, these grains do not show the characteristic flattening observed in the other genera. The position of the African genus *Himantochilus* T. And. remains somewhat dubious. The species of which the pollen grains proved to be provided with two or more rows of knobs on each side of the pores, were removed by CLARKE to *Macrorungia*, but as their fruits are still unknown, this seems to me a somewhat overhasty decision. The pollen grains of the type species are provided with three pores and possess but a single row of rather large knobs on each side of the pores (cf. LINDAU in ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, p. 281, fig. 110 P). CLARKE unites this species with *Anisotes* Nees, but so long as its seeds are unknown, the value of this reduction remains dubious. The pollen grains of *Anisotes diversifolius* Balf.f. are, according to LINDAU (in ENGL., Bot. Jahrb. XVIII, p. 58, tab. II fig. 93, 1893) 2-porous with a double row of knobs on each side of the pores, and the seeds are described as scabrous.

The group of genera with 2-porous pollen grains ornamented on each side of the pores with two or more rows of knobs, and with smooth or slightly puberulous seeds is represented in Java by cultivated species belonging to the genera *Cyrtanthera* Nees and *Beloperone* Nees.

The genus *Cyrtanthera* Nees is now usually included in *Jacobinia* Moric., but it seems to me that this reduction is not justified. BENTHAM (in BENTH. et HOOK.F., Gen. Pl. II, 2, p. 1115, 1876) included in *Jacobinia* not only *Cyrtanthera* Nees and *Sericographis* Nees, which at any rate are nearly related, but even such widely divergent genera as *Pachystachys* Nees and *Drejera* Nees. LINDAU (in ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, p. 351, 1895) gave the genus a more natural delimitation, but even this delimitation is in my opinion too wide. It includes, for instance, besides *Cyrtanthera* Nees also *Sericographis* Nees (syn.: *Libonia* Koch; *Sericobonia* Lindl. et Andr.; *Cyrtantherella* Oerst.), which is well characterized by the three strips of hairs in the basal part of the corolla tube and by the muricate seeds. I have not been able to investigate the pollen grains of this

genus, but it would not surprise me, if these too should prove different, for in the related genera with muricate seeds I have always found a single row of knobs on each side of the pores. *Cyrtanthera*, doubtless, comes nearer to *Jacobinia*, but differs in the smaller, more deeply divided calyx and in the shorter anthers with their curved thecae and wide connective, and it seems, therefore, more prudent to retain this genus. The species cultivated in Java is the plant described and figured by NEES (in MART., Fl. Bras IX, p. 100, tab. XIV, 1847) as *C. magnifica*, but now generally known as *Jacobinia magnifica* (Nees) Benth. As it is conspecific with the plant described and figured bij LINDLEY (in Bot. Reg. XVII, tab. 1397, 1831) as *Justicia carnea*, its name will have to be changed in **Cyrtanthera carnea** (Lindley) Brem. n. comb. (syn.: *Jacobinia carnea* (Lindl.) Nichols).

The genus *Beloperone* Nees was founded on a plant described by NEES (in WALL., Pl. As. Rar. III, p. 102, 1832) as *B. Amherstiae*. As it is according to NEES himself (in MART., Fl. Bras. IX, p. 139, 1847) conspecific with *Justicia brasiliana* Roth (Nov. Pl. Sp., p. 17, 1821), it should be called **Beloperone brasiliana** (Roth) Brem. n. comb. BENTHAM mentions *B. Amherstiae* as a synonym of his *Dianthera nodosa*, which was based on *Justicia nodosa* Hook. (ex. GEEL, Sert. Bot. Cl. 2, 1828 et in Bot. Mag. LVI, tab. 2914, 1829), preferring the name *Dianthera* because the lower thecae are unspurred: the name *Beloperone*, namely, is reserved by him for those species in which the lower thecae are calcarate. From a nomenclatural point of view this is, of course, illegitimate, for *Beloperone brasiliana* must be regarded as the type of the genus, but this need not trouble us, for the presence or absence of a spur at the base of one or both of the thecae is doubtless not such an important character as hitherto has been assumed. The figure of *Justicia nodosa* Hook. shows such a close resemblance to *Beloperone plumbaginifolia* (Jacq.) Nees, one of the species in which the thecae are calcarate, that the near affinity between these species can hardly be doubted. More difficult to answer is the question how the genus should be defined. However, if it is limited to the species with a red corolla provided with an infundibuliform throat, a narrow, erect, subentire or emarginate upper and a spreading, slightly wider, 3-fid lower lip, anthers with short, unequal thecae separated by a wide and more or less oblique connective, 2-porous pollen grains with two or more rows of dots on each side of the pores and swollen, glabrous or slightly puberulous seeds whose testa possesses an epidermis consisting of small, nearly isodiametric cells, it forms a quite natural group. Apart from *B. brasiliana* (Roth) Brem. (*B. Amherstiae* Nees), the type species, it comprises i.a. *B. plumbaginifolia* (Jacq.) Nees and *B. oblongata* (Link et Otto) Nees. NEES reduced the latter (in DC., Prodr. XI, p. 420, 1847) to *B. plumbaginifolia*, from which it differs, however, in the smaller number of flowers per inflorescence and in the circumstance that the inflorescences are not all axillary. *B. plumba-*

ginifolia is not rarely cultivated in Java; of *B. oblongata* I have seen a specimen in the Botanic Garden at Utrecht. [1])

Justicia acuminatissima Miq., *J. lucida* Vahl and *J. secunda* Vahl are very similar to the species above referred to *Beloperone*. They differ from them in the much narrower, shortly 3-lobed lower lip and by the flattened seeds. The two first-named species are provided with pollen grains which are radially symmetrical and covered all over with knobs, and together with a new species they were referred by LINDAU (in Bull. Herb. Boiss. V, p. 668, 1897; ENGL. u. PRANTL, Nat Pflanzenfam. Nachtr. p. 308, 1897) to a new genus *Rhacodiscus*. *Justicia secunda*, however, has flattened pollen grains with a double row of knobs on each side of the pores, and was left by him in *Justicia*, which in his delimitation, however, is not more natural than in that of ANDERSON or BENTHAM. As there are apparently no other important points of difference between *J. secunda* and the species referred by LINDAU to *Rhacodiscus*, it seems to me that this one too will have to be included in this genus. *Justicia acuminatissima* Miq. is a superfluous name, for the plant had alraedy been described by NEES (in London Journ. of Bot. IV, p. 637, 1845; see also DC., Prodr. XI, p. 637, 1845) under the name *Beloperone? calycina*. Another synonym is *Rhytiglossa secunda* (Vahl) Nees var. *intermedia* Nees (in DC., Prodr. XI, p. 340, 1847). In future it will have to be called **Rhacodiscus calycinus** (Nees) Brem. n. comb. *Justicia secunda* Vahl becomes **Rhacodiscus secundus** (Vahl) Brem. n. comb. Another apparently nearly related species is *Rhytiglossa moricandiana* Nees, which therefore becomes **Rhacodiscus moricandianus**. *Rhytiglossa geniculata* (Sims) Nees is probably synonymus with *Rhacodiscus secundus*.

The violet-flowered *Beloperone violacea* Planch. et Lind.; *B. ciliata* (Seem.) Hook. and *Justicia carthagenensis* Jacq. (*J. retusa* Vahl) form another group of species, to which *J. periplocifolia* Jacq., *J. lithospermifolia* Jacq. and *J. furcata* Jacq. may perhaps also be reckoned (cf. LINDAU in Symb. Antill. II, p. 237, 1900). NEES in DC., Prodr. XI, p. 389, 1847) included most of these species in "*Adhatoda* § 3 *Tyloglossa*", but this can not be considered a natural group. They differ from the true representatives of *Beloperone* in the spiciform inflorescence, in the colour of the corolla and in the greater width of the lower lip, and will have to be transferred to a genus of their own.

Entirely different from the species enumerated above is the Mexican *Beloperone guttata* F. S. Brandegee, which at present is a very popular ornamental plant. It differs from the true representatives of the genus by the spiciform inflorescence with its large bracts and bracteoles, by the white corolla with its narrow and but shortly lobed lower lip, by the

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1) The genus *Cyphisia* Rizz., described after my manuscript was finished (in Rev. Brasil. Biol., VI, p. 521, 1946) differs from *Beloperone* mainly in the violaceous gibbous corolla.

3-porous pollen grains ornamented on each side of the pores with a single row of rather large shields, and by the flat seeds. I refer it to a new genus: on account of the showy bracts covering the inflorescence like shields, I propose for it the name *Calliaspidia*.

Calliaspidia Brem. n. gen. *Justiciearum* americanarum, forma corollae et structura testae ad *Beloperonem* Nees et genera ei affinia accedens, granulis pollinis 3-poris, utroque latere pororum serie singula scutellorum magnorum ornatis, seminibus complanatis ab eis faciliter noscendum.

Herba ramosa. Folia petiolata, opposita aequalia. Inflorescentiae terminales sed mox a ramulo axillari in positionem lateralem coactae, patentes, spiciformes. Bracteae ovato-cordatae, imbricatae, lateritiae, serierum duarum dorsalium floriferae, aliae vacuae. Flores in axillis bractearum solitariae; bracteolae bracteis paulo minores, ceterum similiores, calyce bis longiores. Calyx albidus, 5-partitus; lobi angusti acuti. Corolla tubulosa, alba sed palato rubro-maculata, tubo cum faucibus limbo subaequilongo, anguste infundibuliformi, faucibus brevibus, labiis aequilongis, superiore erecto, emarginato, rugula instructo, inferiore breviter 3-lobato, palatifero, haud reflexo. Stamina 2 labio superiori subaequilonga; antherae bithecae, thecis ambobus brevissime calcaratis. Granula pollinis doleiformia, 3-pora, utroque latere pororum serie singula scutellorum magnorum ornata. Discus hippocrepiformis. Stylus glaber. Capsula unguiculata. Semina complanata, glabra; epidermis testae e cellulis isodiametricis composita.

Distr. Mexico.

Typus generis: **C. guttata** (F. S. Brandegee) Brem. n. comb. (*Beloperone guttata* F. S. Brandegee in Univ. Calif. Publ. Bot. IV, p. 278, 1912).

Notwithstanding the striking difference in the structure of the pollen grains it seems to me that this genus must be considered a close ally of *Beloperone*. It is noteworthy that in the *Justiciinae* the presence of a third pore is nearly always correlated with the presence of solid bands instead of single or double rows of knobs on each side of the pores. Rows of knobs are almost entirely confined to the 2-porous grains, but, as I have stated already in the introduction to this paper, the latter too may be provided with bands.

57. **Psacadocalymma** Brem. n. gen.

The genus *Psacadocalymma*, of which a single species occurs in Java as a weed, is entirely of American origin. It comprises a number of species brought together by NEES (in DC., Prodr. XI, p. 380, 1847) in *Leptostachya* § 2 (in MART., Fl. Bras. IX, p. 150, 1847, this group is called "*Pectorales*") and, moreover, a species which he referred to *Rhytiglossa*, but which shows no near affinity to any other species of that genus: it is *Rh. pectoralis* (Jacq.) Nees (*Justicia* Jacq.). All these plants have afterwards been referred to *Justicia* and *Dianthera*. It are comparatively weak herbs of wet habitats, provided with a terminal panicle composed of lax,

as a rule more or less distinctly secund spikes with small, white or partly coloured flowers and small bracts and bracteoles; the calyx is 5-partite with narrow, acute lobes; the corolla consists of an infundibuliform tube, a short throat, an ovate, entire or shortly 2-lobed upper lip provided with rugula and a 3-lobed lower lip with palate; the anthers are 2-thecous with the thecae, of which the lower one is spurred, at unequal height; the pollen grains are small and 2-porous, with a single row of rather indistinct dots on each side of the pores; and the seeds are distinctly flattened, mainly brown but covered with globose white protuberances; to this character the new genus owes its name.

Psacadocalymma Brem. n. gen. *Justiciearum* americanarum, spicis paniculatis, calyce aequaliter 5-partito, corolla parva, granulis pollinis 2-poris parvis, utroque latere pororum serie singula carunculorum plerumque vix distinguendorum ornatis, testa muricata a generibus aliis distinguendum.

Herbae palustres, simplices vel parce ramosae. Folia petiolata vel sessilia, plerumque utroque extremo angustata, opposita aequalia. Inflorescentiae terminales et axillares, paniculiformes; paniculae e spicis laxis compositae; bracteae bracteolaeque parvae, calyce breviores. Flores ad nodos spicarum plerumque solitarii, parvi. Calyx 5-partitus; lobi aequales, angusti, acuti. Corolla alba vel dilute violacea, sed labio inferiore maculis saturate violaceis ornato vel toto violaceo albo-maculato, tubo infundibuliformi, faucibus brevissimis, limbo bilabiato, labio superiore breviter bilobato vel subintegro, rugula instructo, inferiore 3-lobo, palatifero. Stamina 2; filamenta glabra; antherae 2-thecae, thecis subopppositis vel plus minusve superpositis, basi ambobus vel inferiore sola calcaratis. Granula pollinis doleiformia, complanata, parva (25—35 μ longa), 2-pora, utroque latere pororum serie singula carunculorum, plerumque difficiliter distinguendorum ornata. Discus urceolaris, parvus. Ovarium glabrum. Stylus basi hirtellus. Stigma parvum, indivisum. Capsula parva, unguiculata, valvulis 2-seminalibus. Semina superposita, complanata, brunnea, muricata.

Distr. America Tropicali et Subtropicali; species una in Java graecizans.

Typus generis: **Ps. comatum** (L.) Brem. n. comb. (*Justicia* L.).

The number of species belonging to this genus is difficult to ascertain. According to LINDAU (in URBAN, Symb. Antill. II, p. 620, 1900) most of the species enumerated by NEES in his § 2 of *Leptostachya* are conspecific: they were accordingly sunk by him in the species chosen above as the type of the new genus. The only species which can not be reduced to this one, are *L. antirrhina* Nees and *L. laxa* Nees, and these two resemble each other so much that they too are better regarded as one: this species is to be called **Ps. antirrhinum** (Nees) Brem. n. comb. The third species is **Ps. pectorale** (Jacq.) Brem. n. comb. (*Justicia* Jacq.): this is the plant which NEES had referred to *Rhytiglossa*.

Ps. comatum (L.) Brem. is wideley distributed in America, but its occurrence as a weed in another tropical country, was up to now unknown. In 1910, however, it was already rather common in the neighbourhood of Batavia and Buitenzorg (cf. BACKER in Ann. Jard. Bot. Buitenz. Suppl. III, p. 400, 1910, where this species is mentioned under the name *Dianthera leptostachya* Bth. [1]), which is *Leptostachya Wallichii* Nees, a plant which does not occur in Java). Since then it has been found in the vicinity of Bandung and in 1931 also in East Java, namely at Purwodadi in the Malang Residency.

58. **Adhatoda** Nees.

The genus *Adhatoda* was founded by NEES (in WALL., Pl. As. Rar. III, p. 76 et 102, 1892), and contained already at its inception a large number of species which apparently are but distantly related. As NEES credits the genus to HERMANN, it is clear that the type must be sought among the species known to the latter. The question is in this way easily decided, for HERMANN knew but one species, NEES's *Adhatoda vasica* (*Justicia adhatoda* L.), and this, therefore, is to be regarded as the type. As this plant unfortunately produces seldom seeds, the structure of the latter is but imperfectly known. CLARKE (in HOOK.F., Fl. Brit. Ind. IV, p. 540, 1885) describes them as "tubercular-verrucose". As the pollen grains too of most of the species referred to this genus are not or but imperfectly known, it is difficult to decide which of them should be retained in it. For the time being it seems prudent to follow CLARKE's example and to restrict the use of the generic name to the type species and to *A. Beddomei* Clarke, which apparently is nearly related to the type. In this delimitation it is characterized by the presence of pedunculate axillary spikes equipped with large bracts; the hairy intrusions on the ventral side of the corolla tube may also prove of taxonomic importance. The American species which according to LINDAU (in ENGL. u. PRANTL, Nat. Pflanzenfam. IV 3 b, p. 350, 1885) should be very near to the type, differ in reality very considerably, e.g. in the conspicuously swollen stigma with its ring of hairs at the base and in the smooth seeds and belong doubtless to another circle of affinity.

A. vasica Nees is the only species occurring in Java, where it is known as a cultivated plant only. Its country of origin is unknown, but as it is apparently nearly related to *A. Beddomei*, it will probably have arisen in the same region as the latter.

59. **Calophanoides** Ridl.

The Indo-Malayan genus *Calophanoides* was apparently based by RIDLEY (Fl. Mal. Pen. II. p. 592, 1923) on *Justicia* sect. *Calophanoides*

[1]) With regard to the synonym *Justicia leptostachya* Bold. 1916, non Hemsl. 1890 cf. MERRILL in Brittonia V, p. 31, 1943.

Clarke (in HOOK.F., Fl. Brit. Ind. IV, p. 530, 1885 et in Journ. As. Soc. Beng. LXXIV, p. 681, 1908), but its delimitation was somewhat restricted, for RIDLEY excluded the Indo-African *Justicia heterocarpa* T. And. and the African species belonging to the latter's circle of affinity, and also the anisophyllous Malayan species which were referred by him to a section *Henicophyllae* of *Justicia*. The first group of species might be referred to the genus *Harnieria* Solms; they differ from the genus *Calophanoides* not only in the structure of the pollen grains, whose pores are flanked on each side by a double instead of a single row of shields, but also and even more conspicuously in the structure of the testa, which in *Harnieria* is alveolate and in *Calophanoides* muricate. No material of the anisophyllous species which Ridley refers to his section *Henicophyllae* of *Justicia*, was available to me, but as the pollen grains and seeds of *Justicia henicophylla* Clarke are, if we may trust the author's description, similar to those of *Calophanoides*, they might perhaps be referred to the latter. The anisophylly is in itself hardly sufficient to justify their exclusion. It seems, however, that the inflorescences too are somewhat different, and it is, therefore, better to leave their position undecided until more information becomes available.

As the generic description of *Calophanoides* given by RILDEY appears to be somewhat summary, a more detailed one will be wellcome.

Calophanoides Ridl., Fl. Mal. Pen. II, p. 592, 1923; *Justicia* L. sect. *Calophanoides* Clarke in Hook.f., Fl. Brit. Ind. IV, p. 530, 1885, quoad species 20—23; id. in Journ. As. Soc. Beng. LXXIV, p. 681, 1908, minime quoad species 7 et 8; non Clarke in Fl. Trop. Afr. V, p. 181, 1899, quae species ad genus *Harnieriam* Solms ducendae sunt; anne *Justicia* L. sect. *Henicophyllae* Ridl., op. cit. p. 594, adhuc incertum.

Herbae. Folia lanceolata vel elliptica, utroque extremo acuta vel attenuata. Flores axillares vel in cymas axillares paucifloras dispositi; flores et cymae haud raro superpositi. Bracteae florum lateralium calyce breviores; bracteolae minimae vel nullae; pedicelli breves. Calyx 5-partitus; lobi aequales, angusti, acuti. Corolla alba vel viridula, palato roseo-maculata, tubo brevi infundibuliformi in fauces brevissimas mergente, labiis tubo subaequilongis, superiore triangulari, apice emarginato, rugula instructo, inferiore 3-lobato, palatifero. Stamina 2; filamenta glabra; antherae 2-thecae; dimidium inferius thecae superioris et dimidium superius thecae inferioris opposita; theca inferior calcarata. Granula pollinis 2-pora, doleiformia, complanata, utroque latere pororum serie singula scutellorum ornata. Staminodia nulla. Discus hippocrepiformis. Ovarium utroque loculo ovulis 2. Stylus filiformis, glaber vel hirtellus. Stigma brevissime 2-lobum, haud crassius quam stylus. Capsula breviter unguiculata, 4-seminalis. Retinacula applanata, obtusa. Semina valde complanata, brunnea, muricata.

Distr. in China Australi, Indo-China, India Aquosa.

Typus: C. *quadrifaria* (Nees) Ridl. (*Gendarussa* Nees).

Species aliae: **C. zollingeriana** (Nees) Brem. n. comb. (*Adhatoda* Nees);

C. neesiana (Nees) Ridl. (*Adhatoda* Nees); **C. Loheri** (Clarke) Brem. n. comb. (*Justicia* Clarke).

C. zollingeriana was reduced by CLARKE to *C. quadrifaria*, but it seems to me that NEES was right in keeping them apart. The differences, however, are but small: *C. zollingeriana* has slightly scabrid shoots and leaves, whereas the same parts of *C. quadrifaria* are merely puberulous, and the leaves of *C. zollingeriana* are somewhat narrower than those of the other species. As the latter, however, is known to me from the description only, it is not impossible that a reinvestigation of this species will reveal the presence of more points of difference. Specimens collected in the Malay Peninsula were not available to me either, so that I am unable to decide whether they should be referred to *C. quadrifaria*, to *C. zollingeriana*, or perhaps to a new species. In Java *C. zollingeriana* is the only representative of the genus. It is apparently a very rare plant: I have seen but a single set of specimens collected some years ago on the G. Tangkuban Prahu. Zollinger's collection is not represented in the herbaria of this country.

60. **Mananthes** Brem. n. gen.

This genus comprises a number of species found in Southern China, Indo-China and the western part of the Malay Archipelago. They are characterized by the presence of lax terminal panicles composed of a small number of spiciform branchlets with small and narrow bracts subtending small flowers or clusters of small flowers. The pollen grains are 2-porous, doleiform and slightly compressed with a single row of rather large shields on each side of the pores. The seeds are provided with a rugulose testa. CLARKE (in HOOK.F., Fl. Brit. Ind. IV, p. 532, 1885 et in Journ. As. Soc. Beng. LXXIV, p. 681, 1908) referred these species to *Justicia* sect. *Gendarussa*, which was based on the genus *Gendarussa* as originally delimitated bij NEES (in WALL., Pl. As. Rar. III, p. 76 et 103, 1832), for afterwards the latter (in DC., Prodr. XI, p. 410, 1847) restricted it to the type species, *G. vulgaris* Nees (*Justicia gendarussa* L.), removing the other ones to *Adhatoda*. The position of *Gendarussa vulgaris* remains to this day uncertain. RIDLEY (Fl. Mal. Pen. II, p. 593, 1923) maintains *Gendarussa* as a distinct genus, and this attitude, which I have followed, finds support in LINDAU's discovery of the presence of three pores in the pollen grains and in the fact that the rows of knobs on each side of the pores are replaced by bands. So long as the structure of the testa is unknown, its position, however, can not be regarded as definitely settled, and seeds are in *G. vulgaris* unfortunately extremely rare. The study of *Hemichoriste montana* Nees, which resembles *Gendarussa vulgaris* in the structure of the inflorescence and in that of the pollen, and which is, therefore, referred by me to the same genus, may shed some light on this problem. At any rate, *Gendarussa* differs from *Mananthes* not only in the structure

of the pollen grains but also in the larger size of the bracts and in the coriaceous leaves.

Mananthes Brem. n. gen. *Justiciearum* paleotropicarum inflorescentiis spiciformibus, parce ramificatis et valde elongatis, bracteis parvis, granulis pollinis doleiformibus, 2-poris, testa rugulosa a generibus aliis distinguendum.

Herbae. Folia magna, opposita aequalia. Inflorescentiae terminales, spiciformes, plerumque valde elongatae et parce ramificatae, floribus in axillis bractearum nunc solitariis, nunc glomeratis. Bracteae bracteolaeque parvae, calyce breviores, acutae. Bracteolae basi pedicelli brevis insertae. Calyx 5-partitus; lobi subaequales, angusti, acuti. Corolla albida, tubo in fauces anguste infundibuliformes et ei subaequilongas ampliato, labio superiore emarginato, rugula instructo, inferiore 3-fido, palatifero. Stamina 2; filamenta glabra; antherae 2-thecae, connectivo oblique papilioniformi, thecis sese dimidio obtegentibus, apice apiculatis, ambobus breviter et obtuse calcaratis. Granula pollinis doleiformia, 2-pora, paulum complanata, utroque latere pororum serie singula tuberculorum instructa. Discus urceolaris. Ovarium utroque loculo ovulis 2. Stylus subglaber. Stigma didymum, vix incrassatum. Capsula unguiculata. Semina complanata, rugulosa.

Distr. a China Australi usque ad Javam.

Typus: **M. sumatrana** (Miq.) Brem. n. comb. (*Gendarussa*? Miq.).

Species aliae: **M. flaccida** (Kurz) Brem. n. comb. (*Justicia* Kurz); **M. glomerulata** (Benoist) Brem. n. comb (*Justicia* Benoist); **M. vasculosa** (Nees) Brem. n. comb. (*Adhatoda* Nees); **M. patentiflora** (Hemsl.) Brem. n. comb. (*Justicia* Hemsl.).

Gendarussa? *sumatrana* Miq. was based on a specimen collected by TEYSMANN at Padang Sidimpuan in the Tapanuli Residency. Another specimen was obtained by TEYSMANN on the same trip at Palembajan in the West Coast Residency (Sumatra). Afterwards it has repeatedly been collected near Sibolangit in the East Coast Government, from where it was described by RIDLEY as a new species under the name *Justicia virescens*. CLARKE (In Journ. As. Soc. Beng. LXXIV, p. 681, 1908) reports its presence in Perak, and RIDLEY in Kelantan. Recently it has also been found in the Buitenzorg Residency in West Java, namely on the G. Halimoon near Tjibadak bij BAKHUIZEN V. D. BRINK. A nearly related, as yet undescribed species, differing mainly in the subcordate leaves, was collected on the island Simalur, west of Sumatra, and another one, a much smaller plant with a smaller number of nerves in the leaves is represented in the Utrecht Herbarium by a specimen collected in Djambi.

62. **Rhyticalymma** Brem. n. gen.

The new genus *Rhyticalymma* comprises but a small number of species, all of them confined to the Malay Peninsula, Sumatra, Java and Borneo.

In the shape of the pollen grains it resembles *Rostellularia* Reichenb., for seen from the flat side the lumen looks like a sand-glas, the central part of the wall being considerably thickened on the inside. Its most conspicuous feature, however, are the large, ovate-cordate, distinctly petiolate bracts with their ciliate margin. From *Rostellularia* it is also easily distinguishable by the presence of five subequal calyx lobes. In this respect it resembles *Mananthes* and *Gendarussa*.

Rhyticalymma Brem. n. gen. *Justiciearum* paleotropicarum, maxime ut *Mananthes* Brem., *Gendarussa* Nees et *Rostellularia* Reichenb. sed bracteis ovatis vel cordatis, basi in petiolum contractis, margine longe ciliatis faciliter ab eis distinguendum, a *Rostellularia* insuper calyce subaequaliter 5-partito diversum.

Herbae. Folia magna; opposita aequalia. Inflorescentiae primum terminales, deinde a ramulo axillari in positionem lateralem coactae, spiciformes, floribus in axillis bractearum inferiorum interdum glomeratis, aliis solitariis. Bracteae magnae, late ovatae vel cordatae, basi in petiolum contractae, margine longe ciliatae. Bracteolae calyce multo breviores, ciliatae. Calyx aequaliter 5-partitus; lobi angusti, acuti, breviter ciliolati. Corolla sordide luteola, palato purpureo-venosa, tubo tereti brevi, faucibus inflatis tubo paulo brevioribus, labio superiore triangulari, rugula instructo, inferiore 3-lobo, palatifero. Stamina 2; filamenta glabra; antherae 2-thecae, connectivo oblique papilioniformi, thecis ellipsoideis patentibus sese dimidio obtegentibus, theca inferiore basi calcarata. Granula pollinis doleiformia, paulum complanata, 2-pora, utroque latere pororum serie singula scutellorum ornata, lumine ad medium constricto. Discus urceolaris. Stylus glaber vel basin versus hirtellus. Stigma vix conspicue 2-lobum. Capsula unguiculata, valvulis 2-seminalibus. Semina complanata, rugulosa, brunnea.

Distr. in Peninsula Malayana et in parte occidentali Indiae Aquosae.

Typus: **Rh. ochroleucum** (Bl.) Brem. n. comb. (*Justicia* Bl.).

Species aliae: **Rh. ptychostomum** (Nees) Brem. n. comb. (*Justicia* Nees); **Rh. patulinerve** (Clarke) Brem. n. comb. (*Justicia* Clarke); **Rh. vittatum** (Hall.f.) Brem. n. comb. (*Justicia* Hall.f.).

Is is not impossible that some more species of CLARKE's section *Bracteatae* and of RIDLEY's section *Spatuliferae* may belong to this genus, but as no material was available to me, and the descriptions are not sufficiently detailed, I am unable to determine their exact position.

Justicia ochroleuca Bl. is quoted by NEES under the synonyms of *J. betonica* L, and this explains why MIQUEL, BOERLAGE and KOORDERS mention the latter as occurring in Java. "*Justicia*" *betonica* L., however, has but little in common with *Rhyticalymma ochroleucum*, and has never been found in Java, not even as a cultivated plant. *Rh. ochroleucum* is endemic in West Java and a large part of Sumatra.

63. **Rostellularia** Reichenb.

The great majority of the fairly numerous species belonging to the genus *Rostellularia* are nearly related and occur in tropical and subtropical Asia; a single species is found in Abyssinia and another one in Queensland. The African species which CLARKE (in Fl. Trop. Afr. V, p. 180, 1899 et in Fl. Cap. V, 1, p. 56, 1901) referred to his section *Rostellularia* of *Justicia*, differ from the true representatives of the genus in their subequally 5-partite calyx and in the structure of the testa, for the latter is not rugulose but, like that of the genus *Harnieria*, tesselated.

The genus *Rostellularia* was created in 1832 by NEES (in WALL., Pl. As. Rar. III, p. 76 et 100), who called it *Rostellaria*. As the latter is a younger homonym of *Rostellaria* Gaertn., the name was changed by REICHENBACH in 1837 to *Rostellularia*. It is a well-defined genus, easily recognizable by the following features; the leaves are sprinkled with boomerang-shaped cystolithis, which are, as a rule, transversely placed; the spikes are terminal and provided with decussate bracts, each subtending a single flower; the bracteoles and calyx lobes are of about the same length as the bracts and like these conspicuously ciliate; the calyx is either unequally 5-partite with a diminutive posticous lobe or, by the complete suppression of the latter, 4-partite; the corolla is short and provided with a rugula whose margins are towards the base conspicuously ciliolate, and with a palate consisting of two parallel bulges, which towards the top are ornamented with coloured veins; the stamens possess flattened, glabrous filaments, descending in the tube in the form of ciliolate ridges and showing at the top a sudden contraction, a narrow, very oblique connective and a spur at the base of the lower theca; the pollen is doleiform and slightly flattened, 2-porous and ornamented with a single row of flat knobs on each side of the pores, and shows, seen from the flat side, a sandglass-shaped lumen; the urceolate disk is provided on two sides with a small quadrate appendage: the ovary is comose and the stigma didymous and hardly thicker than the style; the capsules are small and although provided with a solid base, outwardly not distinctly unguiculate; the four seeds are attached to short, at the top conspicuously widened retinacula; and the seeds themselves are flattened and provided with a wrinkled or, rarely, carunculate testa.

In Java so far seven representatives of this genus could be recognized: 1. **R. sundana** Brem. n. spec.; 2. **R. hijangensis** Brem. n. spec.; 3. **R. Backeri** Brem. n. spec.; 4. *R. obtusa* Nees; 5. **R. ovata** Brem. n. spec.; 6. **R. ardjunensis** Brem. n. spec.; and 7. **R. smeruensis** Brem. n. spec. Apart from *R. obtusa* Nees they are all new. Former authors have reported the presence of *Justicia procumbens* L., *J. simplex* Don and *J. diffusa* Willd., which all three belong to *Rostellularia*, but these reports are based on misidentifications partly caused by the fact that NEES had quoted wrongly identified specimens under names which CLARKE (in HOOK.F., Fl. Brit.

Ind. IV, p. 538—9, 1885) cites as synonyms of these species, and partly due to the unsatisfactory nature of the descriptions given by the latter. The differences between most of the species belonging to this genus are doubtless small, but as they appear to be quite constant, they should not be overlooked. The whole genus, however, deserves a thorough revision. The number of species will prove to be far more considerable than at present is assumed, and it seems to be extremely doubtful whether any one of them will prove to be wide-spread.

Rostellularia sundana Brem. n. spec.; *R. procumbens* Nees in DC., Prodr. XI, p. 871, 1847, quoad var. *α*, non *Rostellaria procumbens* (L.) Nees in Wall., Pl. As. Rar. III, p. 101, 1832, nec *Justicia procumbens* L., Sp. Pl. ed. 1, p. 15, 1753, *Rostellularia procumbens* (L.) Nees in errore apud Miq., Fl. Ind. Bat. II, p. 826, 1857; *Justicia procumbens* L. in errore apud Boerl., Handl. Fl. Ned. Ind. II, 2, p. 663, 1899; apud Koorders, Exkursionsfl. v. Java III, p. 230, 1912; apud Backer, Onkruidfl. Suikerrietgr. p. 683, 1934; typus: BAKHUIZEN V. D. BRINK JR 1243 U; maxime ut **R. serpyllifolia** (Gamble) Brem. n. comb. (*Justicia* Gamble, syn.: *J. simplex* Don var. *serpyllifolia* Clarke) sed bracteis, bracteolis, calycis lobis longioribus ab ea faciliter distinguenda.

Herba procumbens, 5—20 cm alta, valde ramosa. Rami internodiis bisulcatis 1—4 cm longis et 0.5—1.0 mm diam., primum bifariam hirsuti, deinde plus minusve glabrescentes. Folia petiolo parce hirsuto 0.5—1.5 mm longo instructa; lamina ovata, ovato-lanceolata vel oblonga, 7—13 mm longa et 3—7 mm lata, apice subobtusa, basi subacuta, margine integra paulum recurvata, subcoriacea, supra glabra, subtus costa nervisque hirsuta, margine ciliata, cystolithis utrimque sed praesertim supra conspicuis, transversis, nervis utroque latere costae 3—4, subtus prominulis. Spicae plerumque sessiles, interdum longius pedunculatae, casu quo folia basi pedunculi inserta flores suffulcientia. densae, 1.2—3.5 cm longae et 8 mm diam. Rachis parce hirsuta. Bracteae lineares vel lineari-spathulatae, 2.8—3.2 mm longae et 0.6 mm latae, subobtusae, margine et extus dimidio superiore costae longe sed sparse ciliatae, ceterum glabrae, virides, ad basin tamen luteolae, 1-nerviae, costa sicc. haud nigrescente, haud distincte scariose marginatae. Bracteolae lineares, 3.2—3.4 mm longae et 0.3—0.4 mm latae, ceterum ut bracteae. Calycis lobi angustissime triangulares, inaequilongi, duo breviores 3.2 mm, duo longiores 3.8 mm longi, omnes basi 0.7 mm lati, ceterum ut bracteae bracteolaeque; rudimentum segmenti postici inter lobos breviores insertum 1.5—2 mm longum et basi 0.2—0.4 mm latum, hyalinum. Corolla alba, labio inferiore dilute violaceo saturatius notato, 5 mm longa, extus glabra, labio inferiore tamen ad apicem densius hirsuto, tubo cum faucibus brevissimis 2.8 mm longo, labio superiore apice vix conspicue emarginato, lobis labii inferioris 0.4 mm longis rotundatis. Stamina filamentis 1.7 mm longis, thecis 0.6 mm longis, inferiore calcare 0.3

mm longo instructa, connectivo 0.3 mm lato. Granula pollinis 24 μ longa, 16 μ lata, 12 μ crassa. Ovarium 1.6 mm altum. Stylus 3 mm longus, basin versus hirtellus. Capsula 4 mm longa et 1.7 mm lata, apice setulis paucis vix conspicue comosa, parte solida 1.2 mm longa. Semina 1 mm alta lataque.

Habitat Javam Occidentalem inter altitudines 0 et 1000 m. Floret mensibus I—XII.

West Java. Buitenzorg Res.: Depok, KOORDERS 31325 L et U; Buitenzorg, alt. 230 m, LOERZING 1533 L; ibidem, Bubulak, BAKHUIZEN V. D. BRINK JR 18 U; ibidem, Kota Paris, id. 1243 U, typus; Batu Tulis, BOERLAGE 12 L; G. Batu, BAKHUIZEN V. D. BRINK 3474 L, ibidem, RAAP 571 L; Tjitomas nr Buitenzorg, id. 34 L; Sukasari, id. 589 L; Tjibodas, KOORDERS 31694 L; Sukabumi, alt. 600—700 m, BACKER 14679 L; Priangan Res.: Bandung, KARSTEN 65 L; Lembang, VELDHUIS 65 U; Banjumas Res.: Banjumas, alt. 20 m, KIEVITS 945 et 3060 L; Java, s.l.: ZOLLINGER 846 L.

The specimen collected at Lembang (VELDHUIS n. 65) has somewhat longer internodes (up to 4.5 cm) and larger leaves (up to 27 mm long and 13 mm wide with a 5 mm long petiole) and less numerous cystoliths than the other ones, but these differences may probably be ascribed to influences of the habitat.

It is rather remarkable that apart from ZOLLINGER n. 846 no specimens collected by the earlier botanists appear to be extant. This suggests the possibility that it may have been in ZOLLINGER's time a recent introduction, but as I have not been able to identify it with any foreign species, this seems hardly probable.

The following species does not occur in Java. It belongs to the group of species provided with a rudimentary posticous calyx lobe, and resembles *R. sundana* in the narrow bracts.

Rostellularia lanceolata Brem. n. spec.; typus: DE VOOGD 2095 L; inter species rudimento lobi calycini postici instructas, bracteis angustis ad *R. sundanam* et ad varias species indicas accedens, foliis subcoriaceis, lineari-lanceolatis, seminibus fimbriato-rugulosis ab eis distinguenda.

Herba ascendens, ramosa, plus quam 30 cm alta. Rami internodiis primum bisulcatis, 4—5 cm longis et 1—2 mm diam., primum strigosi, deinde plus minusve glabrescentes. Folia in petiolum utroque latere hirsutum, 1—2 mm longum contracta; lamina anguste lanceolata, 4.2—6.6 cm longa et 0.9—1.4 cm lata, utroque extremo acuta, margine integra interdum recurvata, subcoriacea, utroque latere sparse hirsuta, cystolithis subtus inconspicuis, supra irregulariter sparsis, sicc. nigrescentibus, nervis utroque latere costae 5—8, subtus prominulis. Spicae pedunculo usque ad 3 cm longo instructae, rachide dense puberula usque ad 5 cm longa, circ. 12 mm diam. Bracteae lanceolatae, 6 mm longae et 1.8 mm latae, acutae, margine et costa pilis tenuibus densius ciliatae, ceterum extus pilis capitatis brevibus

vestitae, penninerviae, hyaline marginatae. Bracteolae 5.5 mm longae et 1.3 mm latae, 1-nerviae, ceterum ut bracteae. Calycis lobi 4 longiores subaequilongi, basi in tubum 0.6 mm altum connati, 5—6 mm longi et 1.1 mm lati, maxime ut bracteolae; rudimentum lobi postici 2 mm longum et 0.5 mm latum, hyalinum, enervium. Corolla 10 mm longa, extus pubescens, labio inferiore apicem versus hirsuto, tubo cum faucibus brevissimis 4 mm longo, labio superiore apice emarginato, inferiore lobis rotundatis 0.8 mm longis. Stamina filamentis 4 mm longis, theca superiore 1.0 mm longa, inferiore 1.3 mm longa calcare 0.5 mm longo instructa, connectivo 0.3 mm lato. Granula pollinis 27 μ longa, 17 μ lata, 14 μ crassa. Ovarium 1.5 mm altum. Stylus 6.7 mm longus, basin versus hirtellus. Capsula pubescens, 6.5 mm longa et 1.9 mm diam., parte solida 2.3 mm longa. Semina subnigra, 1.3 mm alta lataque, fimbriato-rugulosa.

Habitat regionem montanam insulae Lombok dictae.

East Lombok. Pusook pass (Sembalong), alt. 1500 m, DE VOOGD 2095 L, typus, fl. VI.

Rostellularia hijangensis Brem. n. spec.; typus: BACKER H. Bog. 9703 U; inter species calyce inaequaliter 5-partito instructas bracteis minime 6 mm longis, calyce minime 5 mm longo ad *R. lanceolatam* accedens, habitu robustiore, foliis latioribus, longius petiolatis, bracteis latioribus ab ea distinguenda.

Herba suberecta, ramosa, plus quam 50 cm alta. Rami internodiis bisulcatis 4—12 cm longis et 1.5—4.0 mm diam., primum ad margines sulcorum sparse hirsuti, deinde glabrescentes. Folia petiolo 2—8 mm longo, hirsuto instructa; lamina lanceolata, 3—6 cm longa et 1—2 cm lata, apice basique subacuta, margine integra, herbacea, supra sparse hirsuta, subtus costa nervisque hirsuta, cystolithis subtus haud conspicuis, supra plus minusve transverse dispositis, nervis utroque latere costae 4—5, tenuibus. Spicae nunc subsessiles, nunc pedunculo usque ad 1 cm longo, densius hirsuto elatae, 1.5—3 cm longae et 1.3 cm diam. Rachis hirsuta. Bracteae lanceolato-ellipticae, 7—7.5 mm longae et 2.7—4.6 mm latae, apice in mucronem 0.5 mm longum productae, intus glabrae, margine et costa longe ciliatae, ceterum extus ad costam pilis capitatis brevioribus vestitae, costa subtus prominente, virga mediana viridi 0.7—1.0 mm lata, nervis marginalibus circumdata et nervis lateralibus paucis, sicc. nigrescentibus notata, zona marginali scariosa usque ad 1.5 mm lata. Bracteolae oblongae, 7—7.5 mm longae et 2.2—2.8 mm latae, brevius vel vix mucronatae, ceterum ut bracteae. Calycis lobi 4 majores lineari-lanceolati, longitudine paulum inaequales, 5—6.5 mm longi et 1.0 mm lati, supra medium conduplicati, intus glabri, margine et costa longe ciliati sed extus sine pilis capitatis, scarioso-marginati; rudimentum segmenti postici filiforme, 1.3 mm longum. Corolla 10—14 mm longa, extus glabra, labio inferiore tamen ad apicem densius hirsuto, tubo cum faucibus 1.3 mm longis 7 mm longo, labio superiore apice breviter bilobato, lobis labii inferioris 1.3 mm longis, rotundatis.

Stamina filamentis 6.7 mm longis; thecae 1.2 mm longae; inferior calcare 0.7 mm longo instructa; connectivum 0.4 mm latum. Granula pollinis 30 μ longa, 20 μ lata, 15 μ crassa. Ovarium 1.5 mm altum, conspicue comosum. Stylus 9 mm longus, praesertim basin versus dense hirtellus. Capsula 5.5 mm longa et 2.4 mm lata, dimidio superiore pubescens, parte solida 1.7 mm longa. Semina rugulosa 1.2 mm alta lataque.

Habitat regionem montanam Javae Orientalis.

East Java. Besuki Res.: G. Hijang, alt. 2100 m, BACKER H. Bog. 9703 U, typus, fl. X; ibidem, KOORDERS 43511 L (sub nomine *Hemigraphis hirta* T. And.; *Justicia simplex* in errore apud Bremekamp in Verh. Ned. Akad. v. Wet. Sect. 2, XLI n. 1, p. 77, 1944), fl. VIII, ibidem, JESWIET 321 L, fl. X; Malang Res.: Tenger, on the southern part of the ringwall round the Sandsea, KOBUS 5 PAS.

Whereas *R. sundana*, *R. obtusa* and *R. ovata* are plants from the hot plains and from the lower parts of the mountains, *R. hijangensis*, *R. Backeri*, *R. ardjunensis* and *R. smeruensis* are denizens of the higher regions. On the three first-named species *R. obtusa* reaches an altitude of 1600 m.

R. hijangensis is easily distinguishable from the other Javan species by its robust habit, especially by its thick shoots and large leaves, and by the large size of the bracts and calyx lobes.

Rostellularia Backeri Brem. n. spec.; typus: BACKER 13341 U; maxime ut *R. obtusa* Nees sed foliis sessilibus, pilis longioribus hirsutis, spica basi plerumque interrupta, etiam pilis longioribus hirsuta ab ea distinguenda.

Herba ascendens, ramosa, 20—35 cm alta. Rami internodiis bisulcatis 1—7 cm longis et 1 mm diam., primum hirsutis, deinde plus minusve glabrescentibus. Folia sessilia, ovato-lanceolata, 1—2 cm longa et 3—6.5 mm lata, apice acuta, basi rotundata, margine paulum recurvata, subcoriacea, sicc. supra saturate, subtus dilute olivaceo-brunnea, utrimque hirsuta, cystolithis supra conspicuis, transversis, sicc. interdum nigrescentibus, nervis utroque latere costae 3—4, subtus prominulis. Spicae longius pedunculatae, bracteis infimis tamen interdum foliaceis, basi plerumque interruptae, 2—6 cm longae et 0.8 cm diam. Rachis parce hirsuta. Bracteae ovatae, 4.2 mm longae et 2.6 mm latae, acutae, margine pilis 0.8 mm longis dense ciliatae, carinatae, extus ad medium et apicem versus hirsutae et pilis capitatis parvis sparse vestitae, intus glabrae; virga mediana viridis 0.8 mm lata. Bracteolae ovato-lanceolatae, 4.2 mm longae et 1.7 mm latae, ceterum ut bracteae. Calycis lobi 4 majores subaequilongi, lineares, 4.6 mm longi et 1.0 mm lati, acuti, ut bracteae bracteolaeque ciliati sed costa fortius carinati et densius ciliati; rudimentum segmenti postici 2.4 mm longum et 0.4 mm latum, hyalinum. Corolla 9 mm longa, extus glabra, labio inferiore tamen ad apicem densius hirsuto, tubo 4 mm longo, labio superiore apice emarginato, labio inferiore lobis rotundatis 0.9 mm longis instructo. Stamina filamentis 4 mm longis; thecae 0.8 mm longae; superior 0.3 mm supra in-

feriorem inserta; inferior calcare 0.7 mm longo instructa; connectivum 0.3 mm latum. Granula pollinis 28 μ longa, 17 μ lata, 14 μ crassa. Ovarium 1.3 mm altum, apice pubescens. Stylus 5 mm longus, dimidio inferiore hirtellus. Capsula 5 mm longa et 1.8 mm lata, apice vix conspicue comosa, parte solida 2 mm alta. Semina 1.3 mm alta lataque.

Habitat Javae Orientalis regionem montanam.

East Java. Besuki Res.: G. Hijang, alt. 2200 m, BACKER 13341 U, typus, fl. IV.

As stated above, this species resembles *R. obtusa* Nees, from which it differs, however, in the complete suppression of the petioles, in the greater length of the hairs by which all parts are covered, and in the interrupted spikes. It was collected, moreover, at a much higher altitude, for *R. obtusa* has so far not been found above 1600 m.

As the description given by NEES of *R. obtusa* is not sufficiently detailed, a new one has been drawn up.

Rostellularia obtusa Nees in DC., Prodr. XI, p. 374, 1847; Miq., Fl. Ind. Bat. II, p. 827, 1857; *Justicia obtusa* (Nees) Lindau in Engl. u. Prantl, Nat. Pflanzenfam. IV 3 b, p. 349, 1897; Boerl., Handl. Fl. Ned. Ind. II, 2, p. 663, 1899; — *Rostellularia mollissima* Nees var. α Nees l.c.; Miq., l.c. ubi in errore var. β scripta; — *Justicia procumbens* L. in errore apud Bl., Bijdr. Fl. Ned. Ind. p. 783, 1826; *J. blumeana* Klotsch ex S. Moore in Journ. of Bot. LXIII, Suppl. p. 79, 1925.

Herba ascendens, ramosa, nunc 10—15 cm, nunc 15—35 cm alta. Rami internodiis bisulcatis 1—11 cm longis et 1.0—1.5 mm diam., primum pilis nunc retrorsis, nunc patentibus vestiti, deinde plus minusve glabrescentes. Folia petiolo hirsuto 1—8 mm longo instructa; lamina orbicularis, ovalis vel ovali-oblonga, 0.8—6.5 cm longa et 4—33 mm lata, apice subacuta, basi subobtusa, rotundata vel subcordata, margine paulum recurvata, subcoriacea, supra setulis sparsa, subtus ubique sed praesertim costa nervisque sparse hirsuta, cystolithis supra conspicuis, transversis, subtus vix distinguendis, nervis utroque latere costae 3—6, subtus prominentibus, supra plerumque plane distinguendis. Spicae plerumque longius pedunculatae, bracteis infimis interdum tamen foliaceis, 1—8 cm longae et 9 mm diam. Rachis parce hirsuta. Bracteae obovatae, 4—4.5 mm longae et 2—2.2 mm latae, obtusae vel in mucronem viridem 0.6 mm longum contractae, margine pilis 0.4 mm longis dense ciliatae, carinatae, carina setulis appressis instructa, dorso pilis capitatis parvis sparsae, ceterum glabrae, 1-nerviae, virga mediana viridi 0.8 mm lata, margine hyalina. Bracteolae bracteis similiores, 3.8—4.0 mm longae et 2.0 mm latae, haud carinatae tamen, obtusae vel acutissimae. Calycis lobi 4 majores lineares subaequilongi, 3.5—5.0 mm longi et 1.0 mm lati, dense ciliati, carinati, virga mediana viridi 0.3 mm lata; rudimentum segmenti postici 2—2.5 mm longum et 0.4 mm latum, hyalinum. Corolla alba, palato tamen violaceo et venulis

saturate violaceis ornato, 8 mm longa, extus glabra, labio inferiore tamen ad apicem densius hirsuto, tubo cum faucibus 0.8 mm longis 3 mm longo, labio superiore apice emarginato, lobis labii inferioris rotundatis 0.7 mm longis. Stamina filamentis 3.2 mm longis; thecae 0.8 mm longae, superior 0.5 mm supra inferiorem inserta; inferior calcare 0.9 mm longo instructa; connectivum 0.3 mm latum. Granula pollinis 31 μ longa, 18 μ lata, 14 μ crassa. Ovarium 1.3 mm altum, dimidio superiore setosum. Stylus 5 mm longus, dimidio inferiore hirtellus. Capsula 4 mm longa et 1.7 mm lata, dimidio superiore parce hirtella, parte solida 1.2 mm alta. Semina 1.2 mm alta lataque.

Habitat totam Javam inter altitudines 0 et 1600 m; floret mensibus II—XII.

Varietates duae distinguendae sunt:

Rostellularia obtusa Nees var. **neesiana** Brem. n. nom. quae est forma a NEES descripta.

10—15 cm alta. Rami primum pilis retrorsis vestiti; bracteae, bracteolae, calycis lobi obtusi; bracteae 4.0 mm, bracteolae 3.8 mm, calycis lobi 3.5 mm longi.

Central Java. Semarang Res.: G. Ungaran, Medinieh, alt. 900—1200 m, JUNGHUHN s.n. L et U, exempla typi; Djocjakarta Res.: Prambanan, JUNGHUHN s.n. L.

Rostellularia obtusa Nees var. **grandifolia** Miq., Fl. Ind. Bat. II, p. 827, 1857; *Justicia blumeana* Klotsch ex Nees in DC., Prodr. XI, p. 374 in syn., nomen nudum; S. Moore in Journ. of Bot. LXIII, Suppl. p. 79, 1925.

15—35 cm alta. Rami primum pilis patentibus vestiti; bracteae bracteolaeque acuminatae, calycis lobi acutissimi; bracteae 4.5 mm, bracteolae 4.0 mm, calycis lobi 5 mm longi.

West Java. Batavia Res.: Tjikao, BLUME 1209 L (*Justicia procumbens* L. in errore apud BLUME); ibidem, KORTHALS? 601 L; Priangan Res.: G. Papandajan, BOERLAGE s.n. L; Kawah Kamodjah, VELDHUIS 19 et 20 U; Pengalengan, alt. 1200 m, FORBES 903 (*Justicia blumeana* Klotsch ex S. Moore).

Central Java. Semarang Res.: Semarang, alt. 50 m, LOERZING 2458 L, ibidem, KOORDERS 27627 L; Madioon Res.: G. Lawu, Sido Ramping, alt. 1300—1400 m, ELBERT 3 L; Sarangan, alt. 1600 m, KARSTEN 46 L; Magelang, JUNGHUHN s.n., typus var.; Ngebel, alt. 700 m, KOORDERS 23203 L.

East Java. Surabaja Res.: Surabaja, GEERTS–RONNER s.n. PAS; Malang Res.: Pasuruan, Umbulan, alt. 75 m, BACKER 36857 PAS; Semongkrong, alt. 50 m, id. 7712 et 36793 PAS; G. Tengger, Bodo, alt. 900 m, MOUSSET 70 L; Besuki Res.: Redjingan, KOORDERS 43225 L; G. Idjen, alt. 1100 m, BACKER 36858 PAS.

MIQUEL's type specimen is a plant with fairly large and wide leaves. The specimens collected in Central and East Java are in this respect all

very similar, but those collected in West Java are provided with somewhat smaller and narrower leaves.

The two varieties of *R. obtusa* differ in so many respects that they might perhaps better be regarded as distinct species. In view of the fact that of the first-named variety but scanty material was available, I have for the time being accepted MIQUEL's valuation.

Rostellularia ovata Brem. n. spec.; typus: BACKER 21132 L, inter species calyce 4-partito instructas maxime ut *R. smeruensis* Brem. et *R. ardjunensis* Brem. (v. infra), bracteis brevioribus, 1-nerviis et sicut bracteolae et calycis lobi dimidio inferiore pilis tenuibus dense, dimidio superiore pilis robustioribus parce ciliatis, seminibus carunculatis ab eis distinguenda.

Herba ascendens, circ. 35 cm alta, ramosa. Rami internodiis bisulcatis, 3—7 cm longis et 0.7—2 mm diam., primum densius hirsuti, deinde plus minusve glabrescentes. Folia petiolo hirsuto 1—8 mm longo instructa; lamina ovato-orbicularis, ovata, ovato-elliptica vel oblonga, 1.2—3.5 cm longa et 1.0—2.5 cm lata, apice acuta et plus minusve mucronata, basi rotundata vel subacuta, prope petiolum tamen semper contracta, margine subintegra paulum recurvata, herbacea, utrimque pilis longis densius vestita, cystolithis subtus inconspicuis, supra plus minusve transversis, nervis utroque latere costae 4—5, subtus paulum prominulis. Spicae sessiles, i.e. basi foliis ordinariis vel magnitudine paulum redactis instructae, densae, usque ad 7 cm longae et 1.4—1.8 cm diam. Rachis dense hirsuta. Bracteae lineares 7 mm longae et 0.9 mm latae, dimidio superiore pilis robustioribus paucis pectinatae, dimidio inferiore pilis brevioribus et tenuioribus dense ciliatae, costa extus parce ciliatae, ceterum dorso pilis capitatis sparsae, 1-nerviae, hyalino-marginatae. Bracteolae 6.5 mm longae et 0.7 mm latae, ceterum ut bracteae. Calyx 4-partitus; lobi lineares vel lineari-lanceolati, inaequilongi, basi in tubum 0.6 mm altum connati, longiores 4.5 mm longi et post anthesin usque ad 6 mm accrescentes, breviores 3.5 mm longi et post anthesin usque ad 5 mm accrescentes, omnes 1.1 mm lati, apice conduplicati, ceterum ut bracteae bracteolaeque. Corolla dilute violacea, 7.5 mm longa, extus glabra, labio inferiore tamen ad apicem densius hirsuto, tubo cum faucibus 0.3 mm longis 3.5 mm longo, labio superiore apice bidentato, dentibus triangularibus 0.3 mm longis, lobis labii inferioris 0.5 mm longis, incurvatis. Stamina filamentis 2.3 mm longis; thecae 0.8 mm longae, superior 0.6 mm supra inferiorem inserta, inferior calcare 0.6 mm longo instructa; connectivum 0.2 mm latum. Granula pollinis 25 μ longa, 16.5 μ lata, 13 μ crassa. Ovarium 1.2 mm altum, apice comosum. Stylus 4.7 mm longus, basin versus hirtellus. Capsula 4.3 mm longa et 1.7 mm lata, apice vix conspicue comosa, parte solida 1.0 mm alta. Semina 1.1 mm longa lataque, subnigra, carunculis satis magnis ornata.

Habitat Javam Orientalem, Maduram et insulam Bali dictam, ad altitudinem maris vel paulo altius; floret mensibus V—VII.

East Java. Surabaja Res.: between Modjokerto and Lumadjang, south of

Simo, DORGELO 1830 PAS; Grissik, DORGELO 717 PAS, ibidem, BACKER 36298 et 37174 PAS.

Madura. Arosbaja, alt 5 m, BACKER 21132 L, typus; s.l., DORGELO 661 PAS.

Bali. Buleleng, ROBINSON 2527 L.

A specimen collected in Timor (JONKER 272 U) has somewhat shorter bracts and erect shoots, but is in other respects not unlike *R. ovata*; as neither flowers nor fruits are present, its identification, however, remains uncertain.

Rostellularia ardjunensis Brem. n. spec.; typus: ARENS 4 L; maxime ut *R. smeruensis* Brem. (v. infra) sed foliis minoribus et rigidioribus, nervis paucioribus instructis, spicis subsessilibus, capsulis minoribus ab ea distinguenda.

Herba ascendens, circ. 30 cm alta, valde ramosa. Rami internodiis bisulcatis 1—3.5 cm longis et 1.5 mm diam., primum densius hirsuti, deinde plus minusve glabrescentes. Folia petiolo dense hirsuto, 1.5 mm longo instructa; lamina ovato-orbicularis vel ovato-oblonga, 1.2—2.5 cm longa et 1.1—1.4 cm lata, apice acuminata, basi rotundata vel subcordata, margine integra recurvata, subcoriacea, supra sparse hirsuta, subtus costa nervisque hirsuta sed inter nervos subglabra, cystolithis subtus haud conspicuis, supra transversis, nervis utroque latere costae 3—5, supra immersis, subtus prominentibus. Spicae subsessiles, foliis magnitudine redactis flores suffulcientibus praecessae, densae, 2—4.5 cm longae et 1.8 cm diam. Rachis ut internodium praecedens dense hirsuta. Bracteae anguste lanceolatae, 10 mm longae et 2.2 mm latae, acuminatae, intus glabrae, margine et costa longe ciliatae, ceterum extus pilis capitatis brevioribus vestitae, costa subtus prominente, nervis utroque latere costae 3 in nervum marginalem conjunctis, sicc. ut costa nigrescentibus, haud distincte scarioso-marginatae. Bracteolae lineares, 10 mm longae et 1.5 mm latae, supra medium sensim attenuatae, 3-nerviae, ceterum ut bracteae. Calyx 4-partitus; lobi linearilanceolati, longitudine paulum inaequales, 8—9 mm longi et 1.6 mm lati, supra medium conduplicati, intus glabri, margine et costa longe ciliati, extus utroque latere costae pilis aliquibus capitatis instructi, scarioso-marginati, Corolla 11 mm longa, extus glabra, labio inferiore tamen ad apicem densius hirsuto, tubo cum faucibus 1.5 mm longis 6 mm longo, labio superiore apice vix conspicue emarginato, lobis labii inferioris 1.1 mm longis, rotundatis. Stamina filamentis 4.5 mm longis, thecae 0.7 mm longae, superior 0.3 mm supra inferiorem inserta, inferior calcare 0.4 mm longo munita; connectivum 0.5 mm latum. Granula pollinis 30 μ longa, 20 μ lata, 15 μ crassa. Ovarium 1.7 mm altum, apice setulis paucis conspicue comosum. Stylus 7 mm longus, dimidio inferiore sparse hirtellus. Capsula 7 mm longa et 2.2 mm lata, apice setulis paucis comosa, parte solida 2 mm longa. Semina 1.5 mm alta lataque.

Habitat regionem montanam Javae Orientalis.

East Java. Malang Res.: G. Ardjuno, alt. 2500 m, ARENS 4 L, typus.

KOORDERS confused this plant, as an identification label in his handwriting shows, with the Indian *Hemigraphis hirta* (Vahl) T. And. Another specimen referred by him to *H. hirta* proved to be *R. hijangensis* Brem. (v. supra).

Rostellularia smeruensis Brem. n. spec.; typus: V. STEENIS 7290 BZ, dupl. L; maxime ut *R. ardjunensis* Brem., sed foliis majoribus et tenuioribus, numero majore nervorum instructis, spicis distincte pedunculatis, capsula longiore ab ea recedens.

Herba ascendens, circ. 45 cm alta, ramosa. Rami internodiis primum bisulcatis, 5—7 cm longis et 1.5—3.5 mm diam., primum dense, deinde sparse hirsuti. Folia petiolo hirsuto 1—2 mm longo instructa; lamina ovato-oblonga, 2.5—5.5 cm longa et 1.4—3.0 cm lata, apice acuta et plus minusve mucronata, basi rotundata vel truncata, prope petiolum interdum paulum contracta, margine subcrenulata et undulata, paulum recurvata, herbacea, utrimque pilis longis densius vestita, cystolithis subtus inconspicuis, supra difficiliter distinguendis, irregulariter sparsis, nervis utroque latere costae 5—6, subtus prominulis. Spicae plerumque longius pedunculatae; pedunculus usque ad 4 cm longus, dense hirsutus; spica ipsa densa, usque ad 10 cm longa, 1.5—2 cm diam. Rachis dense hirsuta. Bracteae inferiores interdum foliaceae et usque ad 15 mm longae et 4 mm latae; aliae semper lineares, 12 mm longae et 2.2 mm latae, apicem acutum versus conduplicatae et paulum recurvatae, margine et dimidio apicali costae longe et densius ciliatae, dorso insuper pilis capitatis satis longis vestitae, intus glabrae, virga mediana viridi, margine hyalina, penninerviae, nervis lateralibus in nervum marginalem confluentibus. Bracteolae 11 mm longae et 1.4 mm latae, ceterum ut bracteae. Calyx 4-partitus; lobi lineares, inaequilongi, basi in tubum 1 mm altum connati; longiores 8 mm longi et post anthesin usque ad 11 mm accrescentes; breviores 7 mm longi et post anthesin usque ad 9.5 mm accrescentes; omnes 1.5 mm lati, apicem versus conduplicati, maxime ut bracteae bracteolaeque sed sine nervis lateralibus et latius hyalino-marginati, minus dense pilis capitatis vestiti. Corolla alba vel dilute rosea, 16 mm longa, extus glabra, labio inferiore tamen ad apicem densius hirsuto, tubo cum faucibus 2 mm longis 8 mm longo, labio superiore apice bilobato, lobis circ. 0.8 mm longis, denticulatis, lobis labii inferioris 1.6 mm longis, rotundatis. Stamina filamentis 7 mm longis; thecae 1.2 mm longae, superior 0.9 mm supra inferiorem inserta, inferior calcare 0.8 mm longo instructa; connectivum 0.3 mm latum. Granula pollinis 31 μ longa, 18 μ lata, 14 μ crassa. Ovarium 2 mm altum, apice setulis paucis comosum. Stylus 9 mm longus, dimidio inferiore hirtellus. Capsula 10 mm longa et 2 mm lata, subglabra, parte solida 3.5 mm longa. Semina 1.8 mm alta et 1.6 mm lata, subnigra, plicis altioribus ornata.

Habitat regionem montanam Javae Orientalis: floret mensibus VI—VIII.

East Java. Malang Res.: between Bromo and Smeru (Smeru-hoeve — Sendura), alt. 2000 m, v. STEENIS 7290 BZ, typus, L. dupl. typi; ibidem, GISIUS "Aug. 1939" BZ.

R. ardjunensis and *R. smeruensis* show some resemblance to **R. latispica** (Gamble) Brem. n. comb. (*Justicia* Gamble), but are easily distinguishable from the latter by the greater length of the spikes and of the bracts and bracteoles.

Two species provided with large leaves and with a 4-partite calyx were collected in Celebes:

Rostellularia bonthainensis Brem. n. spec.; typus: BÜNNEMEYER 12088 U; maxime ut *R. smeruensis* Brem. et *R. ardjunensis* Brem. sed foliis longius petiolatis, basi contractis, bracteis bracteolisque brevioribus, haud distincte penninerviis ab eis distinguenda.

Herba erecta, plus quam 50 cm alta, ramosa. Rami internodiis bisulcatis 4—9 cm longis et 1.5—2.5 mm diam., primum densius hirsuti, deinde plus minusve glabrescentes. Folia petiolo densius hirsuto, 3—10 mm longo instructa; lamina ovata vel elliptica, 2.7—5.7 cm longa et 1.6—2.8 cm lata, apice acuta vel subacuminata et mucronata, basi in petiolum contracta, margine integra, herbacea, supra hirsuta, subtus costa nervis venulis etiam hirsuta, cystolithis vix distinguendis, nervis utroque latere costae 4—5, tenuibus. Spicae nunc sessiles, nunc pedunculo dense hirsuto, usque ad 4 cm longo instructae, 3.5—6.5 cm longae et 1 cm diam.; spicae sessiles plerumque floribus duobus axillaribus praecessae. Rachis hirsuta. Bracteae lanceolatae, 6.5 mm longae et 2 mm latae, apicem versus contractae et conduplicatae, margine longe ciliatae, subtus pilis isdem cum pilis aliquibus brevioribus capitatis mixtis hirsutae, supra glabrae, virga mediana viridi 0.6 mm lata, haud distincte venosa, margine hyalina 0.7 mm lata. Bracteolae lineari- lanceolatae, 5 mm longae et 1.1 mm latae, ceterum ut bracteae. Calyx 4-partitus; lobi lineari-lanceolati, longitudine paulum inaequales, 5.5—6 mm longi et 1.4 mm lati, ad apicem haud distincte conduplicati, ceterum ut bracteolae. Corolla 12 mm longa, tubo extus glabro, ceterum pilis longioribus ecapitatis cum pilis brevioribus capitatis mixtis hirsuta, tubo faucibus 0.5 mm longis comprehensis 4 mm longo, labio superiore apice subquadrato vix retuso, lobis labii inferioris 1.2 mm longis, rotundatis. Stamina filamentis 4.5 mm longis; thecae paulum inaequilongae, superior 1.0 mm longa, apice truncata, inferior 1.2 mm longa, basi calcare 0.6 mm longo instructa; connectivum 0.3 mm latum. Granula pollinis 26 μ longa, 19 μ lata, 14 μ crassa. Ovarium 1.5 mm altum, dimidio superiore comosum. Stylus 7 mm longus, basin versus hirtellus. Capsula 6.5 mm longa et 1.8 mm lata, parce pubescens, basin versus glabrescens, parte solida 2 mm longa. Semina 1.5 mm longa lataque.

Habitat terrae Celebicae partem austro-occidentalem.

S.W. Celebes. G. Bonthain, alt. 2000 m, BÜNNEMEYER 12088 U, fl. VI

Rostellularia magnifolia Brem. n. spec.; typus: BÜNNEMEYER 12587 L; maxime ut *R. bonthainensis* Brem., sed spicis angustis laxioribus, foliis majoribus, bracteis bracteolisque minoribus ab ea faciliter distinguenda.

Herba ramosa robustior. Rami internodiis primum bisulcatis 4—12 cm longis et 1—2.5 mm diam., primum densius hirsuti, deinde plus minusve glabrescentes. Folia petiolo hirsuto 2—9 mm longo instructa; lamina lanceolato-elliptica, 2—11 cm longa et 0.9—3.7 cm lata, utroque extremo acuta, margine indistincte crenata, herbacea, supra hirsuta, subtus pilis brevioribus praesertim costa nervisque pubescens, cystolithis subtus inconspicuis, supra irregulariter sparsis, sicc. nigrescentibus, nervis utroque latere costae 3—10, utraque facie prominulis. Spicae pedunculo usque ad 5 cm longo instructae, rachide pubescente usque ad 8 cm longa, ex internodiis 3—7 mm longis composita; spica 7 mm diam. Bracteae calyci plerumque subaequilongae, infimae interdum breviores, omnes ovato-lanceolatae, 4—5 mm longae et 1.2—1.7 mm latae, acutae, apicem versus contractae et conduplicatae, margine et costa carinata pilis tenuioribus densius ciliatae, late hyalino-marginatae. Bracteolae lanceolatae, 3—4 mm longae et 0.8—0.9 mm latae, ceterum ut bracteae. Calyx 4-partitus; lobi in tubum 0.4 mm altum connati, aequilongi, 3.7—4.0 mm longi et 0.8—1.0 mm lati, ceterum ut bracteae bracteolaeque. Corolla 8.5 mm longa, extus glabra, labio inferiore tamen ad apicem hirtello, tubo faucibus 0.6 mm longis comprehensis 3.3 mm longo, labio superiore apice latius truncato, vix emarginato, lobis labii inferioris 0.5 mm longis, rotundatis. Stamina filamentis 3.4 longis; thecae inaequilongae, superior 0.6 mm, inferior 0.7 mm longa, inferior calcare vix 0.2 mm longo instructa; connectivum 0.3 mm latum. Granula pollinis 27 μ longa, 17 μ lata, 13 μ crassa. Ovarium glabrum, 1.2 mm altum. Stylus basi hirtellus 6 mm longus. Capsula glabra vel apice pilis perpaucis instructa, 6 mm longa et 1.7 mm lata, parte solida 2 mm longa. Semina carunculata.

Habitat terrae Celebicae partem austro-occidentalem.

S.W. Celebes. Ravolo, alt. 900 m, BÜNNEMEYER 12587 L, typus, fl. VI.

This species is easily recognizable by the comparatively large size of the leaves and the great length of the internodes and by the long and narrow, rather lax spikes. The shortness of the spur at the base of the lower theca and the glabrous ovary are also noteworthy features.

64. Rungia Nees.

The taxonomic position of the genus *Rungia* Nees was discussed by me at some length at an earlier occasion (in Boissiera VII, p. 200, 1943), and as since then no new facts bearing on this question have come to light, I will not revert to it. Notwithstanding the similarity in the structure of the fruit, the genus proved to be but distantly related to *Dicliptera* Juss., whereas it shows an unmistakable affinity to *Rostellularia* Reichenb.

Rungia is represented in Java by the following species: 1. *R. rungiodes* (O.Ktze) Backer (*Ecbolium* O.Ktze; syn.: *Dicliptera coerulea* Bl. var. *a* Bl.; *Rungia salaccensis* Val.; *R. silvatica* Hochr.); 2. **R. saranganensis** Brem. n. spec. (v. infra); 3. *R. blumeana* Val.; 4. **R. chamaedryoides** Brem. n. spec. (v. infra); 5. **R. smeruensis** Brem. n. spec. (v. infra); 6. *R. coerulea* (Bl.) Warb. (*Justicia* et postea *Dicliptera* Bl.); 7. *R. parviflora* (Retz.) Nees (*Justicia* Retz.) and 8. *R. pectinata* (L.) Nees (*Justicia* L.).

The two last-named species are apparently adventitious weeds. *R. parviflora* was collected long ago near Linga Djati in the Cheribon Residency by BLUME and recorded by him (Bijdr. Fl. Ned. Ind., p. 790, 1826) under the name *Justicia pectinata*. NEES saw that this was a false identification, but he himself overlooked the identity of BLUME's specimens with *R. parviflora*, and referred them together with some other specimens which VALETON afterwards removed to his *R. blumeana*, to a new species which he called *R. origanoides*: the latter, therefore, is to be considered a "nomen confusum". *R. parviflora* is indigenous in the northern provinces of India and Burma, and has since the days of BLUME never again been collected in Java, so that there is good reason to regard BLUME's specimens as adventitious. *R. parviflora* belongs to a group of species which are so nearly related that CLARKE (in HOOK.F., Fl. Brit. Ind. IV, p. 550, 1885) regarded them as conspecific, but although the differences are small, they are by no means negligible: *R. parviflora*, e.g., differs from the other species belonging to this group in the small size of the bracts. *R. pectinata* has in more recent times repeatedly been found on the lawns of the Botanical Garden, Buitenzorg, but not yet outside the precincts of the Garden. NEES referred to this species a specimen collected by JUNGHUHN, but this was a misidentification, for the latter belongs to *R. blumeana* Val. var. *hirsuta* Val.

A species not mentioned in the list given above, is *R. sarmentosa* (NEES) Val. (in Ic. Bogor. III, tab. 257, 1908), based on *Rostellularia sarmentosa* Nees (in DC., Prodr. XI, p. 370, 1847). The latter was founded by NEES on a specimen collected by ZOLLINGER (n. 596), which according to HALLIER (in Bull. Herb. Boiss. VI, p. 612, 1898) is conspecific with a specimen collected by FORBES (n. 224). VALETON l.c. suggested that both specimens might have been collected in the Buitenzorg Botanical Garden, but this supposition is wrong: FORBES 224 was, according to S. MOORE (in Journ. of Bot. LXIII, Suppl. p. 79, 1925) collected in the Bantam Residency near Kosala at an altitude of 100 m. In the Leiden Herbarium there are two sterile specimens both collected by BAKHUIZEN V. D. BRINK in the vicinity of Buitenzorg at an altitude of 300—350 m, one near Tjiomas (n. 2296) and the other at Karang Tengah (n. 6215), which the collector, probably by comparison with the specimen of FORBES on which VALETON l.c. has based his description, identified as *R. sarmentosa*. As I myself have seen neither flowers nor fruits, I am unable to express a defi-

nite opinion on the position of this species, but the capsule figured by VALETON differs considerably from the ordinary *Rungia* capsule, for the latter is very short and rounded at the base, whereas this one is rather long and provided with a distinctly cuneate, solid base, and looks in my opinion much more like a *Rostellularia* than like a *Rungia* fruit. It is true that the figure shows the "placenta" rising elastically from the back, but this may have been due to pressure exercised on the fruits during the process of drying. At any rate, more complete material will have to be awaited before the taxonomic position of this species can be settled.

The two first-named species, *R. rungiodes* (O.Ktze) Backer and *R. saranganensis* Brem., differ from the other ones and, in fact, from all their congeners by the radially symmetrical spikes, in which every bract subtends a flower: in the remaining species two of the four rows of bracts are sterile, and as the latter lay on the same side of the spike, the spikes are dorsiventral. The dorsiventrality is often accentuated by a dissimilarity in shape between the sterile bracts and the fertile ones.

Rungia saranganensis Brem. n. spec.; typus: DORGELO 113 L; maxime ut *R. rungiodes* (O.Ktze) Backer, sed caule foliisque siccitate non conspicue discoloratis, bracteis 3-nerviis dorso setulis sparsis, bracteolis margine tota ciliatis, calycis lobis ciliatis, stylo hirtello, capsula pubescente ab ea recedens.

Herba erecta, simplex vel parce ramosa, circ. 50 cm alta. Caulis internodiis bisulcatis, sulcis puberulo-pubescentibus, 3—12 cm longis. Folia in petiolum canaliculatum sulco puberulo-pubescentem, 0.5—2.0 cm longum contracta; lamina lanceolata, 3.5—16 cm longa et 1.5—5 cm lata, apicem obtusam versus attenuata, margine integra, tenuis, subtus pallida, sicc. haud conspicue discolorata, subtus setulis minimis sparsa, costa supra basin versus puberulo-pubescens, ceterum glabra, cystolithis utrimque distinguendis, nervis utroque latere costae 6—8. Spicae terminales, plerumque solitariae, interdum tamen in dyades vel triades dispositae. Pedunculus bifariam pubescens, 0.3—2.5 cm longus. Rachis 1.5—3 cm longa. Bracteae omnes fertiles, late ellipticae, 6 mm longae et 5 mm latae, apice truncatae vel retusae, haud conduplicatae, late hyalino-marginatae et ciliatae, 3-nerviae, dorso setulis minimis sparsae. Bracteolae conduplicatae, 5 mm longae et 2.5 mm latae, apice truncatae, margine tota ciliatae, 1-nerviae, dorso praesertim costa setulis sparsae. Calyx 3.5 mm altus, lobis hyalinis ciliatis. Corolla 6.5 mm longa, limbo extus hirtello, tubo 2.5 mm longo, faucibus 0.7 mm longis, labio superiore 3 mm longo, apice subintegro, labio inferiore 3.5 mm longo. Stamina filamentis 2.5 mm longis, basi ut palati basis papillosis; antherae thecis 0.7 mm longis, inferiore calcarata, superiore dorso ciliata. Granula pollinis 25 μ longa, 17 μ lata, 15 μ crassa, utroque latere pororum virgata. Discus glaber. Ovarium 1 mm altum, puberulum. Stylus 4.5 mm longus, hirtellus. Capsula 4 mm alta, fere tota puberula.

Habitat Javam Centralem.

Central Java. Madioon Res.: G. Lawu, above Sarangan, alt. 1600 m, DORGELO 113 L, typus, fl. X, id. 345 PAS, fl. X, ibidem, GEERTS–RONNER s.n. PAS, fl. XI, v. LEER s.n. PAS.

This species is known from Sarangan on Mount Lawu only, but here it is, according to the various collectors, abundant. It comes very near to *R. rungiodes* (O.Ktze) Backer (syn.: *Rungia salaccensis* Val. et *R. silvatica* Hochr.), which it resembles in the structure of the spikes, but from which it differs in the 3- instead of 5-nerved bracts and in the ciliated calyx lobes. The 2-porous pollen grains resemble those of most of the other species in the presence of a band on each side of the pores.

A nearly related species has been collected in Sumatra (KORTHALS s.n. et s.l. L).

Rungia chamaedryoides Brem. n. spec.; typus: REINWARDT s.n. in herbario lugdunensi sub nomine inedito *Justicia chamaedryoides* Bl.; granulis pollinis utroque latere pororum serie curva scutellorum ornatis ad *R. blumeanam* Val. accedens, habitu *R. coeruleae* (Bl.) Warb. similior, bracteis angustioribus et vix conspicue hyalino-marginatis ab ea tamen faciliter distinguenda.

Herba ascendens, circ. 25 cm alta, simplex. Caulis internodiis bisulcatis, sulcis pubescentibus, 1.5—6 cm longis et 1.0—1.8 mm diam. Folia in petiolum canaliculatum, sulco strigosum, 7—15 mm longum contracta; lamina lanceolata vel ovato-lanceolata, 2.5—6 cm longa et 5—20 mm lata, apicem versus attenuata, basi prope petiolum subito contracta, margine integra, subcoriacea, supra glabra, costa basin versus tamen densius strigosa, subtus subglabra, sicc. supra brunnescens, subtus pallida, cystolithis difficiliter distinguendis, nervis utroque latere costae 3—5. Spicae terminales, haud raro geminae, i.e. spica terminalis a spica axillari basi pedunculi inserta et folio 1—2 cm longo suffulta comitata. Pedunculus 4—10 mm longus, bifariam pubescens; spica ipsa compacta, rachis 2—2.5 cm longa. Bracteae steriles et fertiles simillimae, omnes lanceolatae, 7—8 mm longae et 0.7—1.5 mm latae, densius ciliolatae, vix conspicue marginatae, 3-nerviae, dorso setulis parvis sparsae. Bracteolae late oblongae, 7 mm longae et 3 mm latae, apice truncatae, mucronatae tamen, acriter conduplicatae, margine hyalina 0.8 mm lata circumdatae, 3-nerviae, virga viridi dorso setulis minimis sparsa, costa apicem versus setulis longioribus ciliata. Calyx 6 mm longus; lobus medianus 1.2 mm latus; alii 1.0 mm lati; omnes ciliati. Corolla probabiliter coerulea, 1.4 cm longa, apicem versus hirtella, tubo 4.5 mm longo, faucibus 1.5 mm longis, labio superiore 6.5 mm longo, basi 4.5 mm lato, apice recurvata brevissime bidentato, labio inferiore 8 mm longo, rugulae marginibus ad medium tubum ex intrusionibus pilosis orientibus. Stamina filamentis glabris 5 mm longis; thecae ovoideae circ. 1.0 mm longae, inferior calcare obtuso 0.3 mm longo instructa. Granula pollinis 28 μ longa, 19 μ lata, 17 μ crassa, poris annulo elliptico scutellorum cir-

cumdatis. Discus urceolaris. Ovarium glabrum 1 mm altum. Stylus 10 mm longus, glaber. Capsula nondum visa.

Habitat Javam Occidentalem.

West Java. Buitenzorg Res.: Pappien, herb. REINWARDT L, typus.

REINWARDT's specimens are the only ones I have seen: it is apparently a very rare species. In the nature of the pollen grains it resembles *R. blumeana* Val., but in habit it is more like *R. coerulea* (Bl.) Warb., from which it differs, however, not only in the structure of the pollen grains but also in the nature of the bracts, which are narrower and provided with a rather conspicuous hyaline margin.

Both in *R. chamaedryoides* and in *R. blumeana* the flat knobs on each side of the pores are not arranged in more or less straight longitudinal rows but in the form of an ellipse. It is noteworthy that the bands by which the pores in the other *Rungia* species with 2-porous pollen grains are surrounded, are also distinctly bent: in this respect the pollen grains of the *Rungia* species show some resemblance to those of the *Andrographideae*.

Rungia blumeana Val. was identified by HOCHREUTINER (in Candollea V, p. 237, 1934) with *R. latior* Nees, but the latter has narrower bracts and more rigid, erect shoots; the structure of the pollen grains is as yet unknown. HOCHREUTINER l.c. distinguishes two varieties which he calls var. *hirsuta* Hochr. and var. *malabarensis* Hochr. The first corresponds to *R. blumeana* Val. var. *hirsuta* Val., but the latter is not so easily to locate. It may be identical with *Diapedium latius* (Nees) O.Ktze var. *integerrimum* O.Ktze and with my var. *parvifolia* of *R. coerulea* (v. infra), but as neither KUNTZE's nor HOCHREUTINER's specimens were available to me, I am unable to settle this point. For the typical *R. blumeana* Val. I. propose the name **R. blumeana** Val. var. **communis** Brem. n. nom. With regard to the position of *Diapedium latius* (Nees) O.Ktze var. *sinuato-crenatum* O.Ktze I have no suggestion to offer, as I have seen no Javan *Rungia* specimens provided with this kind of leaves. KUNTZE mentions also the occurrence of a plant which he calls *Diapedium repens* (L.) O.Ktze f. *coeruleum* O.Ktze in Java, and MOORE (in Journ. of Bot. LXIII, Suppl. p. 79, 1925) similarly quotes *Rungia repens* (L.) Nees as present in Java, but these records doubtless rest on misidentifications: the presence of *R. repens* in Java is improbable, for this species belongs to a group provided with rugulose seeds, and this group is apparently not represented in the Malay Archipelago. I suppose that their specimens will prove to belong to *R. coerulea*.

Rungia smeruensis Brem. n. spec.; typus: BACKER 36373 L; habitu ad *R. chamaedryoidem* Brem. accedens, sed granulis pollinis utroque latere pororum virgatis, bracteis fertilibus et sterilibus diversis, bracteolis in apiculam contractis, calyce et corolla minoribus, stylo parce hirtello ab ea

recedens, a *R. coerulea* bracteis angustioribus, bracteolis apiculatis distinguenda.

Herba ascendens vel suberecta, circ. 30 cm alta, simplex vel parce ramosa. Caulis internodiis bisulcatis, sulcis pubescentibus, 5—10 cm longis et 1—2 mm diam. Folia in petiolum strigosum 5—10 mm longum contracta; lamina lanceolata vel elliptica, 4—7 cm longa et 2.5—3.5 cm lata, apicem obtusam versus plerumque paulum contracta, basi attenuata, tenuis, supra setulis paucis sparsa vel glabra, costa utrimque strigosa, subtus ceterum glabra, cystolithis utrimque distinguendis, nervis utroque latere costae 4—6. Spicae apice caulis et ramorum plerumque geminae, interdum spica accessoria a nodo praecedente oriente comitatae. Pedunculus puberulo-pubescens circ. 5 mm longus; rachis 2—5 cm longa. Bracteae remotiores, infimarum altera interdum spicam axillarem brevem suffulciente; bracteae steriles lineari-lanceolatae, subfalcatae, 7.5 mm longae et 1.5 mm latae, vix conspicue hyalino-marginatae, ciliolatae, extus subglabrae, 3-nerviae; bracteae fertiles paulo latiores, symmetricae, 6.2 mm longae et 1.8 mm latae, ceterum ut aliae. Bracteolae conduplicatae, ovatae, 4.4 mm longae et 2.0 mm latae, in apiculam contractae, ciliatae, late hyalino-marginatae, 3-nerviae. Calyx 3.3 mm altus, lobis hyalinis ciliatis. Corolla 7 mm longa, colore ignoto, tubo 2 mm, faucibus 0.8 mm, labio superiore late triangulari 2 mm longo, apice subintegro, labio inferiore 4 mm longo, lobo mediano 1 mm longo. Stamina filamentis glabris 1.8 mm longis; thecae 0.7 mm longae, inferior calcarata; connectivum dorso ciliatum. Granula pollinis 24 μ longa, 14 μ lata, 13 μ crassa, utroque latere pororum virgata. Ovarium apicem versus puberulum 1.5 mm altum. Stylus parce hirtellus 3.5 mm longus. Capsula apicem versus vix conspicue puberula 5 mm alta. Semina minute carunculata.

Habitat Javam Orientalem.

East Java. Malang Res.: southern slope of G. Smeru near Ranu Darungan, alt. 1000 m, BACKER 36373 L, typus, fl. VI; G. Tengger, alt. 1300 m, v. STEENIS s.n. L (with much narrover leaves than the type), fl. VI; G. Tengger, Ngadiwono, alt. 1850 m, ARENS s.n. L (bracts with small bristles on the back and with a somewhat more conspicuous hyaline margin), fl. VI.

The material of this species is rather variable and might comprise distinct varieties.

Of *R. coerulea* (Bl.) Warb. I have found two varieties. The typical form I will distinguish as **R. coerulea** (Bl.) Warb. var. **blumeana** Brem. n. nom. The other one, for which I propose the name **R. coerulea** (Bl.) Warb. var. **parvifolia** Brem. n. var., is a much smaller plant. Its height does not exceed 20 cm, whereas the typical form reaches a height of about 50 cm, and its leaves are much smaller than those of the latter.

Rungia coerulea (Bl.) Warb. var. **parvifolia** Brem. n. var.; typus var.: BLUME s.l. in herbario lundunensi.

Statura minore (vix 20 cm alta), foliis ovatis raro usque ad 3 cm longis a typo recedens.

Habitat Javam Occidentalem.

West Java. Buitenzorg Res.: Tjiapoos, alt 500 m, BAKHUIZEN V. D. BRINK 462 U; Tjidadap near Tjibeber, alt. 1000 m, id. 2569 L; s.l. BLUME s.n. L, typus var.

As stated above, this variety may be identical with *R. latior* Nees var. *malabarensis* Hochr. and with *Diapedium latius* (Nees) O.Ktze var. *integerrimum* O. Ktze, but in the absence of the type specimens this question can not be settled.