NOTES ON THE ACANTHACEAE OF SURINAM

by

C. E. B. BREMEKAMP (Utrecht).

(With Tab. XIII—XVI)

I. The Subfamilies and Tribes of the Acanthaceae.

LINDAU in his monograph of the family in the first edition of ENGLER & PRANTL distinguished four subfamilies: *Nelsonioideae, Mendoncioideae, Thunbergioideae* and *Acanthoideae*. The first three subfamilies afterwards were united by VAN TIEGHEM and separated from the *Acanthaceae* under the name *Thunbergiaceae*. WETTSTEIN agreed with VAN TIEGHEM in so far that he too accepted a nearer affinity between the first three subfamilies, but instead of regarding the whole as a family distinct from the true *Acanthaceae* he considered them as a subfamily *Thunbergioideae*, reducing the three subfamilies of LINDAU to tribes. In this way, however, he had, apparently unwittingly, returned to the standpoint taken in by NEES, whose *Anechmatacantheae* and *Echmatacantheae* correspond exactly with WETTSTEIN's *Thunbergioideae* and *Acanthoideae*.

The difference between the various systems lies therefore in the rank assigned to the groups for which LINDAU used the names *Nelsonioideae, Mendoncioideae* and *Thunbergioideae*. They agree with each other in considering these groups as fundamentally distinct from what we might call the typical *Acanthaceae* or, in LINDAU's nomenclature, the *Acanthoideae*.

That LINDAU's *Mendoncioideae* and *Thunbergioideae* differ widely from the *Acanthoideae* can hardly be doubted: their habit as well as the peculiar character of their fruits prove that they are but distantly related to the latter. The position assigned to the *Nelsonioideae*, however, is by no means so well founded.

As the two subfamilies created by NEES differed in one character only, namely in the presence or absence of retinacula, it is clear that the *Nelsonioideae* had to side with *Mendoncia* and *Thunbergia* and their allies. On this character, however,

too much emphasis has been laid: in the *Acanthoideae* themselves the retinacula are by no means always well developed; in LINDAU's *Aphelandreae* and *Acantheae* they are, for instance, often very short and in the genus *Trichacanthus* Zoll. they have even been described as rudimentary. The capsule of the *Nelsonioideae*, on the other hand, shows a much greater resemblance to that of the *Acanthoideae* than to the drupe of the *Mendoncioideae* or to the beaked capsule of the *Thunbergioideae*. It is true that the *Nelsonioideae* resemble these plants in the absence of cystoliths, but the latter are also wanting in the *Aphelandreae* and *Acantheae*. In the structure of their pollen grains they do not show the slightest resemblance either to the *Thunbergioideae* or to the *Mendoncioideae*, but in this respect too they resemble the *Aphelandreae* and the *Acantheae*. That the seeds of *Nelsonia* are covered with a kind of forked hairs very similar to those found on the seeds of *Aphelandra* is perhaps also noteworthy. After carefully weighing the pros and cons I think that the *Nelsonioideae* may safely be included in the *Acanthoideae*, where they will find a place in the neighbourhood of the *Aphelandreae* and *Acantheae*.

The *Mendoncioideae* and the *Thunbergioideae* show, as a rule, the same habit: almost all of them are winding plants. This is doubtless an important feature, as among the *Acanthoideae* there are no winding plants at all. The flowers are in both groups arranged in the same way: we find them, as a rule, in pairs or threes superposed in the axil of the leaves or, less often, of bracts. This character, though rather striking, is, however, of less importance, as superposed flowers occur also in some of the *Acanthoideae:* I have noticed them, for instance, in *Blechum Brownii* Juss. and in *Justicia cayennensis* (N. ab E.) Lindau. The peculiar development of the bracteoles too finds its counterpart in some *Acanthoideae*, for instance in *Phaulopsis* and *Petalidium* and in a very striking way in *Chlamydacanthus*. Of more importance is the rudimentary character of the calyx. The absence of cystoliths, on the other hand, signifies very little, as the latter, as we have seen already, are also wanting in the *Nelsonieae*, the *Aphelandreae* and the *Acantheae*.

Differences between the *Mendoncioideae* and the *Thunbergioideae* are found in the shape and nervation of the leaves, which in *Mendoncia* are entire and penninerved and in *Thunbergia*, usually, lobed and palmately veined; in the indumentum, consisting in *Mendoncia* of hairs anchored in the epidermis with a kind of stolons, and in *Thunbergia*, where, however, it is not

always present, of hairs of a more common kind; in the characters of the pollen grains, which in *Mendoncia* are provided with germ pores, but otherwise without any design, whereas in those of *Thunbergia* the germ pores are always wanting and a relief formed by, not rarely, twisted grooves is, usually, present [1]); and lastly in the fruit: in *Mendoncia* an ovoid drupe and in *Thunbergia* a globose capsule ending in a long beak. In view of such important differences we will have to admit that a near relationship between these groups can not exist.

Among the other *Tubiflorae* the *Mendoncioideae, Thunbergioideae* and *Acanthoideae* form a natural and rather isolated group, and they are, therefore, best treated as a single family differing from the other families in the following points: The shoots are, as a rule, jointed; the leaves opposite and at the base connected by a transverse edge; bracteoles are almost always well developed; the flower, or at least its androecium, is zygomorphic; the ovary is bilocular, and the ovules in each cell collateral or biserial; the style is implanted on the more or less pointed top of the ovary. VAN TIEGHEM's family *Thunbergiaceae,* therefore, can not be recognized, and the family *Acanthaceae* is to be divided in three subfamilies: *Mendoncioideae, Thunbergioideae* and *Acanthoideae.*

The two first-named subfamilies consist each of a small number of nearly related genera, and need no further division. The *Acanthoideae,* however, are a large group, and show considerable diversity. A sound base for the subdivision of this group had been laid already by NEES, who knew the family better than most of his successors. Unfortunately, the definitions of his various tribes are rather vague, and it is, therefore, perhaps no wonder that his work found but little credit. By the investigation, with the aid of the microscope, of the pollen grains, a method introduced by RADLKOFER and perfected by LINDAU, afterwards characters came to light which allowed a sharper definition. It appeared, however, at the same time that most of NEES' groups had been rightly conceived.

LINDAU divides the *Acanthoideae* first of all in *Contortae* and *Imbricatae.* This division, however, has but little to recommend itself, and is better dropped: among the *Contortae* the relation-

[1]) The pollen grains of *Meyenia,* a genus nearly allied to *Thunbergia,* should, according to LINDAU (Engler's Jahrbücher XVIII, pp. 39 and 40, fig. 2 H), show an entirely different character. The grain figured by LINDAU looks, however, so exactly like those found in the family *Pedaliaceae,* that a reinvestigation of this plant appears desirable.

ship between his *Trichanthereae* and his *Louteridieae* with the other tribes is very uncertain, and that there should be any relationship at all between his *Acantheae* and *Aphelandreae* and the bulk of the tribes brought together in the *Imbricatae* is hard to believe; the position of the *Isoglosseae* in this group is also dubious. The tribes themselves, on the other hand, are on the whole natural groups.

Of the nine tribes distinguished by NEES the *Eranthemeae* were sunk by LINDAU in the *Ruellieae:* they are both provided with pollen showing an alveolate surface. As their other characters too differ but little, this is doubtless an improvement. In addition, however, to the tribes distinguished by NEES several new ones were created by him: *Trichanthereae, Louteridieae, Petalidieae, Strobilantheae, Haselhoffieae, Rhombochlamydeae, Asystasieae, Graptophylleae, Pseuderanthemeae, Odontonemeae* (in which, however, NEES' *Diclipteреae* are incorporated as a subtribe) and *Isoglosseae.* His *Justicieae* correspond more or less with NEES' *Gendarusseae,* in which *Justicia,* as understood by NEES, is not included.

His first two tribes, the *Trichanthereae* and the *Louteridieae,* are both easily recognizable by the nature of their pollen grains: as they differ moreover in several other respects from each other and from the rest of the *Acanthoideae,* their position must be regarded as firmly established. It is, however, rather remarkable that pollen grains looking uncommonly like those of *Louteridium* have been described in two species of the genus *Stenandrium,* which belongs to an entirely different tribe, but these plants indubitably deserve further study [1]).

The four following tribes, *Hygrophileae, Petalidieae, Strobilantheae* and *Haselhoffieae,* are very near to each other, and are better united. The position of the genus *Blechum* in this group, however, is anomalous. This genus is, in my opinion, related to a number of genera which so far have found a place in the *Barlerieae,* because they show a superficial resemblance to *Barleria;* the most important of these genera are *Lepidagathis* and *Teliostachya.* Their pollen grains resemble those of *Blechum* in the presence of three grooves extending from pole to pole and containing in their middle the germ pores. The rest of the *Barlerieae* is doubtless very nearly related with the *Ruellieae,*

[1]) LINDAU mentions in "Engler & Prantl" the presence of similar pollen grains in the genus *Asystasiella.* His figure of these pollen grains in Engler's Jahrbücher XVIII, (Pl. II, fig. 54) shows that this must be a slip of the pen: they possess but three germ pores.

and should be united with them. All the tribes enumerated in this paragraph are, however, very near to each other, and I unite them therefore in one tribe, the *Ruellieae,* which I divide in three subtribes: *Blechinae, Hygrophilinae* and *Ruelliinae.* The *Ruellieae* are characterized by the presence of mucous hairs on the seeds and by the aestivation of the corolla; the three subtribes can be distinguished by the aid of their pollen, but also by other characters, which, however, deserve further study.

The next two tribes, the *Acantheae* and the *Aphelandreae* differ in minor points only. I use the name *Acantheae* for a more comprehensive group consisting of two subtribes, the *Nelsoniinae* and the *Acanthinae,* of which the first corresponds with LINDAU's subfamily *Nelsonioideae* and the second with his *Acantheae* and *Aphelandreae* combined. The *Acantheae* in this delimitation are characterized by the absence of articulations in the shoots and of cystoliths and by the absence of germ pores in the pollen grains. The most important difference between its two subtribes, the *Nelsoniinae* and the *Acanthinae* lies in the structure of the anthers, which in the first are two-lobed and in the second one-lobed; the rudimentary retinacula are, as we have seen already, a character of less importance.

The *Andrographideae, Rhombochlamydeae, Asystasieae, Graptophylleae, Pseuderanthemeae* and *Odontonemeae* form a natural group, for which I will use the name *Odontonemeae.* LINDAU's tribes may be kept up provisionally, together with his *Diclipterinae,* as subtribes. The group is well characterized by its pollen: there are always three germ pores situated in grooves, and the fields between these grooves are by another set of grooves more or less completely divided in a central and a marginal part.

The *Isoglosseae* comprise two subtribes between which I can not find the slightest relation; both are moreover heterogeneous mixtures. The genera with lenticular pollen grains, however, form a natural group. The shape of the pollen grains and the number of germ pores suggest affinity with the *Trichanthereae,* but this point deserves further study. With the *Odontonemeae* and the *Justicieae* they have at any rate very little in common.

The *Justicieae* are doubtless a natural group, though nearly related to the *Odontonemeae.* The main difference lies in the pollen grains, which in the *Justicieae* are always elliptical and provided with two germ pores; grooves are but rarely present.

The sixteen tribes distinguished by LINDAU are here, therefore,

reduced to seven, which I arrange in the following way:

I. *Acantheae.*
II. *Trichanthereae.*
III. *Isoglosseae.*
IV. *Louteridieae.*
V. *Ruellieae.*
VI. *Odontonemeae.*
VII. *Justicieae.*

As the position of several genera remains uncertain, it is not impossible that further study will necessitate the creation of new tribes.

In order to show how the pollen characters may be used for the identification not only of the tribes, but very often of the genera and species as well, I have made the following key, by the aid of which the majority of the Surinam species can be found. The pollen grains themselves are figured on Tables XIII—XVI. The drawings have been made with the aid of the camera lucida from material embedded in euparal. In order to obtain the pollen grains the anthers had to be boiled, but the grains have not been treated with chemical agents causing a strong and unequal swelling of the membrane.

Key to the Surinam Genera and Species, based on the Pollen Characters.

1a. Germ pores 5 or, rarely, 6. Grains globose and without any relief ..... A. **Mendoncioideae. 1. Mendoncia** 20
b. Germ pores absent or 2—4. Grains sometimes globose, but then either without germ pores or with some kind of relief, or not globose 2
2a. Grains globose and without germ pores. Exine either very thin and without relief, or thicker and provided with 1—4 grooves; the latter usually twisted; when circular, then always parallel to each other; when semi-circular, then never all of them meridional ..... B. **Thunbergioideae. 2. Thunbergia** 21
b. Grains globose or not globose; in the first case either provided with germ pores or with 3 meridional grooves .. C. **Acanthoideae** 3
3a. Germ pores absent. Grains provided with 3, rather wide, meridional grooves ..... I. **Acantheae** 4
b. Germ pores present. Grains usually with a different relief: when the latter consists of three meridional grooves only, then the grooves very narrow 5

4a. Grains either globose or ellipsoidal, but the largest diameter never more than 25 microns .....
I. a. **Nelsoniinae. 3. Staurogyne** 24

b. Grains always ellipsoidal; the largest diameter in the Surinam species from 50—100 microns .....
I. b. **Acanthinae. 4. Aphelandra** 25

5a. Grains compressed-globose; the flattened sides with a system of equidistant grooves and, in the centre, a two-lipped germ pore; the two groove systems crossing each other perpendicularly .....
II. **Trichanthereae. 5. Trichanthera** 27

b. Grains never compressed-globose. Grooves present or absent, but never in perpendicularly crossing systems. Germ pores never two-lipped 6

6a. Germ pores 3 or 4. Grains either alveolate or provided with a set of meridional grooves ..... V. **Ruellieae** 7

b. Germ pores 2 or 3; when 3, then the pores in meridional grooves and the fields between the latter divided by a groove parallel to the margin in a central and a marginal part 13

7a. Grains with 3 meridional grooves and either globose or ellipsoidal ..... V. a. **Blechinae** 8

b. Grains either with a greater number of meridional grooves or alveolate; always globose 9

8a. Grains globose; the grooves very narrow and often difficult to see; the whole surface evenly punctate .....
6. Blechum 28

b. Grains ellipsoidal; the grooves wider and very conspicuous, on each side with a row of rather flat lenticular protuberances ..... **7. Teliostachya** 29

9a. Grains with a large number of meridional grooves. Germ pores 4 ..... V. b. **Hygrophilinae. 8. Hygrophila** 30

b. Grains alveolate. Germ pores 3 ..... V. c. **Ruelliinae** 10

10a. Walls of the alveoles straight and everywhere of the same height and thickness ..... **9. Eranthemum** 31

b. Walls of the alveoles not everywhere of the same thickness: near the corners usually thinner; very often wavy and varying in height 11

11a. Alveoles small and numerous, i.e. 7—8 in a semi-circle; the majority very regular in outline ..... **10. Ruellia** 32

b. Alveoles larger and less numerous, i.e. 5—6 in a semi-circle; partly or all irregular in outline 12

12a. Alveoles easily recognizable ..... 11. **Dipteracanthus** and 12. **Arrhostoxylum** 33
b. Alveoles partly concealed by flaps of the wavy and irregularly fringed walls ..... 13. **Polylychnis** 34
13a. Germ pores 3 ..... VI. **Odontonemeae** 14
b. Germ pores 2 ..... VII. **Justicieae.** 21. **Justicia** and 22. **Beloperone** 42
14a. Grains globose or subglobose .. VI. d. **Odontoneminae** 18
b. Grains either ellipsoidal or, by a thickening of the central part of the fields between the meridional grooves, trigonal 15
15a. Grains trigonal; the elliptic groove in the vicinity of the germ pore with a very conspicuous semi-circular deviation VI. a. **Asystasiinae.** 14. **Asystasia** 35
b. Grains ellipsoidal or in the vicinity of the germ pores flattened, but without thickened corners; the elliptic groove in the vicinity of the germ pore not conspicuously deflected 16
16a. Grains about 60 microns long ..... VI. b. **Graptophyllinae.** 15. **Pachystachys** 36
b. Grains not more than 50 microns long ..... VI. c. **Diclipterinae** 17
17a. The marginal part of the fields between the meridional grooves in the Surinam species with a row of rather flat, more or less rectangular protuberances; the central part punctate ..... 16. **Dicliptera** 37
b. The fields evenly punctate ..... 17. **Dactylostegium** 38
18a. The central part of the fields between the meridional grooves much more than twice as wide as the marginal part; the grooves difficult to see .. 18. **Herpetacanthus** 39
b. The central part of the fields between the meridional grooves about twice as wide as the marginal part; grooves deep and very conspicuous 19
19a. Grains globose. Meridional grooves undivided ..... 19. **Odontonema** 40
b. Grains subglobose. Meridional grooves in the vicinity of the germ pores divided by a rib extending from the latter in the direction of the poles ..... 20. **Drejera** 41

A. **Mendoncioideae.** 1. **Mendoncia.**

20. There is no difference in the pollen of the three Surinam species.

B. **Thunbergioideae. 2. Thunbergia.**

21a. Exine very thin and without grooves ..... **Th. erecta.**
b. Exine thicker and provided with 1—4 grooves 22
22a. Grains with large conical protuberances .... **Th. fragrans.**
b. Grains without conical protuberances 23
23a. Grains 40 microns in diameter ..... **Th. alata.**
b. Grains 65 microns in diameter ..... **Th. grandiflora.**

C. **Acanthoideae.**

I. **Acantheae. a. Nelsoniinae.**

3. Staurogyne.

24a. Grains globose .. **S. linearifolia; S. Versteegii; S. Stahelii.**
b. Grains ellipsoidal .....
S. Wullschlaegeliana; S. Fockeana; S. Miqueliana.

I. **Acantheae. b. Acanthinae.**

4. Aphelandra.

25a. Grains punctate, 75—100 × 45—50 microns. **A. paraensis.**
b. Grains smooth, less than 60 × 35 microns 26
26a. Grains 50—55 × 25—27 microns ..... **A. tetragona.**
b. Grains 47—50 × 30—33 microns ..... **A. pectinata.**

II. **Trichanthereae. 5. Trichanthera.**

27. One species only ..... **Tr. gigantea.**

V. **Ruellieae. a. Blechinae.**

6. Blechum.

28. But one species in Surinam ..... **B. Brownii.**

7. Teliostachya.

29. The differences between the pollen grains of the six Surinam species are too small to be any use.

V. **Ruellieae. b. Hygrophilinae.**

8. Hygrophila.

30a. The space between two germ pores divided by four grooves. Surface between the grooves smooth ... **H. surinamensis.**
b. The space between two germ pores divided by three grooves. Surface between the grooves granulate .....
H. guyanensis.

V. **Ruellieae. c. Ruelliinae.**

9. Eranthemum.

31. But one species in Surinam ..... **E. nervosum.**

10. **Ruellia.**

32. But one species in Surinam ..... **R. tuberosa.**

11. **Dipteracanthus** and 12. **Arhostoxylum.**

33. The pollen grains of the two Surinam species of *Dipteracanthus* differ somewhat in size (in *D. surinamensis* they are 50 and in *D. angustifolius* they are 60 microns in diameter) but otherwise the difference between the pollen grains of these species and those of the Surinam species of *Arrhostoxylum,* of which several varieties are found, are very similar; see, however, the figures.

13. **Polylychnis.**

34. But one species ..... **P. fulgens.**

VI. **Odontonemeae.** a. **Asystasiinae.**
14. **Asystasia.**

35a. The central thickenings of the fields between the germ pores conspicuously protruding ..... **A. gangetica.**
b. The central thickenings of the fields between the germ pores not protruding ..... **A. nemorum.**

VI. **Odontonemeae.** b. **Graptophyllinae.**
15. **Pachystachys.**

36. But one species in Surinam ..... **P. coccinea.**

VI. **Odontonemeae.** c. **Diclipterinae.**
16. **Dicliptera.**

37. But one species in Surinam ..... **Di. ciliata.**

17. **Dactylostegium.**

38. But one species in Surinam ..... **Da. assurgens.**

VI. **Odontonemeae.** d. **Odontoneminae.**
18. **Herpetacanthus.**

39. But one species in Surinam ..... **H. rotundifolius.**

19. **Odontonema.**

40. But one species in Surinam ..... **O. surinamense.**

20. **Drejera.**

41. But one species ..... **Dr. boliviensis.**

VII. **Justicieae.**
21. **Justicia** and 22. **Beloperone.**

42a. Grains in the lower anther lobe all sterile .. **B. modesta.**

b. Grains in both anther lobes, at least partly, fertile 43
43a. Grains covered with conical protuberances ..... **J. acuminatissima.**
b. Grains not covered with conical protuberances 44
44a. Grains without grooves and without rows of lenticular protuberances 45
b. Grains with two, not always easily distinguishable grooves, in which the germ pores are found, and with a row of lenticular protuberances on each side of the groove .. 47
45a. Sterile grains far more numerous than the fertile ones, and rectangular ..... **J. pectoralis.**
b. Sterile grains neither very numerous nor rectangular .. 46
46a. Grains less than 30 microns long ..... **J. Martiana.**
b. Grains about 50 microns long ..... **J. carthaginensis.**
47a. Grooves straight; the protuberances on each side in opposite pairs ..... **J. cayennensis.**
b. Grooves serpentine; the protuberances on each side alternate ..... **J. obtusifolia.**

II. Remarks on the Surinam Species.

Of the genus *Mendoncia* three species had been recorded from Surinam, but two of these: *M. Velloziana* Mart. apud de Vriese e.a. and *M. aspera* Ruiz et Pav. proved identical, the name *M. Velloziana* being a misidentification. The second species, which I recognized as *M. Perrottetiana* N. ab E., had been described by DE VRIESE as a new one under the name *M. Splitgerberiana,* whereas MIQUEL had identified the material partly as *M. Sellowiana* N. ab E. and partly as *M. Sellowiana* N. ab E. var. *Perrottetiana* (N. ab E.) Miq. In my opinion, however the specimens studied by MIQUEL are all identical. TURRILL in his revision of the genus unites *M. Sellowiana* with *M. puberula* N. ab E., and brings the Guiana plants partly to this species and partly to *M. hirsuta* N. ab E., but the latter is a very dubious species and from *M. puberula* they differ in various respects: the leaves are acute or subacute at the base, not rounded, they possess, as a rule, but 4 pairs of nerves in stead of 5—6 pairs, and the bracteoles measure 2.2 cm × 1.4 cm instead of 1.5—2 cm × 1—1.3 cm. They agree, however, exactly with the type of *M. Perrottetiana* N. ab E. in the herbarium Delessert. Though nearly related to *M. puberula* *M. Perrottetiana* can doubtless not be regarded as a mere variety of the latter,

A third species, *M. Hoffmannseggiana* N. ab E., was found among the unnamed material.

The three Surinam species are easily distinguishable. An excellent diagnostic is found in the shape of the hairs covering the leaves: even completely sterile material may be identified in this way. As these hairs appear to differ from all other kinds of hairs hitherto described, I have drawn them in some detail (Fig. 1). The free part of the hair shows no features worth

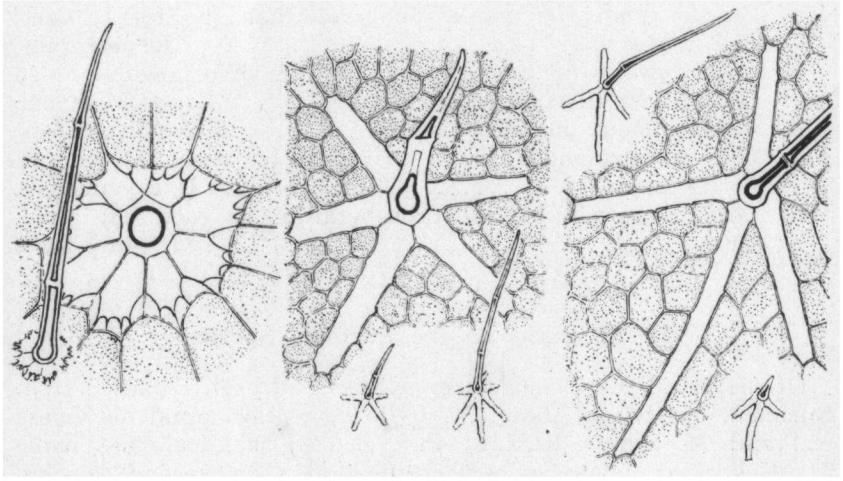


Fig. 1. Hairs of *Mendoncia*. Left *M. Perrottetiana* N. ab E., middle *M. Hoffmannseggiana* N. ab E., right *M. aspera* Ruiz et Pav.

mentioning, but the way it is anchored in the epidermis is very remarkable: from its base a number of cells much larger and higher than the ordinary epidermis cells radiate in various directions. In dried material these cells rise conspicuously above the general level, but this is perhaps due to the circumstance that they do not shrink so much as the other cells: they are, at any rate, of an entirely different type as the stellate hairs, with which up to now they have been confused. The difference between the hairs of *M. Perrottetiana* and those of the two other species is very striking: in *M. Perrottetiana* the radiating cells are short and united in the form of a fringed cushion, whereas in the two other species they are much longer; in *M. Hoffmannseggiana* they form a 5- or 6-pointed star, whereas in *M. aspera*, where they are, as a rule, but 4 in number, they

look more like a bird's foot.

In the putamen of *M. Perrottetiana* I found two cavities, the upper one containing the seed and the lower one empty. The presence of this lower cell seems to have escaped the attention. Its morphological meaning is unknown to me. In *M. aspera* and its allies there is, apparently, but one cell.

The pollen grains of *Mendoncia* are globose and show no relief. They are provided with a number of pores (in the species investigated by me 5 or 6) arranged in what we may consider as the equator. The pores are, as a rule, very small, more or less slitlike, and often difficult to see. They can be found, however, by following the contour of the intine: the latter is here much thicker than the exine, but becomes under the pores suddenly so thin as to be almost invisible.

The old-world genus *Thunbergia* is represented in Surinam by four species. *T. alata* Boj. ex Sims and *T. fragrans* Roxb. escaped already long ago from cultivation and are now firmly established in the colony; *T. erecta* (Bth.) T. Anders. is known as a garden plant only, and *T. grandiflora* (Roxb. ex Rottl.) Roxb., with its vegetative propagation by means of subterranean runners, maintains itself in the neighbourhood of settlements.

The genus is a large one and contains groups of species which might well be raised to generic rank. It is quite remarkable that the herbaceous species from Asia and Africa, though at first view, very similar, show important morphological differences: the anthers, for instance, of some of the African species are like those of the plants formerly united in the genus *Hexacentris* provided with spurs (6 in all), whereas those of the Asiatic species are without any spurs. In view of this it is noteworthy that the pollen grains of *T. alata* and *T. reticulata* Hochst., both species with calcarate anthers, resemble those of *T. grandiflora,* which must be regarded as a representative of the subgenus *Hexacentris,* whereas the pollen grains of *T. fragrans* with their armament of conical protuberances show an entirely different aspect. It appears, however, that the pollen characters in this genus have not been studied in sufficient detail: even the general definition given bij LINDAU is incorrect. According to this author the pollen grains are characterized by the presence of spiral grooves. In reality, however, there is much diversity. In *T. erecta* I find no grooves at all, but this is perhaps due to the extreme thinness of the exine. When, however, grooves are present, they are not always spirally twisted, and even in a single species a

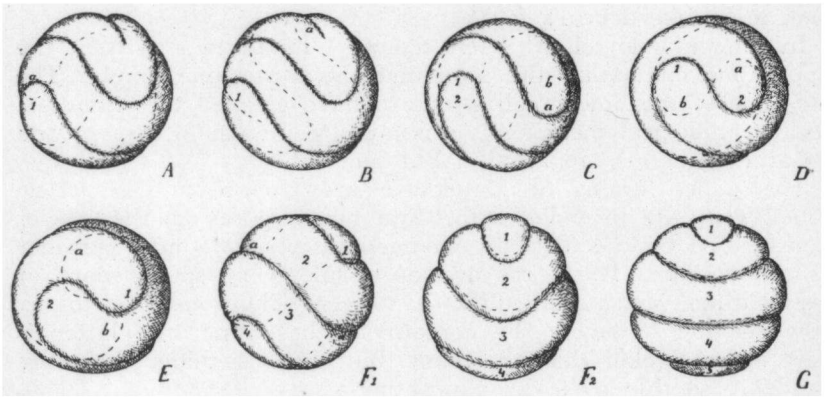


Fig. 2. Various forms of pollen grains found in a single flower of *Thunbergia grandiflora* (Roxb. ex Rottl.) Roxb. Of A, B, C, D and E antidromous forms occur. F 1 and F 2 are two views of the same grain. The bands are numbered: in A to F the number is put at one end of the band, and a corresponding letter at the other end.

large range of variability may be found. Fig. 2 shows a number of pollen grains obtained from a single flower of *T. grandiflora*. It will be seen that the number of grooves varies and that the grooves themselves are by no means always spiral ones.

T. grandiflora, which I refer to the subgenus *Hexacentris*, was put by LINDAU in *Euthunbergia*, but this is doubtless a mistake: the description of this species given by C. B. CLARKE in the Flora of British India does not leave the slightest doubt on this point. The specimens which LINDAU had seen, were apparently weak ones, in which the flowers, instead of being racemose, were axillary. When he obtained a specimen with the flowers arranged in the normal way, he did not recognize it, but described it under the name *T. borbonica* as a new species of the subgenus *Hexacentris*.

The genus *Staurogyne* is represented in the flora of Surinam by six species. It are all small, unassuming herbs, not yet known outside our area. One species had been identified by MIQUEL with the Brazilian *S. repens* (N. ab E.) Kuntze, but though doubtless related to the latter, it is nevertheless a distinct species. The plant described by MIQUEL as *Ebermaiera humilis*, was rechristened by Kuntze, because the specific epithet had been used already for another species: it is now known as *S. Miqueliana* Kuntze. Another species, which I will describe

hereafter as *S. Stahelii,* comes very near to a plant recently described by LEONARD as *S. agrestis.*

The pollen grains are in three of the six species globose, and in the three other ones ellipsoidal, a form as yet unknown in this genus. In the two groups the differences are too small to be of any use.

Staurogyne linearifolia Brem. n. spec.; typus: Versteeg n. 739 in herb. Ultraj.; a speciebus aliis surinamensibus foliis linearibus, floribus majoribus, labio corollae inferiore quam labio superiore circiter quinties longiore faciliter distinguenda.

HERBA repens. CAULES dense villosi; caules floriferi adscendentes, 5—7 cm alti. FOLIA sessilia, linearia, 2—5.5 cm longa et 2—6 mm lata; inferiora glabrescentia costa utrimque et nervis subtus tamen pubescentia; superiora densius pubescentia; omnia apice basique acuta, nervis utroque latere costae circ. 7. INFLORESCENTIA capituliformis floribus inferioribus oppositis et foliis magnitudine reductis, dense pubescentibus suffultis, floribus superioribus alternantibus et bracteis lanceolatis trinerviis 7 mm longis et 2.3 mm latis suffultis. BRACTEOLAE lineares 5 mm longae et 1.3 mm latae, uninerviae, costa et margine villosae. CALYX lobis 4.5 mm longis, postico indistincte trinervio 1.1 mm lato, aliis 0.3 mm latis. COROLLA tota 8.5 mm longa, puberula, labio superiore 0.4 mm longo, labio inferiore 2.2 mm. STAMINA inferiora 2 mm supra basin tubi inserta; superiora 3 mm supra basin; filamenta 2.2 mm longa; pollinis granula globosa, inter fissuras applanata tamen, 17 μ diam. OVARIUM glabrum 1.3 mm altum. Stylus glaber 3.5 mm longus, apice inaequaliter bifidus. CAPSULA glabra 4.2 mm longa et 1.5 mm lata; semina circ. 60, areolata.

Hab. Guianam Batavorum.

Tapanahoni River (Versteeg n. 739, fl. Aug., type); Upper Sipaliwini River, Lat. 2° N, Long. 56° W (Rombouts n. 196, fl. Oct.); Lucie River (Hulk n. 335, fl. Oct.).

Staurogyne Versteegii Brem. n. spec.; typus: Versteeg n. 109 in herb. Ultraj.; inflorescentia capituliformi speciei precedenti similis, foliis latioribus et in parte basali caulis petiolatis, floribus minoribus, corollae labio inferiore quam labio superiore circiter bis longiore ab ea valde recedens.

HERBA subrepens. CAULES floriferi erecti an suberecti 4—10 cm alti, post florationem decumbentes et ad nodos radicantes, deinde ex axillis caules floriferos novos emittentes; semper dense

villosi. FOLIA inferiora petiolo usque ad 10 mm longo instructa; superiora subsessilia; lamina oblonga, ovata an rhomboidea, foliorum inferiorum usque ad 32 mm longa et 14 mm lata, foliorum superiorum circ. 15 mm longa et 7 mm lata, omnium apice basique acuta, margine irregulariter et haud conspicue dentata, supra pilis longis adpressis sparse pubescens, costa tamen densius pilosa, subtus costa nervisque dense pubescens, ceterum subglabra, nervis utroque latere costae 6—7 subtus prominentibus, margine anguste revoluta. INFLORESCENTIA capituliformis floribus plerumque 5 quorum 4 decussati composita; flores infimi foliis subsessilibus, magnitudine multo reductis suffulti, alii bracteis lineari-lanceolatis 7 mm longis et 1.5 mm latis uninerviis, indistincte dentatis, margine costaque villosis. BRACTEOLAE anguste lineares 5 mm longae et 0.8 mm latae uninerviae, indistincte dentatae, ad marginem villosae. CALYX lobis 4—5 mm longis, ad marginem villosis, postico trinervio 0.5 mm lato, aliis 0.3 mm latis. COROLLA tota 6.2 mm longa; pars basalis cylindrica 2 mm alta et 0.8 mm diam., pars superior tubi ad faucem 1.7 mm diam.; limbus puberulus, usque ad basin in lobos 5 divisus; lobi labii superioris 0.7 mm, labii inferioris 1.5 mm longi. STAMINA inferiora ad apicem tubi partis cylindricae inserta; superiora 0.8 mm supra inferiora; filamenta omnia 1.4 mm; pollinis granula globosa, inter fissuras applanata, 17 μ diam. OVARIUM glabrum 0.8 mm altum. Stylus glaber 2.5 mm longus, apice inaequaliter bifidus. CAPSULA apicem versus puberula, distincte nervosa, 3.8 mm longa et 1.4 mm diam., apiculata; semina areolata.

Hab. Guianam Batavorum.

Gonini River (Versteeg n. 109, fl. Aug., type).

Staurogyne Stahelii Brem. n. spec.; typus: Stahel n. 272 in herb. Ultraj.; speciei precedenti affinis, sed foliis omnibus petiolatis, margine integris, inflorescentia spicata, calycis lobis glandulosis ab ea faciliter distinguenda, a *S. agresti* Leonard foliis minoribus, floribus sessilibus, calycis lobis angustioribus, corolla majore distinguenda.

HERBA repens. CAULES floriferi erecti an suberecti 6—7 cm alti, paucifolii, dense villosi. FOLIA petiolo 2.5—4 mm longo munita; lamina oblonga, 9—16 mm longa et 4.5—7 mm lata, apice subobtusa, basi acuta, supra pilis longis adpressis sparse pubescens, subtus costa nervisque dense pubescens, ceterum subglabra, nervis utroque latere costae 7 subtus prominentibus, margine haud distincte revoluta. INFLORESCENTIA spicata cylin-

drica; flores omnes alternantes et bracteis oblanceolatis, quam bracteolis longioribus, indistincte trinerviis, utraque facie pilis longis vestitis suffulti. BRACTEOLAE anguste lineares 6 mm longae et 0.9 mm latae, uninerviae. CALYX lobis dense villosis et glandulosis 5 mm longis, lobo postico trinervio 0.7 mm lato, aliis 0.3 mm latis. COROLLA tota 7.2 mm longa; tubi pars basalis cylindrica 2 mm alta et 0.9 mm diam., pars superior ad faucem 1.5 mm diam.; limbus puberulus usque ad basin in lobos 5 divisus; lobi labii superioris 0.6 mm, labii inferioris 1.4 mm longi. STAMINA inferiora ad apicem partis tubi cylindricae inserta; superiora 0.8 mm supra inferiora; filamenta omnia 2 mm; pollinis granula globosa, inter fissuras paulo applanata, 20 μ diam. OVARIUM glabrum 1.4 mm altum. Stylus glaber 2.6 mm longus, apice subaequaliter bifidus. CAPSULA glabra 4 mm longa et 1.3 mm diam., apiculata; semina circ. 50, areolata.

Hab. Guianam Batavorum.

Upper Gran Rio, de-Haan Fall (Stahel n. 272, type).

Staurogyne Fockeana Brem. n. spec.; *Ebermaiera repens* N. ab E. apud Miquel, Stirp. Sur. p. 129 (1851) et *Staurogyne repens* (N. ab E.) Kuntze apud Pulle, Enum. Pl. Sur. p. 431 (1906); typus: Focke 1146 in herb. Ultraj.; *S. repenti* similior, indumento haud hirsuto, foliis longioribus, inflorescentia compacta, corolla majore ab ea distincta, a speciebus tribus precedentibus bracteolis longioribus et angustioribus et forma ellipsoidea granulorum pollinis diversa; forma granulorum pollinis et foliis sessilibus as *S. Miquelianam* Kuntze vergens, ab ea tamen foliis angustioribus et spica ovoidea distinguenda.

HERBA repens. CAULES floriferi adscendentes, graciles, subquadrangulares, internodiis folia aequantibus, primum dense villosi, deinde sparse villosi. FOLIA sessilia, lanceolata, 10—35 mm longa et 4—11 mm lata, apice subobtusa, basi acuta an cuneata, margine subrevoluta, indistincte crenata an dentata, utrimque sparse pubescentia an glabrescentia, costa tamen utrimque dense pubescentia, nervis utroque latere costae 5—6 subtus pubescentia. INFLORESCENTIA spica ovoidea; flores infimi oppositi et foliis multo reductis suffulti; alii alternantes et bracteis anguste linearibus, indistincte trinerviis, bracteolas longitudine aequantibus suffulti. BRACTEOLAE anguste lineares, 7 mm longae et 0.5 mm latae, villosae et glandulosae. CALYX lobis 5 mm longis, villosis et glandulosis, postico indistincte trinervio 0.7 mm lato, aliis 0.4 mm latis. COROLLA tota 6 mm longa, tubulosa; limbus puberulus usque ad basin in lobos 5 divisus; lobi labii superioris 0.4 mm,

labii inferioris 0.8 mm longi. STAMINA inferiora 2 mm supra basin tubi inserta; superiora 0.7 mm supra inferiora; filamenta omnia 1.7 mm longa; granula pollinis ellipsoidea, 22 μ longa et 15 μ diam. OVARIUM glabrum 1.1 mm altum. Stylus glaber 2.7 mm longus, apice inaequaliter bifidus. CAPSULA puberula 3.5 mm longa et 1.4 mm diam., subobtusa; semina areolata.

Hab. Guianam Batavorum.

Surinam, without locality (Focke n. 1146, type, „in cultis").

Staurogyne Wullschlaegeliana Brem. n. spec.; typus: Wullschlaegel n. 426a in herb. Brux.; *S. Miquelianae* affinis, sed foliis ovatis pilosioribus, bracteis bracteolisque uninerviis, bracteolis et calycis lobis eglandulosis, floribus majoribus ab ea distinguenda; a *S. Fockeana* forma foliorum et bracteis bracteolisque uninerviis diversa.

HERBA subrepens. CAULES floriferi erecti an suberecti 6—10 cm alti, post florationem decumbentes et ad nodos radicantes, deinde ex axillis caules floriferos novos emittentes; paucifolii et dense villosi. FOLIA subsessilia, interdum tamen petiolis usque ad 3 mm longis munita; lamina ovata 10—19 mm longa et 8—14 mm lata, apice obtusa, basi rotundata, supra pilis longis adpressis pubescens, subtus costa nervisque dense pubescens, ceterum subglabra, nervis utroque latere costae 5 subtus prominentibus, margine anguste revoluta. INFLORESCENTIA spica ovoidea an breviter cylindrica; flores infimi oppositi; superiores alternantes; omnes bracteis obovatis, uninerviis, 7 mm longis, supra sparse pubescentibus, costa et margine villosis suffulti. BRACTEOLAE anguste lineares 7 mm longae et 0.9 mm latae, uninerviae, ad marginem dense villosae. CALYX lobis villosis, sed eglandulosis, 7 mm longis, postico trinervio 0.9 mm lato, aliis 0.3 mm latis. COROLLA tota 8 mm longa; pars tubi basalis cylindrica 2.4 mm alta et 1.0 mm diam., pars superior ad faucem 2.0 mm diam.; limbus hirtello-puberulus usque ad fundum in lobos 5 divisus; lobi labii superioris 0.8 mm, labii inferioris 2 mm longi. STAMINA inferiora ad apicem tubi partis cylindricae inserta; superiora 1.2 mm supra inferiora; filamenta omnia 2 mm longa; granula pollinis ellipsoidea 24 μ longa et 18—19 μ diam. OVARIUM glabrum 1.4 mm altum. Stylus glaber 3 mm longus, apice subaequaliter bifidus. CAPSULA glabra 4 mm longa et 1.3 mm diam., brevissime apiculata; semina areolata.

Hab. Guianam Batavorum.

Paramaribo (Wullschlaegel n. 426a [B], type, „in arenosis").

The genus *Aphelandra* is represented by three species: one, *A. paraensis* Lindau, belonging to the section *Platychila,* and two, *A. tetragona* (Vahl) N. ab E. and *A. pectinata* N. ab E., to the section *Stenochila.* These sections are easily distinguishable: in fact, they differ so much that they might well be regarded as distinct genera. The plants belonging to *Platychila* are herbs, their bracts lack the curious disc-shaped glands so characteristic for the bracts of the other section, and the lower lip of the corolla consists of three broad spreading lobes; the pollen grains are larger than in the other section, less cylindrical and distinctly punctate. In the section *Stenochila* the habit is fruticose, and the lateral lobes of the lower lip of the corolla are so small as to be nearly invisible.

LINDAU put his *A. paraensis* [1]) in the section *Stenochila,* and this mistake probably explains the fact that he overlooked the very close affinity between this plant and *A. acutifolia* N. ab E., under which name another Surinam specimen has been quoted by NEES in DE CANDOLLE's „Prodromus". From the true *A. acutifolia* the Surinam species differs in the glandular, not merely pubescent, ovary, the larger size of the corolla, and in the strong development of the staminode. According to LINDAU the latter should be provided with an anther, but this is doubtless an error: as the staminode occupies a median position, its anther ought to be symmetrical, i.e. it ought to have two lobes, and when the latter would have been present, they could not have escaped LINDAU's attention and would have been mentioned by him.

KUNTZE (Rev. Gen. Pl. I p. 482, 1892) identified *A. acutifolia* N. ab E. with *A. aurantiaca* Lindl., but though these species are nearly related, they are nevertheless sufficiently distinct. In the latter the bracts are in herbarium material pale yellowish green instead of brown, and serrate in the lower half instead of provided in the upper half with small teeth; the bracteoles are nearly as long as the calyx lobes instead of much shorter, and the upper lip of the corolla is bidentate instead of entire.

A. pectinata N. ab E., the most common species in Surinam, has of late been united with *A. Deppeana* C. et S., for instance by STANDLEY in Ann. of the Field Mus. Bot. III p. 421 (1930), but it seems to me that the two species are different. The true *A. Deppeana,* which appears to be confined to Mexico, has less

[1]) LINDAU described this species as Brazilian: like several authors before and after him, he mistoke the Surinam district Para for the Brazilian town of that name.

densely pubescent shoots, much more densely pubescent leaves, more hairy and less conspicuously dentate, at the top recurved bracts and a more hairy corolla.

Trichanthera gigantea (Humb. et Bonpl.) Steud. has twice been described from Surinam as a new species: once by DE VRIESE as a *Verbenacea* under the name *Clerodendron verrucosum*, and once by MIQUEL as a *Gesneriacea* under the name *Besleria surinamensis*. PULLE recognized the identity of the plants described by DE VRIESE and MIQUEL, and HALLIER showed that they belong to the *Acanthaceae* and agree with the plant originally described and figured by HUMBOLDT and BONPLAND under the name *Ruellia gigantea*.

The pollen grains of this plant have been figured by LINDAU in Engler's Jahrb. XVIII, Taf. I, Fig. 7. The presence of the two protruding lips round the germ pores, however, is not shown, nor are they mentioned by the author. It is nevertheless an important character, for these lips are not found in any of the other tribes. The lips of the two pores are crossed with each other.

The genus *Blechum* is represented by a single species, *B. Brownei* Juss., a wide-spread weed. URBAN introduced for this plant the combination *B. pyramidatum* (Lam.) Urban, but this name can not be accepted, because LAMARCK's *Barleria pyramidata* is merely a binomial appellation for PATRICK BROWNE's *Blechum*, and as LINNÉ had used already for the same purpose the name *Ruellia Blechum*, the epithet *pyramidata* is invalid. In the genus *Blechum* the name chosen by DE JUSSIEU is therefore correct.

The genus *Teliostachya* created by NEES was united by BENTHAM and HOOKER with *Lepidagathis*, a decision which appears to have been generally accepted. In my opinion, however, NEES was quite right in keeping these plants apart. *Teliostachya* is well characterized by its terminal, radially symmetric spike, by its entirely free anticous calyx lobes, by the anther lobes inserted at different height and by the complete absence of reticulation on the surface of the pollen grains. *Lepidagathis* is even after the exclusion of *Teliostachya* difficult to define: in fact, it contains doubtless heterogeneous elements. The following characters, however, appear to be general: the inflorescence is often axillary and always dorsiventral, the anticous calyx lobes are at least partly united, the anther lobes are inserted at the

same height and the pollen grains are, at least in the species investigated by LINDAU, finely reticulated. This reticulation was homologized by LINDAU with the much coarser netwerk found on the pollen grains of the *Ruelliinae*, and for this reason he left the genus in the neighbourhood of *Barleria*, where it had been put by NEES. The resemblance with the latter, however, is superficial, and the reticulation of the pollen grains is, probably, entirely different from the network on those of the *Ruelliinae*. The presence of grooves extending from pole to pole point in the direction of *Blechum*, with which these genera show a much greater resemblance than with *Barleria*.

Of the species which NEES refers to this genus, one, the widespread *T. alopecuroidea* (Vahl) N. ab E., has frequently been found in Surinam. Another one, *T. catharactae* N. ab E., was mentioned by PULLE in his Enumeration, but proved a nearly related, as yet undescribed species, and among the rest of the material four more new ones were found. They are all easily distinguishable from *T. alopecuroidea*, but very similar to each other and to *T. catharactae*. The pollen grains are in all six of the same nature: ellipsoidal in shape and provided with three very distinct grooves extending from pole to pole, each with a germ pore in its centre; on each side of the grooves a row of four or more rather flat lenticular protuberances is found, and the rest of the surface is finely punctate.

Teliostachya glandulosa Brem. n. spec.; *Lepidagathis catharactae* (N. ab E.) Lindau apud Pulle, Enum. Pl. Sur. p. 433 (1906); typus: Boon n. 1095 in herb. Ultraj.; a *Teliostachya catharactae* N. ab E. calycis lobis basi glandulas globosas oculo inarmato visibiles exhibentibus diversa, praesentia pilorum glanduliferorum in inflorescentia tamen ad eam accedens.

HERBA 10—20 cm, an interdum usque ad 30 cm alta. CAULES numerosi e basi decumbente et radicante emergentes, quadricostati, subrufi, primum praesertim costis et inter bases foliorum hispiduli, deinde subglabrescentes, cystolithis invisibilibus, internodiis quam foliis brevioribus. FOLIA sessilia, sed in pseudopetiolum brevem contracta, rhomboidea, 18—22 mm longa et 6.5—9 mm lata, acuta, tenuia et glabra, cystolithis invisibilibus; nervis utroque latere costae 4—5. INFLORESCENTIAE spiciformes usque ad 8 cm longae, 1.2 cm diam., interdum plures congestae, lateralibus a ramulis brevibus elatis; verticillastris contiguis, sed haud confluentibus. Cymae plerumque 5-florae, infimae foliis reductis, aliae bracteis lanceolatis trinerviis suffultae;

cymarum bracteae 5—6 mm longae et 1.9—2.1 mm latae, acutae, margine pilis longis et glandulis capitatis paulo brevioribus ciliatae; bracteae florum lateralium anguste lineari-lanceolatae 4.5 mm longae et 0.9 mm latae. BRACTEOLAE lineares 5 mm longae et 0.4 mm latae et sicut bracteae florum lateralium uninerviae et acutissimae, margine pilis glandulisque ciliatae. CALYX lobis in aristam 0.8 mm longam exeuntibus, margine etiam pilis glandulisque ciliatis; lobo postico obovato 6 mm longo et 2.5 mm lato, trinervio, basi glandulis globosis oculo inarmato visibilibus duabus munito; lobis lateralibus linearibus 4 mm longis et 0.7 mm latis, uninerviis, basi glandulis plus minusve rudimentariis duabus munitis; lobis anticis lineari-oblanceolatis 5 mm longis et 1 mm latis, uninerviis, valde obliquis, basi glandula una munitis. COROLLA alba, labio inferiore violaceo-virgatulo tamen, tota 4.5 mm longa, tubo 2.1 mm longo et 1 mm diam., fauce paulo dilatato; labiis 2.4 mm longis, superiore oblongo, apice breviter bilobato, lobulis 0.3 mm longis; inferiore in lobos rotundatos 1.5 mm longos diviso. STAMINA 0.6 mm infra incisuras laterales limbi inserta; filamenta basi contigua, 1.5 mm et 2.0 mm longa, glabra; antherae 0.6 mm altae, quoque lobo 0.4 mm longo, lobo inferiore basi subapiculato; granula pollinis 30 μ longa et 22 μ diam. DISCUS cupularis ovario dimidio brevior, facie antica in lobum productus et ibi ovario subaequilongus, glaber. OVARIUM apice pilis paucis instructum, ceterum glabrum, 0.8 mm altum. Stylus 4 mm longus, glaber. CAPSULA 3—4 mm longa et 0.8—1.0 mm diam., apice sparse pubescens, ceterum glabra; retinacula apice dilatata; semina ovoidea 1 mm longa et 0.7 mm lata.

Hab. Guianam Batavorum.

Coppename River (Boon n. 1095, type and n. 1114, fl. Aug.); Upper Nickerie River, Blanche-Marie Falls (Tulleken n. 336 [L], n. 338, fl. Aug., n. 358 [L], fl. Sept.); without locality (Kappler n. 163 [L], poor specimen).

The four other species differ from *T. catharactae* N. ab E. in the absence of glandular hairs in the inflorescence, and from *T. glandulosa* moreover in the absence of the large globose glands at the base of the calyx lobes.

Teliostachya gracilis Brem. n. spec.; typus: Versteeg n. 757 in herb. Ultraj.; caulibus gracilioribus, internodiis quam foliis longioribus, bracteis eciliatis, calyce longiore a speciebus aliis distinguenda; bracteis et calycis lobis tribus aristatis ad *T. coppenamensem* (v. infra) accedens.

HERBA 15—25 cm alta. CAULES basi repentes, quadricostati, ad nodos solos pilis paucis muniti, ceterum glaberrimi, graciles (0.5—1.0 mm diam.), cystolithis haud distinguendis, internodiis quam foliis longioribus. FOLIA sessilia, sed interdum in pseudopetiolum usque ad 2 mm longum contracta, lanceolata, 1.5—2.5 cm longa et 0.5—0.8 cm lata, subobtusa, basi acuta an contracta, glaberrima, tenuiora, supra cystolithis parvis permultis sed difficiliter distinguendis sparsa, nervis utroque latere costae 4. INFLORESCENTIA spica cylindrica confluens 1—2.5 cm longa et 0.8 cm diam., axe ad nodos sparse ciliata; cymae triflorae, infimae foliis reductis suffultae, aliae bracteis anguste obovatis 5.5 mm longis et 1.8 mm latis, in cuspidem 0.4 mm longam exeuntibus, trinerviis, eciliatis. CALYX lobis omnibus basi eglandulosis, lobo postico obovato 6 mm longo et 2.1 mm lato, in aristam 0.7 mm longam exeunte, sparse et breviter ciliato; lobis lateralibus anguste triangularibus 4 mm longis et 0.4 mm latis, acutissimis, dense sed breviter ciliatis; lobis anticis linearibus 5 mm longis et 0.8 mm latis, obliquis, in aristam circiter 0.5 mm longam exeuntibus, sparse et breviter ciliatis. COROLLA albida, labio inferiore lineis brunneis picto, glabra, tota 4.5 mm longa; tubo 2.6 mm longo et 1.2 mm diam., fauce parce villoso; labio superiore ovato-oblongo, apice in lobulos 0.3 mm longos, obtusos diviso; labio inferiore in lobos tres rotundatos 1 mm longos diviso. STAMINA 0.8 mm sub divisura corollae inserta; filamenta glabra 1.2 et 1.8 mm longa; antherae 0.5 mm altae, lobis 0.3 mm altis, ambobus basi breviter apiculatis; granula pollinis 28—30 μ longa et 17—19 μ lata. DISCUS cupularis glaber, facie antica in lobum ovario subaequilongum, facie postica breviter productus. OVARIUM 1.5 mm altum, apice pilosum. Stylus glaber 4 mm longus. CAPSULA 4 mm longa et 1.0 mm lata, apice pilosa.

Hab. Guianam Batavorum.

Tapanahoni River (Versteeg n. 757, fl. Aug., type).

Teliostachya coppenamensis Brem. n. spec.; typus: Lanjouw n. 981 in herb. Ultraj.; bracteis et calycis lobis tribus aristatis ad *T. gracilem* accedens, foliis longioribus, bracteis lanceolatis ciliatis ab ea faciliter distinguenda.

HERBA circ. 15 cm alta, basi repens. CAULES quadricostati, rubri, primum costis hirtelli, deinde glabrescentes, cystolithis non distinguendis. FOLIA sessilia lanceolata 3—4.5 cm longa et 9—15 mm lata, acuta, basi attenuata, glabra, cystolithis cylindricis parvis supra rare bene distinguendis, nervis utroque latere costae 4—6. INFLORESCENTIA spica cylindrica 1.5—4 cm longa et 8.5 mm diam.,

verticillastris confluentibus; cymae plerumque triflorae, infimae foliis reductis suffultae, aliae bracteis lanceolatis 6 mm longis et 1.5 mm latis, in aristam 0.7 mm longam exeuntibus, margine ciliatis. BRACTEOLAE sicut bracteae florum lateralium lineares 5—6 mm longae et 0.3 mm latae, ciliatae. CALYX lobis omnibus ciliatis, basi eglandulosis, aristatis; lobo postico obovato 6 mm longo et 2.2 mm lato, trinervio; lobis lateralibus angustissime triangularibus 3.8 mm longis et 0.3 mm latis, dense sed breviter ciliatis; lobis anticis lineari-oblanceolatis 4.5 mm longis et 0.8 mm latis, obliquis. COROLLA tubo albo et limbo violaceo, extus glabra, apice pilosa tamen, tota 6.4 mm longa; tubo 3.2 mm longo et 1.5 mm diam.; labio superiore triangulari in lobulos duos obtusos 0.4 mm longos exeunte; labio inferiore in lobos tres 1.2 mm longos rotundatos diviso. STAMINA 1 mm sub divisura corollae inserta; filamenta 1.7 et 2.2 mm longa, glabra; antherae 0.6 mm altae, lobis 0.4 mm altis, inferiore basi acuto; granula pollinis 31—32 μ longa et 19—21 μ lata. DISCUS cupularis glaber, ovario dimidio brevior, facie antica in lobum ovario fere aequilongum productus. OVARIUM ovoideum 0.8 mm altum, apice acuminato pilosum. Stylus glaber 5 mm longus. CAPSULA 4 mm longa et 1.2 mm lata, apice sparse pilosa; retinacula brevia, apice haud conspicue dilatata.

Hab. Guianam Batavorum.

Coppename River, Raleigh Falls (Lanjouw n. 981, fl. Sept., type; Stahel and Gonggrijp n. 6170, fl. July; Boon n. 1034, fl. Aug.).

Teliostachya surinamensis Brem. n. spec.; typus: Tresling n. 382 in herb. Ultraj.; a *T. gracili* et *T. coppenamensi* bracteis et calycis lobis anticis haud aristatis faciliter distinguenda.

HERBA 10—15 cm alta. CAULES basi decumbentes et radicantes, quadri- an interdum sexcostati, primum praesertim costis hirti, ultimo glabrescentes, cystolithis haud distinguendis, internodiis quam foliis brevioribus. FOLIA interdum ternata, sessilia, lanceolata an oblanceolata, 1.5—2.0 cm longa et 6—7 mm lata, subobtusa, basi acuta, cystolithis cylindricis supra difficiliter distinguendis, nervis utroque latere costae 5. INFLORESCENTIA spica cylindrica, haud interrupta, 1—3 cm longa et 7 mm diam., axe ad nodos ciliata; cymae plerumque triflorae, infimae foliis reductis, interdum trinerviis suffultae, aliae semper bracteis obovatis 3.8 mm longis et 2.0 mm latis, acuminatis, trinerviis, longe ciliatis; bracteae florum lateralium lineari-lanceolatae, haud obliquae, 4 mm longae et 0.6 mm latae, acutissimae, uninerviae, longe ciliatae. BRACTEOLAE filiformes 3.3 mm longae, acutissimae,

uninerviae, longe ciliatae. CALYX lobo postico obovato 4 mm longo et 1.6 mm lato, in cuspidem 0.3 mm longam exeunte, trinervio, longe ciliato; lobis lateralibus anguste triangularibus 2.2 mm longis et 0.3 mm latis, dense sed breviter ciliatis, acutissimis; lobis anticis lineari-lanceolatis 3.8 mm longis et 0.7 mm latis, acutissimis, longe ciliatis. COROLLA dilute violacea, 5 mm longa, glabra; tubo 3 mm longo et 1 mm diam.; labio superiore subintegro, obtuse triangulari; labii inferioris lobis 0.7 mm longis, rotundatis. STAMINA 1 mm sub divisura corollae inserta; filamenta 1.5 et 2.0 mm longa, glabra; antherae 0.5 mm altae, lobis 0.3 mm altis, basi apiculatis; granula pollinis 31 μ longa et 22 μ diam. DISCUS cupularis glaber, ovario dimidio brevior, facie antica in lobum ovario fere aequilongum productus. OVARIUM 0.8 mm altum, apice piloso. Stylus glaber 4 mm longus. CAPSULA 4.5 mm longa et 1.1 mm diam., apice pubescens; semina ovoidea 0.9 mm longa et 0.8 mm lata, basi inaequalia.

Hab. Guianam Batavorum.

Marowyne River, Armina Falls (Went n. 459, fl. Oct.); Surinam River, Makapakoe Falls (Tresling n. 382, fl. Aug., type); Lucie River (Hulk n. 323, fr. Oct.).

Teliostachya medicaginea Brem. n. spec.; typus: Versteeg n. 214 in herb. Ultraj.; foliis ellipticis, margine scabridis, nervis utroque latere costae tribus, spica ovoidea, calyce longiore a *T. surinamensi* diversa, a *T. gracili* et *T. coppenamensi* bracteis et calycis lobis anticis haud aristatis distinguenda.

HERBA 5—15 cm alta. CAULES basi repentes, quadricostati, primum praesertim costis hirti, ultimo glabrescentes, cystolithis haud distinguendis, internodiis quam foliis brevioribus. FOLIA in pseudopetiolum usque ad 3 mm longum contracta, anguste elliptica, 1.5—2 cm longa et 4—8 mm lata, obtusa, firma, margine scabrida, costa et nervis utroque latere costae tribus subtus sparse scabrida, deinde glabrescentia, supra cystolithis cylindricis interdum conspicue lineolata. INFLORESCENTIA spica ovoidea, verticillastris confluentibus, circ. 1.2 cm longa et 9 mm diam., axe apicem versus glabrescente; cymae triflorae, infimae foliis reductis suffultae, aliae bracteis obovatis 4.3 mm longis et 1.8 mm latis, acuminatis, trinerviis, longe ciliatis; bracteae florum lateralium lanceolatae 4 mm longae et 0.7 mm latae. BRACTEOLAE anguste lineares 3.5 mm longae et sicut bracteae florum lateralium acutissimae, uninerviae, longe ciliatae. CALYX lobis eglandulosis; postico obovato 6 mm longo et 1.9 mm lato, in aristam 0.6 mm longam exeunte, trinervio, longe ciliato; lobis lateralibus

anguste triangularibus 4 mm longis et 0.3 mm latis, uninerviis, acutissimis, dense et breviter ciliatis; lobis anticis oblanceolatis 5 mm longis et 0.5 mm latis, obliquis, binerviis, acutissimis, longe ciliatis. COROLLA alba, labio inferiore lineis rubris ornato, tota 4.5 mm longa, glabra; tubo 2.6 mm longo et 1.1 mm diam., fauce pilis paucis villoso; labio superiore ovato obtuso, apice in lobulos duos 0.2 mm longos exeunte; labio inferiore lobis rotundatis 0.9 mm longis. STAMINA 0.8 mm sub divisura corollae inserta; filamenta glabra 1.4 et 1.9 mm longa; antherae 0.5 mm altae, lobis 0.3 mm altis, basi apiculatis; granula pollinis 26—27 μ longa et 18—19 μ diam. DISCUS cupularis quartam partem ovarii tegens, facie antica in lobum ovoideum ovario paulo breviorem productus. OVARIUM apice pilosum 0.8 mm altum. Stylus glaber 3.8 mm longus. CAPSULA 3.2 mm longa et 1.1 mm diam., apice pilosa; semina ovoidea 1.0 mm longa et 0.7 mm lata.

Hab. Guianam Batavorum.

Gonini River (Versteeg n. 214, fl. Sept.).

The genus *Hygrophila* is represented by the wide-spread *H. guyanensis* N. ab E. and a new species.

Hygrophila surinamensis Brem. n. spec.; typus Versteeg n. 843 in herb. Ultraj.; calycis lobis hirtellis ad *H. guyanensem* N. ab E. accedens, sed foliis brevioribus et comparate latioribus, floribus solitariis an in triades dispositis, sculptura pollinis granulorum ab ea faciliter distinguenda.

HERBA semi-aquatica 20—30 cm alta basi decumbente et radicante. CAULES obtuse quadrangulares et profunde sulcati, rubri, primum hirsuti, deinde glabrescentes, cystolithis cylindricis haud conspicue striati. FOLIA sessilia; inferiora lanceolata 4.5 cm longa et 1.0 cm lata, subacuta, tenuiora et glabra; superiora oblonga 3 cm longa et 0.9 cm lata, obtusa, firmiora, subtus primum hirsuta, deinde costa nervisque exceptis glabrescentia, cystolithis cylindricis praesertim supra numerosis lineolata. FLORES in axillis foliorum solitarii an in triades dispositi. Bracteae florum lateralium triadum spathulatae 6 mm longae et 1.8—2.0 mm latae, ciliatae. Pedicelli usque ad 1 mm longi. BRACTEOLAE ad medium pedicellorum 4 mm longae. CALYX usque ad basin in lobos 5 aequales divisus; lobi lineares 6 mm longi et 0.8 mm lati, hirtelli, in fructu usque ad 9.5 mm accrescentes et glabrescentes. COROLLA dilute violacea tota 9 mm longa, extus pubescens; tubo 4.8 mm longo, dimidio inferiore cylindrico, dimidio superiore infundibuliformi; labiis 4.2 mm longis; superiore apice in lobulos 0.6

mm longos exeunte; inferiore in lobos tres 2.0 mm longos diviso. STAMINA ad medium tubi inserta, inclusa; filamenta basi per paria conjuncta, 2 mm et 2.7 mm longa, glabra; antherae apice apiculatae 1 mm et 1.2 mm longae; granula pollinis 33 μ diam., glabra, inter fissuras 4 poriferas ubique fissuris meridionalibus quattuor sculpta. DISCUS annularis parvus, glaber. OVARIUM glabrum 1.8 mm altum. Stylus 3 mm longus, glaber; lobo antico stigmatis 0.7 mm longo, filiformi, lobo postico 0.1 mm. CAPSULA glabra et nitida, cylindrica, 9—10 mm longa et 1.6 mm lata, apiculata, estipitata; valvulae 7-seminales, dorso haud conspicue sulcatae. SEMINA lenticularia 1 mm diam., basi inaequalia, ubique pilis mucosis obtecta, marginem versus pilis longioribus et densius glomeratis aqua vehementius distendentia.

Hab. Guianam Batavorum.

Tapanahoni River (Versteeg n. 843, fl. Sept., type).

Of the genera of the *Ruelliinae* distinguished by NEES, but by later authors sunk in *Ruellia,* two have been revived here, namely *Dipteracanthus* and *Arrhostoxylum.* The name *Ruellia* I reserve for those species which possess a cylindrical, estipitate capsule, containing a large number of seeds. The pollen grains of these species show an at once more regular and finer network than those of *Dipteracanthus* and *Arrhostoxylum.* Between the pollen grains of the latter I have found no difference. These genera are doubtless nearly related, and resemble each other also in the characters of the fruit. The latter is either distinctly stipitate or at least solid at the base, and the number of seeds is much smaller than in *Ruellia.* In *Dipteracanthus,* however, the flowers are axillary and shortly pedicellate, and the corolla is infundibuliform, whereas in *Arrhostoxylum* the flowers are arranged in lax cymes, and the corolla is subhypocrateriform.

Ruellia is represented by the wide-spread *R. tuberosa* L. It has been found in the neighbourhood of settlements only, and it is, therefore, probably, here as in many other countries a recent introduction.

Of *Dipteracanthus* two species occur. One is *D. surinamensis* Miq., which is known in a single specimen only, and the other is the plant originally described by NEES as *D. geminiflorus* (H.B.K.) N. ab E. var. *angustifolius.* According to its author it differs from the true *D. geminiflorus* in its narrower leaves only, but I find several other differences: the stem is erect, not procumbent; the leaves are sessile, not shortly petiolate, at the top acute, not obtuse, and at the base cuneate, not rounded;

the number of nerve pairs varies between 5 and 8, instead of being always 5; bracteoles are present and not even small, instead of absent; the calyx lobes are 15 mm long and all of the same size, not the posticous one 10 mm and the others shorter; the corolla is up to 5 cm long, instead of 2.5—3.5 cm; the capsule shortly pubescent, not more or less tomentose. Hostmann n. 1254, probably a duplicate of the plant in Hooker's herbarium studied by NEES, may be regarded as the type of the new species, of which I will here give a description:

Dipteracanthus angustifolius (N. ab E.) Brem. n. comb. = *D. geminiflorus* (H.B.K.) N. ab E. var. *angustifolius* N. ab E. in DC., Prodr. XI p. 137 (1847); *Ruellia geminiflora* H.B.K. var. *angustifolia* (N. ab E.) Griseb., Fl. West Ind. Isl. p. 451 (1862).

HERBA perennis erecta, usque ad 40 cm alta, interdum nana. CAULIS obtuse quadrangularis et sulcatus, primum dense, subinde sparse hirsutus, ultimo glabrescens, cystolithis haud distinguendis. FOLIA sessilia, lineari-lanceolata, plerumque 3.5—6.5 cm longa et 0.6—1.2 cm lata, acuta, basi cuneata, utrimque primum dense, deinde sparse hirsuta, cystolithis cylindricis difficiliter distinguendis, nervis utroque latere costae 5—8, subtus valde prominentibus. FLORES solitarii in axillis foliorum ordinariorum, saepe oppositi, breviter pedicellati. BRACTEOLAE lineares 6.5 mm longae et 0.8 mm latae, dense hirsutae. Pedicelli 1.5 mm longi, hirsuti. CALYX usque ad basin in lobos 5 aequales, angustissime triangulares, 15 mm longos et infra 1 mm latos, extus dense hirsutos, intus pilis adpressis breviter pubescentes divisus. COROLLA usque ad 5 cm longa, coerulea, extus pubescens, intus glabra; tubo in partem basalem cylindricam 14 mm longam et 2 mm diam. et in partem superiorem infundibuliformem 17 mm longam et ad faucem 9 mm diam. diviso; lobis ovato-orbicularibus 15 mm longis. STAMINA ad apicem tubi partis cylindricae inserta; filamenta 5 mm et 10 mm longa, parte connata 1—1.5 mm longa; antherae 4.5 mm altae; pollinis granula 67 μ diam., intra membranam 53 μ. DISCUS annularis glaber et parvus. OVARIUM 1.5 mm altum, quadrifariam et ad apicem villosum, ceterum dense sed minute glandulosum. Stylus 3 cm longus, hirtellus, apicem versus tamen glabrescens; stigmatis lobo antico lineari 1 mm longo, lobo postico rudimentario. CAPSULA ovoidea 10 mm alta et 5 mm diam., parte basali sterili 3 mm alta, breviter pubescens, apiculata; valvulae biseminales, seminibus fere collateralibus; retinacula semi-circularia. SEMINA lenticularia 2 mm longa et 2.5 mm lata, lateribus radiatim fibrillatis.

Hab. Guianam Batavorum.

Saramacca River (Stahel and Gonggrijp n. 4232, fl. Jan.); Upper Sipaliwini River (Rombouts n. 229, n. 263 and n. 294, fl. Nov.); without locality (Hostmann n. 1254, type).

Also in the other Guianas, Venezuela and Trinidad.

The genus *Arrhostoxylum* is represented by a single polymorphic species. In its principal characters it agrees well with AUBLET's *Ruellia rubra;* the flowers in the Surinam plants, however, are never red, but always light violet or white. Whether the colour in the material from French Guiana varies, appears to be unknown; that some of the specimens there collected look exactly like some of the Surinam ones, can not be doubted. The various forms are here described as varieties, but it is not impossible that when material will be available for a more detailed investigation, another insight in the significance of the differences may be gained, and that the latter then may appear too important to be regarded as of a varietal character only. One of the forms here treated as a mere variety has long been regarded as a distinct species: it was described by RICHARD as *Ruellia longifolia,* and is found both in French and in Dutch Guiana. As the difference between this plant and AUBLET's species appears to be confined to the shape and size of the leaves, it is more or less of the same order as the differences between the other forms. Besides the typical form I recognize among the Surinam material the following six varieties:

Arrhostoxylum rubrum (Aubl.) N. ab E. var. **parviflorum** Brem. n. var.; typus: Went n. 205 in herb. Ultraj.

A typo recedit caulibus acute quadrangularibus, foliis lanceolatis, 9—14 cm longis et 3.5—4.5 cm latis, nervis utroque latere costae 6—7, corolla 2.2 cm longa.

Hab. Guianam Batavorum.

Saramacca River, Santigron (Went n. 205, fl. Aug., type).

Arrhostoxylum rubrum (Aubl.) N. ab E. var. **multiflorum** Brem. n. var.; typus: B.W. n. 3183 in herb. Ultraj.

A typo recedit caulibus robustioribus, foliis paulo longioribus et angustioribus, cymis quam foliis longioribus, saepius ramificatis et laxioribus.

Hab. Guianam Batavorum et Gallorum.

Brownsberg (B.W. n. 3183, fl. Sept., type).

Also in French Guiana (Leprieur n. 366 in Herb. Deless.).

Arrhostoxylum rubrum (Aubl.) N. ab E. var. **glomeruliflorum** Brem. n. var.; typus: Versteeg n. 761 in herb. Ultraj.

A typo recedit foliis minoribus, nervis utroque latere costae 5—6, inflorescentiis brevioribus (3—5 cm longis) et ramificationibus brevissimis instructis, floribus inde glomeratis.

Hab. Guianam Batavorum.

Tapanahoni River (Versteeg n. 761, fl. Aug., type); Lawa River (Versteeg n. 281, fl. Oct.); Gran Rio (Hulk n. 202, fl. Sept.); Litanie River, Jamaiké (Rombouts n. 778, fl. Aug.).

Arrhostoxylum rubrum (Aubl.) N. ab E. var. **pygmaeum** Brem. n. var.; typus: Boon n. 1190 in herb. Ultraj.

A typo recedit statura minore, foliis lanceolatis, circ. 5.5 cm longis et 1.8 cm latis, nervis utroque latere costae 5, floribus minoribus, corolla 2 cm longa.

Hab. Guianam Batavorum.

Coppename River (Boon n. 1190, fl. Sept., type); without locality (Kappler n. 46 [L]).

Arrhostoxylum rubrum (Aubl.) N. ab E. var. **attenuatum** Brem. n. var.; typus: Gonggrijp n. 5343 in herb. Ultraj.

A typo recedit foliis lanceolatis an lanceolato-ellipticis, 8—14 cm longis et 2.4—4.6 cm latis, caudatis, basi in pseudo-petiolum usque ad 2.5 cm longum contractis.

Hab. Guianam Batavorum.

Lawa River, Jan Passie (Gonggrijp n. 5343, fl. June, type); Lawa River, Mnt. Cottica (Gonggrijp n. 5337, fl. June); Gonini River (Versteeg n. 164, fl. Aug.); Guiana Gold Placer (nat. coll. n. 89, fl. April).

Arrhostoxylum rubrum (Aubl.) N. ab E. var. **longifolium** (Rich.) Brem. n. comb. = *A. longifolium* (Rich.) N. ab E. in DC., Prodr. XI p. 214 (1847); *Ruellia longifolia* Rich. in Act. Soc. Hist. Nat. Paris 1792 p. 110.

A typo recedit foliis lineari-lanceolatis, 10—20 cm longis et 1.2—2.4 cm latis, apice basique sensim attenuatis, nervis utroque latere costae circ. 12 in venam intramarginalem connectis.

Hab. Guianam Gallorum et Batavorum.

Lawa River, Jan Passie (Gonggrijp n. 5344, fl. June); Coppename River (Went n. 132, fl. Aug.); Coppename River, Raleigh Falls (Boon n. 1026, fl. Aug.).

Of all the varieties described above, with the exception only of the var. *multiflorum*, of which I had no satisfactory material,

the pollen grains have been investigated. There are everywhere small differences, which though difficult to describe, show well enough in the figures.

A large shrub with long and rather narrow terminal panicles consisting of very long, slightly bilabiate, red flowers proved to be a representative of the *Ruelliinae*. In most of its characters it resembles the species belonging to the genera *Lychniothyrsus* Lindau and *Stemonacanthus* N. ab E. I consider it, however, as generically different.

Polylychnis Brem. n. gen. *Ruelliearum Ruelliinarum* generibus *Lychniothyrso* Lindau et *Stemonacantho* N. ab E. similior, sed ab utroque calyce breviter lobato quasi dentato, a *Lychniothyrso* labio postico bilobato, antheris apiculatis et praesertim capsula 6-sperma stipitata, a *Stemonacantho* corolla tubulosa limbo haud patente, disco facie antica in dentem conicam producto distinguendum.

LIGNOSA ramis quadrangularibus articulatis praesentia cystolithorum parvorum punctatis, foliis utrimque cystolithos cylindricos numerosos exhibentibus. INFLORESCENTIA panicula angusta terminalis. Bracteae florales parvae; bracteolae probabiliter nullae. Flores longius pedicellati. CALYX campanulatus basi inaequalis, limbo breviter 5-lobato quasi dentato. COROLLA tubulosa, leviter incurvata, limbo brevi subbilabiato, haud patente; lobis duobus superioribus in labium bilobatum connatis. STAMINA 4 parte superiore tubi inserta, basi per paria conjuncta, apice omnia antheris coherentia; antherae biloculares, connectivo in apiculam producto, basi profunde sagittatae, lobis ecalcaratis; granula pollinis globosa irregulariter alveolata, alveolis margine lacerato et passim in protuberantia conica producto; staminodium nullum. DISCUS facie antica in dentem conicum obtusum productus. OVARIUM quoque loculo ovulis tribus. Stylus apice in lobos stigmaticos filiformes valde inaequales divisus. CAPSULA dimidio inferiore in stipitem mutata, valvulis triseminalibus dorso sulcatis, retinaculis longis. SEMINA lenticularia, margine annulo crasso pilorum mucosorum brevium instructa.

Hab. Guianam Batavorum.

Species unica:

Polylychnis fulgens Brem. n. spec.; typus: Versteeg n. 313 in herb. Ultraj.

FRUTEX usque ad 3.5 m altus, glaberrimus. RAMI internodiis apicem versus quadricostatis. FOLIA petiolo canaliculato 5—10 mm

longo munita; lamina herbacea oblongo-elliptica 10—16 cm longa et 4—6 cm lata, apice caudato-acuminata, basi acuta, margine irregulariter dentata an subintegra, utroque latere costae nervos circ. 9 utrimque prominulos et a venulis oblique transversalibus subtus prominulis connectos exhibens. PANICULA pedunculo 12 cm longo elata; axe quam pedunculo longiore, acute quadrangulari, ex internodiis longis composita; ramulis infimis 2—2.5 cm longis, semel an bis dichasialiter ramificatis, ramificationibus ultimis monochasialibus (an racemosis?); ramulis superioribus quam infimis multo brevioribus et rare dichasialiter ramificatis. Ramuli infimi foliis parvis et angustis suffulti, alii bracteis anguste triangularibus. Bracteae florales late triangulares, usque ad 1 mm longae. Pedicelli 6—12 mm longi, ergo internodiis ramulorum multo longiores. CALYX tubo 2.5 mm diam. et 1 mm alto, lobis late triangularibus 1—1.5 mm longis. COROLLA rubra 7—7.5 cm longa, tubo ad basin 2 mm diam., ad faucem 8 mm diam., labiis 9 mm longis, superiore in lobulos 3 mm longos exeunte, inferiore usque ad basin in lobos tres aequaliter diviso. STAMINA 1 cm sub divisura corollae inserta; filamenta basi in membranam 2.5 mm altam connata, glabra, partibus liberis 11 mm et 13 mm longis; antherae 4 mm altae; granula pollinis 73 μ diam., intra membranam 55 μ, alveolis sub membranis irregulariter productis difficiliter distinguendis. DISCUS glaber 0.7 mm altus, dente conico insuper 0.8 mm alto. OVARIUM glabrum 3.3 mm altum. Stylus glaber corolla paulo brevior, lobo stigmatico antico 2 mm, postico 0.5 mm longis. CAPSULA glabra 2.4 cm longa, apiculata, stipite 1.2 cm longa et 2.2 mm lata, retinaculis 3.5 mm longis. Semina 3.5 mm diam., margine excepto glabra.

Hab. Guianam Batavorum.

Litanie River (Versteeg n. 313, fl. Oct., type).

Of the palaeotropic genus *Asystasia* two species have been collected near Paramaribo. One is the wellknown and for its medicinal properties not rarely cultivated *A. gangetica* (L.) T. Anders. It is found wild along the coasts of the Indian Ocean. The other one is a native of the Malay Archipelago: its name is usually given as *A. intrusa* Bl. The specific epithet *intrusa*, however, belongs to another species, for BLUME in describing his Javanese material referred to VAHL's *Ruellia intrusa*. As this plant afterwards appeared to be distinct from the Javanese species described by BLUME, the latter had to be renamed. As BLUME's invalid name was quoted by NEES in WALLICH's „Plantae Asiaticae Rariores" III p. 90 in the description of his *A. nemorum*,

the epithet *nemorum* is to be accepted as the oldest valid nomen specificum of BLUME's species. It is possible, of course, and even not improbable that the British-Indian material on which NEES based his description is specifically different from BLUME's plant, but this does not matter. In DE CANDOLLE'S „Prodromus" NEES described a second species from Java, which he called *A. Blumei.* This name, however, is illegitimate, for here too he quotes *A. intrusa* Bl. non Vahl as a synonym. The position, therefore, is, as follows: *A. intrusa* (Vahl) Bl. is the Arabian species described by VAHL; *A. nemorum* N. ab E. the plant described by BLUME as *A. intrusa*; *A. Blumei* N. ab E. is an illegitimate name for the same species; and the material collected in British India and described by NEES as *A. nemorum* is, according to C. B. CLARKE, *A. crispata* Benth. On a Javanese specimen, very similar to the type of *A. nemorum* N. ab E., MIQUEL afterwards based his *Isochoriste javanica.* The type material of this species in the Leyden Herbarium is in a bad condition, but that the plant is either identical with or nearly related to *Asystasia nemorum* can not be doubted: in the size and relief of the pollen grains there is no difference at all. The generic name *Isochoriste,* therefore, can not be retained.

Pachystachys coccinea (Aubl.) N. ab E., a native of French Guiana, is known from Surinam as a garden plant only. In its pollen a remarkably large number of sterile and abnormal grains are found. In the large-flowered plants distinguished by NEES as *P. latior* the sterility and the number of abnormal grains is still more striking. Fruits were not found, and it seems probable, therefore, that the plants are mainly propagated by cuttings. As the wall of the pollen grain is very thin, and its relief almost indistinguishable, the grains look quite different from those of *P. lutea* N. ab E., figured by LINDAU.

The *Diclipterinae* are represented by two species. One is *Dicliptera ciliata* Juss., a plant known already from Brazil and from French and British Guiana, but now for the first time recorded from Surinam. The other one was hitherto known as *D. assurgens* (L.) Juss., and is also new for Surinam. I refer this plant to the genus *Dactylostegium* N. ab E. The latter was created by NEES in the „Flora Brasiliensis", but in his monograph of the family in DE CANDOLLE'S „Prodromus", published in the same year, it was reduced to a section of *Dicliptera.* Nevertheless, the genus is, in my opinion, better kept up. The genus *Dicliptera* then will comprise all those species in which the capitula are

arranged in axillary triads, whereas the name *Dactylostegium* should be reserved for those species where the capitula are solitary at the nodes of large and lax panicles; these species are confined to America. **Dactylostegium assurgens** (L.) Brem. n. comb. (*Justicia assurgens* L.) occurs from the Bahamas, Florida and Carolina to Northern Brazil and Colombia, and comprises also *D. sparsiflorum* N. ab E., on which the genus originally was founded.

Of the genus *Herpetacanthus* a single species was found which proved conspecific with a plant described by LINDAU (Herb. Boiss. 2e Sér. IV pp. 402—403, 1904) under the name *Juruasia rotundata* Lindau as type of a new genus. The description of the latter is practically the same as that of *Herpetacanthus* given by NEES.

Herpetacanthus Nees: „Calyx quinquepartitus aequalis. Corolla bilabiata, labio superiore recto bidentato, inferiore trifido. Stamina quattuor, didynama, basi per paria conjuncta, apice tubi inserta. Antherae muticae, staminum longiorum biloculares, loculo altero oblique altero altius posito, breviorum staminum uniloculares. Stigma bilabiatum, breve. Capsula a basi usque ad medium clausa, angusta et asperma, hinc tetra-octosperma. Semina retinaculis suffulta. — .... Spicae simplices vel varie compositae, bracteatae, subsecundae, bracteis quadrifariis, unifloris, saepe laetis, bracteolis angustis".

Juruasia Lindau: „Calyx quinquepartitus. Corolla iis *Justiciae* generis similis, labio postico obscure bidentato, erecto, labio antico apice trilobo. Stamina quattuor, postica uniloculata, antica loculis duobus superpositis, muticis. Pollinis granula subglobosa, iis *Odontoneminarum* aequalia. Capsula parva, tetrasperma. Inflorescentia spicata bracteis magnis imbricatis, bracteolis lanceolatis".

The explanation of LINDAU'S mistake lies in the position assigned by him to *Herpetacanthus*. In Engler's Jahrbücher XVIII p. 58 at the end of his discussion of the *Isoglosseae* he says: „Ellipsoidische Körner, deren Längsachse horizontal liegt, hat *Herpetacanthus* Nees (Fig. 85). Die Exine ist mit kurzen Stachelchen besetzt und zeigt vier äquatoriale Poren. Ein Gürtel ist nicht vorhanden, weshalb ich die Gattung nur vorläufig hier unterbringe".

The pollen grain of *H. rubiginosus* N. ab E. figured in LINDAU'S fig. 85, however, is globose, and has, as the position of the two germ pores appearing in the figure proves, three germ pores. Why the genus was put by LINDAU in his *Isoglosseae* is difficult to see: it certainly does not show the slightest resemblance to

any of the other genera brought together in this tribe.

I had an opportunity to study the pollen grains of *H. melancholicus* N. ab E. and found that, apart from the fine granulation of the surface, they show the typical structure of the *Odontonemeae* pollen. The grains of *H. rubiginosus* differ from those of *H. melancholicus* in the absence (or inconspicuousness?) of the grooves. In *Juruasia rotundata* (I investigated a duplicate of the type in the Leyden Herbarium) the grooves are, however, very difficult to see, and the difference between the pollen grains of the latter and those of *H. rubiginosus* is certainly not important. As the genus *Juruasia,* therefore, can not be kept up, its two species become: **Herpetacanthus rotundatus** (Lindau) Brem. n. comb. and **H. acuminatus** (Lindau) Brem. n. comb.

H. rotundatus (Lindau) Brem. comes very near to *H. melancholicus* N. ab E. and might even be indentical with the var. *latifolius* N. ab E., of which, however, I have seen no material.

It is rather remarkable that both NEES and LINDAU have overlooked the very peculiar structure of the spikes in these plants. The nodes bear the customary two bracts, but instead of opposite, the latter are shifted to one side, and together they enclose, as a rule, a single flower: at first view one is tempted to regard them as bracteoles, but the presence of a pair of true bracteoles at the base of the flower, the fact that a second flower is sometimes developed, and moreover the absence of a hypsophyll which in that case might be interpreted as a bract, disproves this view. The whole structure might be compared with the capitulum of the *Diclipterinae,* but the latter is always found in the axil of a bract, whereas these structures of *Herpetacanthus* alternate on the axis of a spike; the bracts and bracteoles themselves are moreover entirely free and very different in aspect. By the character of the spike *Herpetacanthus* can be distinguished at once from all other *Acanthaceae.*

Of the genus *Odontonema,* so far unknown from Surinam, a new species was found. This genus comprises two sections which, probably, might be raised to generic rank: one with tubiform, subregular, red flowers in dense and very narrow panicles; the other with deeply bilabiate, white or slightly coloured flowers laxly arranged along the axis of simple or compound spike-like racemes. Our species, like the type of the genus, belongs to the second group.

Odontonema surinamense Brem. n. spec.; typus: Versteeg n. 898 in herb. Ultraj.; inter species corolla brevituba bilabiata

albida instructas floribus majoribus cognoscenda; ab *O. variegato* (Aubl.) Kuntze inflorescentia pedunculata, floribus longius pedicellatis, in axillis plerumque solitariis, ab *O. adenostachyo* Lindau foliis distincte petiolatis, crassioribus, inflorescentia laxiore, bracteis brevioribus, pedicellis paulo longioribus, ab *O. congesto* Lindau foliis haud congestis, ab *O. nitido* (Jacq.) Kuntze, typo generis, labio superiore usque ad basin fisso diversa.

FRUTEX parvus, probabiliter parce ramosus, altitudine 1 m paulo superans. RAMI floriferi usque ad inflorescentiam cortice luteo-brunneo nitido vestiti, cystolithis haud distinguendis. FOLIA petiolo glabro canaliculato 1—1.5 cm longo munita; lamina subcoriacea, lanceolato-elliptica, 9—14 cm longa et 3.5—5.3 cm lata, caudato-acuminata, basi acuta an contracta, tota glabra, supra cystolithis cylindricis parvis sparsa, nervis utroque latere costae 8—10. INFLORESCENTIA pedunculata ex uno an pluribus racemis spiciformibus composita, glanduloso-pubescens, floribus oppositis an interdum flore altero triadi substituto. Pedunculus 2—5 cm longus; racemi 4—18 cm longi. Bracteae anguste triangulares 1.5—3 mm longae, glanduloso-pubescentes. Bracteolae basi pedicellorum insertae, bracteis persimiles, minores tamen, 1.0—1.5 mm longae. Pedicelli 2.5—5 mm longi, glanduloso-pubescentes. CALYX 2.5 mm altus, glanduloso-pubescens, fere usque ad basin in lobos 5 aequales fissus; lobi lineares acuti. COROLLA dilute violacea, labii inferioris lobo mediano maculis obscuris notato, glabra; tubo 7.5—8.5 mm longo, parte inferiore cylindrica 5.5 mm longa et 1.2 mm diam., parte superiore campanulata, valde obliqua, facie antica 2 mm alta, facie postica 3 mm alta; limbo galeato inaequaliter 5-lobato, i.e. labio superiore usque ad fundum fisso in lobos semi-ellipticos obtusos 12 mm longos et 4.5 mm latos, labio inferiore usque ad fundum in lobos obtusos tres diviso, lobis lateralibus semi-orbicularibus 12 mm longis et 5.5 mm latis, lobo centrali obovato in palatum maculatum mutato 9 mm longo et 5 mm lato. STAMINA basi partis campanulatae tubi inserta sed in partem cylindricam decurrentia; filamenta 13 mm longa, basi subhirtella et subglandulosa, 2 mm supra basin staminodio unciformi 0.6 mm longo, haud capitato munita; antherae bilobatae lobo altero apice 0.2 mm supra alterum producto, basi lobis aequalibus, subobtusis. DISCUS annularis glaber et parvus. OVARIUM glabrum 0.9 mm altum, loculis bi-ovulatis. Stylus 22 mm longus, basi hirtellus; stigma capitatum. CAPSULA (nondum matura) 13 mm longa, dimidio inferiore in stipitem contracta, parte fertili 3.8 mm lata, omnino glandulosa et pilosa, acuta; valvulis bi-seminalibus; retinaculis robustioribus. Semina superposita.

Hab. Guianam Batavorum.

Paloemeu River, Talamai (Versteeg n. 898, fl. Sept., type); Gran Rio (Hulk n. 267, fl. Aug.)

The *Justicieae* are represented by the genera *Justicia* and *Beloperone*. The genus *Rhacodiscus*, which on account of its pollen characters, was separated by LINDAU from *Justicia* and put in the *Isoglosseae Porphyrocominae*, is returned here to its former position. The *Porphyrocominae* are a very unnatural group; some of its genera, for instance *Poikilacanthus* with its alveolate pollen grains and its seeds provided with mucous hairs, belong to the *Ruelliinae*, of others the position can not be determined. The pollen of *Porphyrocoma* shows a superficial resemblance to that of the plants for which LINDAU created his genus *Rhacodiscus;* whereas the pollen grains of the latter, however, have but two germ pores, those of *Porphyrocoma* are provided with three. This genus is as yet but imperfectly known, but I believe that it may safely be referred to the *Odontonemeae*, where it may perhaps find a place in the neighbourhood of *Pachystachys*. Apart from the conical protuberances on the exine, the pollen grains of *Rhacodiscus* agree in every essential character with those of *Justicia*, and so long as this genus is kept up in its present delimitation, *Rhacodiscus* will have to remain in it: the name may, probably, be retained for a section or a subsection. The only species of this group found in Surinam, *Rhacodiscus acuminatissimus* (Miq.) Lindau (*Rhytiglossa acuminatissima* Miq.) becomes **Justicia acuminatissima** (Miq.) Brem. n. comb. The name *Rhacodiscus intermedius* (N. ab E.) Lindau, afterwards used by LINDAU for this species, is invalid, as it is derived from a varietal name (*Rhytiglossa secunda* (Vahl) N. ab E. var. *intermedia* N. ab E.).

Justicia acuminatissima has often been confused with *J. secunda* Vahl. The plants are, nevertheless, easily distinguishable. The calyx lobes of *J. acuminatissima* are much longer and the corolla much larger, and the anther lobes are inserted nearly at the same height. The most striking difference, however, is found in the structure of the pollen grains, and for this reason I have also given a figure of the pollen grains of *J. secunda*, though the latter does not occur in Surinam.

Besides *J. acuminatissima* five species of this genus have been found in Surinam: *J. carthaginensis* Jacq., *J. Martiana* (N. ab E.) Lindau, *J. pectoralis* Jacq., *J. cayennensis* (N. ab E.) Lindau and *J. obtusifolia* (N. ab E.) Lindau.

The pollen grains of *J. carthaginensis, J. Martiana* and *J. pectoralis* are over the whole surface finely punctate, but otherwise without any relief. Those of the first two species differ very conspicuously in size, whereas those of *J. pectoralis* are about as long as those of *J. carthaginensis,* but distinctly larger in diameter. The pollen of *J. pectoralis,* however, differs from that of the two other species very conspicuously by the large number of sterile grains and by the curious shape of the latter: they are very flat and nearly rectangular, and not rarely provided with a meridional groove containing the germ pore; as this groove could never be found in normal grains, it is apparently artificial.

J. carthaginensis is often grown as a garden plant, and is in South America perhaps an introduced species. *Beloperone surinamensis* Miq. proved to be identical with it.

J. Martiana belongs to a group of nearly related species, which have often been confused with each other. LINDAU and, afterwards, URBAN united all these species under the name *J. comata* L., but the true *J. comata,* which occurs in the Antilles, is doubtless different from the Surinam species. *J. parviflora* (N. ab E.) Lindau ex Pulle is also a good species, but does not occur in Surinam. The differences between these species have been described in sufficient detail by NEES in DE CANDOLLE'S „Prodromus", sothat a further discussion is not necessary. Of *J. Martiana* the var. *hispida* N. ab E. has also been found in Surinam.

J. pectoralis occurs in two forms: one, a plant with very narrow leaves, has been collected in the neighbourhood of settlements only, and was apparently introduced for its medicinal proporties; the other form, a plant with much wider leaves, occurs far from the beaten track and is doubtless indigenous. In both forms the pollen sterility is very large, but this does not hinder the production of fruits. The large-leaved form was as yet unnamed.

Justicia pectoralis Jacq. var. **latifolia** Brem. n. var.; typus: Lanjouw n. 1302 in herb. Ultraj.

A typo recedit foliis latioribus, inferioribus ovatis an ellipticis 7 cm longis et 3.3 cm latis, superioribus lanceolatis 4.5 cm longis et 1.8 cm latis.

Hab. Guianam Batavorum.

Tapanahoni River, Mnt Teeboe (Versteeg n. 788, fl. Aug.); Surinam River, Gansee (Lanjouw n. 1302, fl. Nov., type); Gran Rio (Tresling n. 468, fl. Sept.); Lucie River (Hulk n. 378, fl. Nov.); without locality (Kappler n. 170 [L]).

The pollen grains of *J. cayennensis* and of *J. obtusifolia* differ from those of the preceding species in two respects; they are from pore to pore slightly compressed and show on each side of the pore and extending from pole to pole a row of lenticular protuberances. The latter number in *J. cayennensis* in each row 7—8, and those of one row are opposite to those of the other row. In *J. obtusifolia* they are much larger, but less prominent, and number only three or four, and those of the first row alternate with those of the second and are separated from the latter by a serpentine groove.

Of *J. cayennensis* a small-leaved form was observed:

Justicia cayennensis (N. ab E.) Lindau var. **parvifolia** Brem. n. var.; typus: Wullschlaegel n. 421 b in herb. Bruss.

A typo recedit foliis ovato-ellipticis 1.5—2 cm longis et 0.9—1.2 cm latis, utroque latere costae nervos quattuor exhibentibus.

Hab. Guianam Batavorum.

Marowyne River, Albina (Wullschlaegel n. 421 b [B], type).

J. obtusifolia (N. ab E.) Lindau is probably among the Surinam species the most aberrant form. It differs from the other ones in the axillary position of its inflorescences. Together with a number of species enumerated by NEES in the „Flora Brasiliensis" on pp. 119—121, and similarly in DE CANDOLLE's „Prodromus" on pp. 337—339, to wit: *J. anagallis, J. repens, J. sarmentosa, J. laevilinguis* and *J. angustifolia,* it forms a natural group which, probably, deserves generic rank. Apart from the axillary inflorescence they agree with each other in the superposition of the anthers lobes, of which the lower one is apiculate at the base, and by very flat and thin seeds with dentate margin.

The separation between the genera *Justicia* and *Beloperone* is entirely artificial. It is not impossible that *Beloperone* may be kept up for a part of the species at present included in it, but then a better definition will have to be found, for neither the characters used by NEES nor the pollen characters introduced by LINDAU are of any value. The plant which I will describe presently as *Beloperone modesta* answers the generic description quite well; nevertheless I do not believe that it is at all nearly related to those species which must be regarded as the nucleus of the genus. Before a thorough revision of the genus *Justicia* has been carried out, no results can be expected from a discussion of this question.

Beloperone modesta Brem. n. spec.; *Justicia Pöppigiana* (N.

ab E.) Lindau apud Pulle, Enum. Pl. Sur. p. 435 (1906), non Lindau in Engler & Prantl IV 3 b p. 350 (1895); typus: Boon n. 1010 in herb. Ultraj.; *B. ciliatae* N. ab E. affinis, sed caulibus bifariam pubescentibus, foliis costa utrimque pubescente, bracteolis filiformibus quam calycis lobis brevioribus ab ea faciliter distinguenda.

Herba basi ramosior. Caules e basi decumbente et radicante suberecti subquadrangulares, pilis recurvatis dense bifariam pubescentes, basin versus cystolithis breviter cylindricis an subglobosis punctati, 25—40 cm alti. Folia in petiolum pilis incurvatis densius pubescentem, circ. 1 cm longum contracta; lamina lanceolata 6—9.5 cm longa et 1.9—2.5 cm lata, caudata, petiolum versus contracta, utrimque glabrescens, costa utrimque et nervis subtus tamen densius pilis adpressis pubescentibus, margine sparse adpresse pubescente, utrimque cystolithis cylindricis parvis, sicc. plerumque nigricantibus sparsa, supra saturate, subtus dilute viridis, nervis utroque latere costae 7—9. Spicae per paria superpositae in axillis foliorum supremorum, rudimentum caulis dense pubescens et interdum foliis duobus linearibus 1.2—2.5 cm longis munitum circumdantes, breviter pedunculatae, 1.5—3.5 cm longae, secundae. Bracteae fertiles oblanceolatae an obovatae 7—10 mm longae et 2.8 mm latae, acuminatae, basi in petiolum contractae, nervis utroque latere costae 2—3, costa et margine adpresse pubescentes. Bracteae oppositae steriles filiformes 5.5 mm longae, sparse pubescentes. Bracteolae filiformes 2.5—3 mm longae, glabrae, apice tamen fasciculo pilorum munitae. Calyx usque ad basin fissus, lobis lineari-lanceolatis 4.5 mm longis et 0.6 mm latis, subglabris, apice tamen in pilos 1—2 exeuntibus. Corolla alba an dilute purpurea 7.5 mm longa, extus pilis recurvatis pubescens; tubo 4.5 mm longo, basi 1 mm diam., ad faucem 2 mm diam., intus nervis hirtello; labiis 3 mm longis, superiore integro obtuso, inferiore in lobos 1.7 mm longos diviso, lobo mediano ovato et palato venoso munito, lobis lateralibus oblongis. Stamina 0.4 mm sub divisura corollae inserta; filamenta glandulosa 2.5 mm longa; antherae lobis connectivo lato separatis, inferiore superiorem haud attingente, quoque lobo 0.7 mm alto et basi calcare 0.2 mm longo munito; granula pollinis lobi superioris normalia, 42—52 μ longa et 23—27 μ diam., bipora, minutissime punctata; lobi inferioris minora, applanata, sterilia. Discus bilobatus, ovario bis latior, glaber. Ovarium 1.2 mm altum, glabrum; stylus 4.2 mm longus, glaber, in lobum stigmaticum singulum 0.2 mm longum exeuns. Capsula glabra 7.5 mm longa, basi in stipitem 3 mm longum mutata; valvulis bi-seminalibus dorso

sulcatis; retinaculis geniculatis. SEMINA ovoidea, basi inaequalia, margine haud incrassata, faciebus muricata, 2 mm longa et 1.6 mm lata.

Hab. Guianam Batavorum.

Coppename River (Boon n. 1010, fl. Aug., type); Upper Nickerie River, Blanche-Marie Falls (Tulleken n. 328 [L]); Upper Nickerie River, Ayobirini Fall (Tulleken n. 391 [L]).

EXPLANATION OF THE PLATES XIII AND XIV.

Tab. XIII.

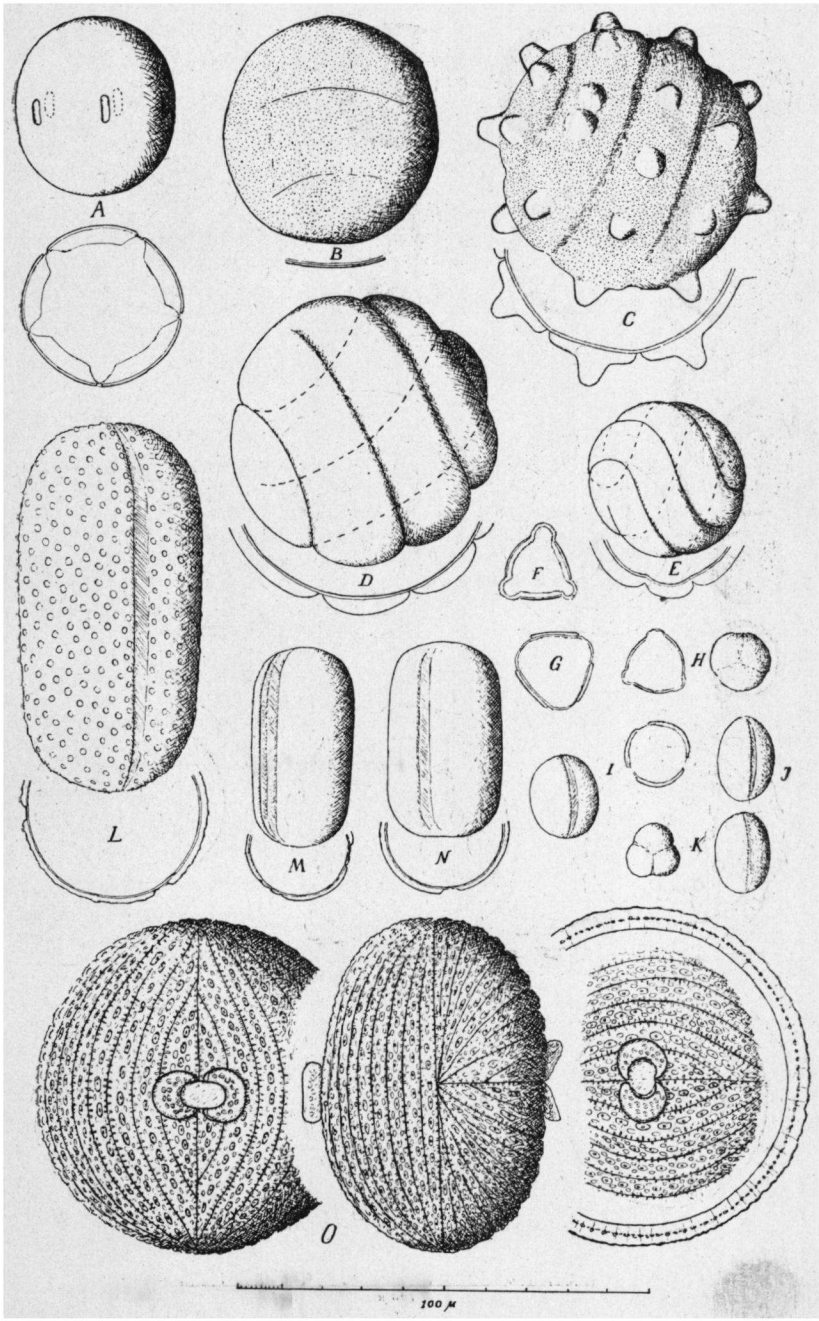
A. *Mendoncia Hoffmannseggiana* N. ab E. (B.W. n. 5621); B. *Thunbergia erecta* (Bth.) T. Anders. (nat. coll. n. 123); C. *T. fragrans* Roxb. (Lanjouw n. 6); D. *T. grandiflora* (Roxb. ex Rottl.) Roxb. (bot. gard. Utrecht); E. *T. alata* Boj. ex Sims (nat. coll. n. 56); F. *Staurogyne linearifolia* Brem. (Versteeg n. 739 *); G. *S. Stahelii* Brem. (Stahel n. 272 *); H. *S. Versteegii* (Versteeg n. 109 *); I. *S. Miqueliana* Kuntze (Focke n. 1159 *); J. *S. Wullschlaegeliana* Brem. (Wullschlaegel n. 426a *); K. *S. Fockeana* Brem. (Focke n. 1146 *); L. *Aphelandra paraensis* Lindau (Went n. 192); M. *A. tetragona* (Vahl) N. ab E. (Tulleken n. 354); N. *A. pectinata* N. ab E. (Lanjouw n. 100); O. *Trichanthera gigantea* (Humb. et Bonpl.) Steud. (Went n. 550).

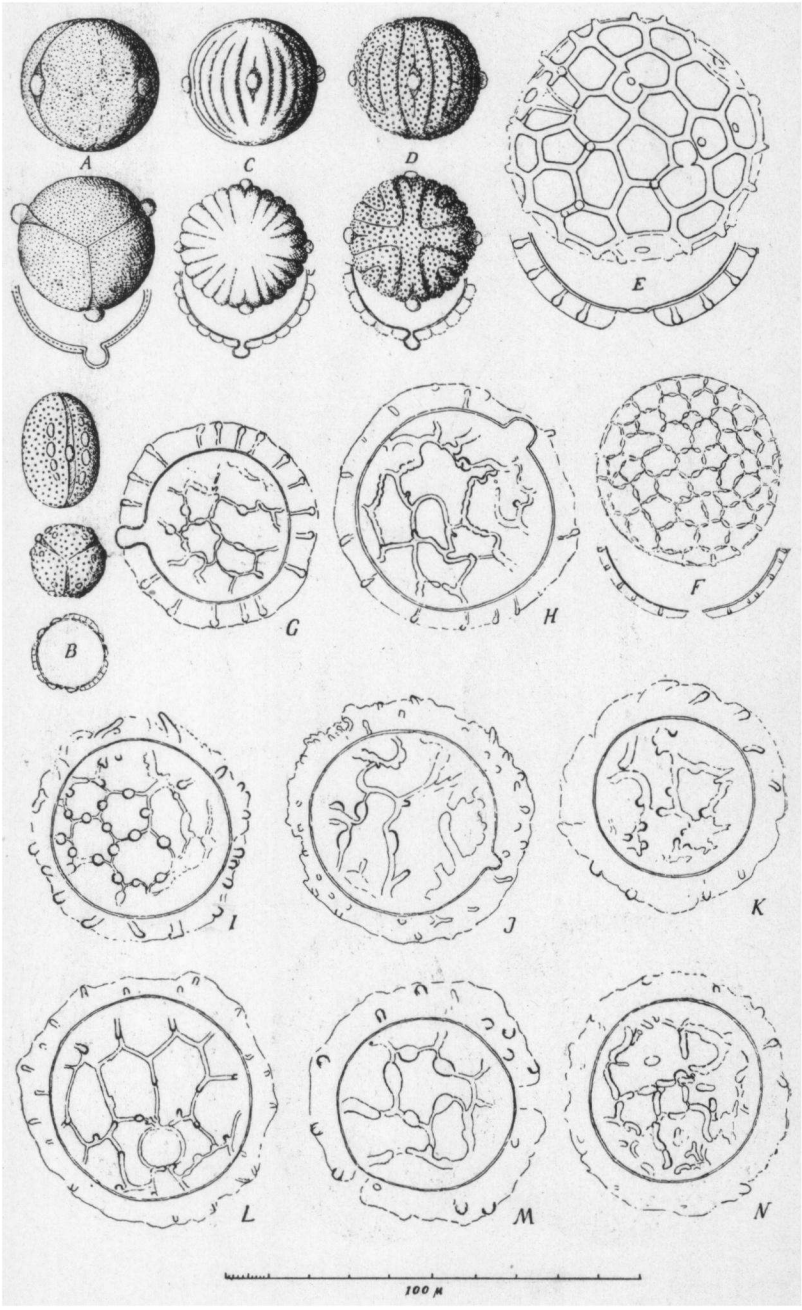
Types are marked with an asterisk.

Tab. XIV.

A. *Blechum Brownii* Juss. (Soeprapto n. 43 F); B. *Teliostachya alopecuroidea* (Vahl) N. ab E. (Rombouts n. 94); C. *Hygrophila surinamensis* Brem. (Versteeg n. 843 *); D. *H. guyanensis* N. ab E. (Focke n. 698); E. *Eranthemum nervosum* R.Br. (bot. gard. Utrecht); F. *Ruellia tuberosa* L. (Soeprapto n. 165); G. *Dipteracanthus surinamensis* Miq. (Kappler n. 1866 *); H. *D. angustifolius* (N. ab E.) Brem. (Rombouts n. 229); I. *Arrhostoxylum rubrum* (Aubl.) N. ab E. (Tresling n. 93); J. *A. rubrum* var. *attenuatum* Brem. (Gonggrijp n. 5343 *); K. *A. rubrum* var. *glomeruliflorum* Brem. (Versteeg n. 761 *); L. *A. rubrum* var. *parviflorum* Brem. (Went n. 265 *); M. *A. rubrum* var. *longifolium* (Rich.) Brem. (Gonggrijp and Stahel n. 5344); N. *A. rubrum* var. *pygmaeum* Brem. (Boon n. 1190 *).

In the grains of the *Ruelliinae* the relief has not been shaded, because in the shape in which they are shown here they are more easily recognizable. Of *Dipteracanthus* and *Arrhostoxylum* the optical section and a part of the surface relief are figured.


A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
100 µ


A
C
D
E
B
G
H
F
I
J
K
L
M
N
100 µ

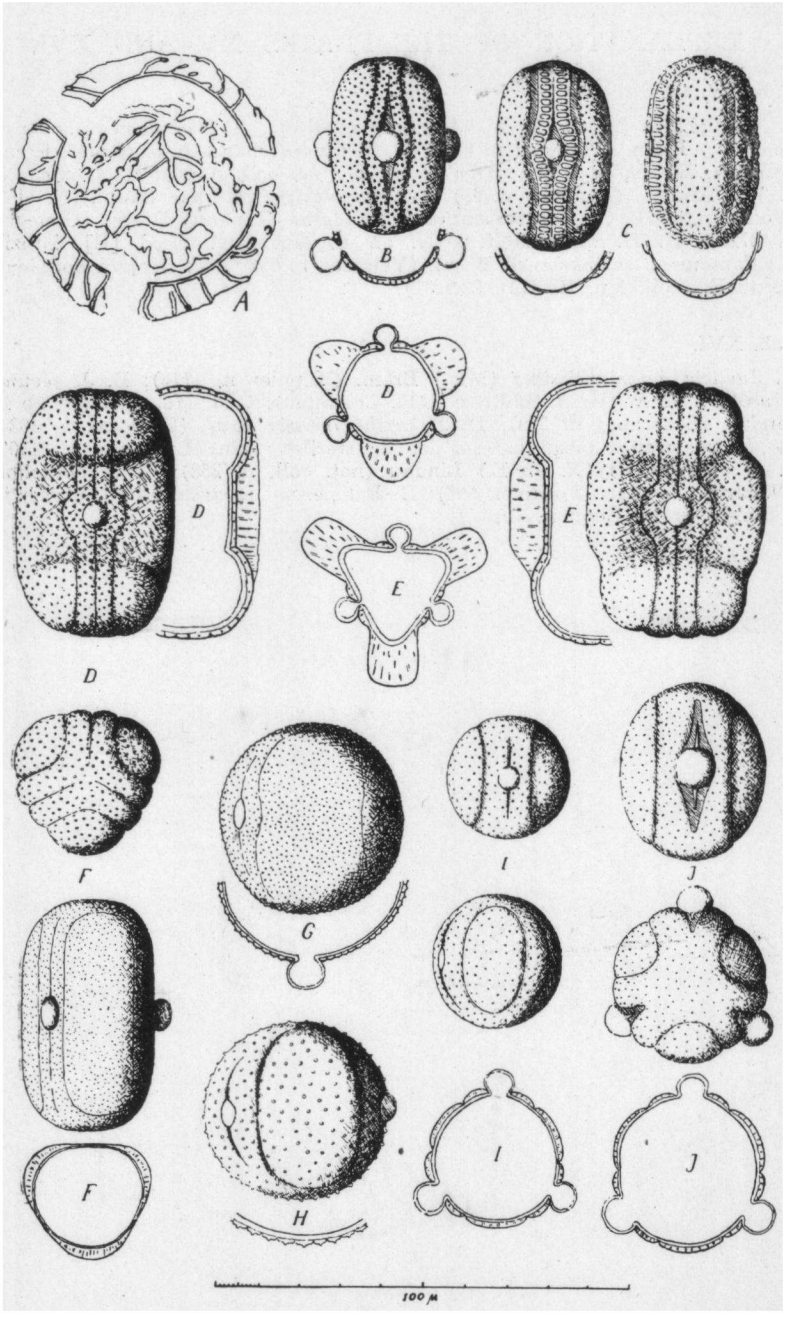
EXPLANATION OF THE PLATES XV AND XVI.

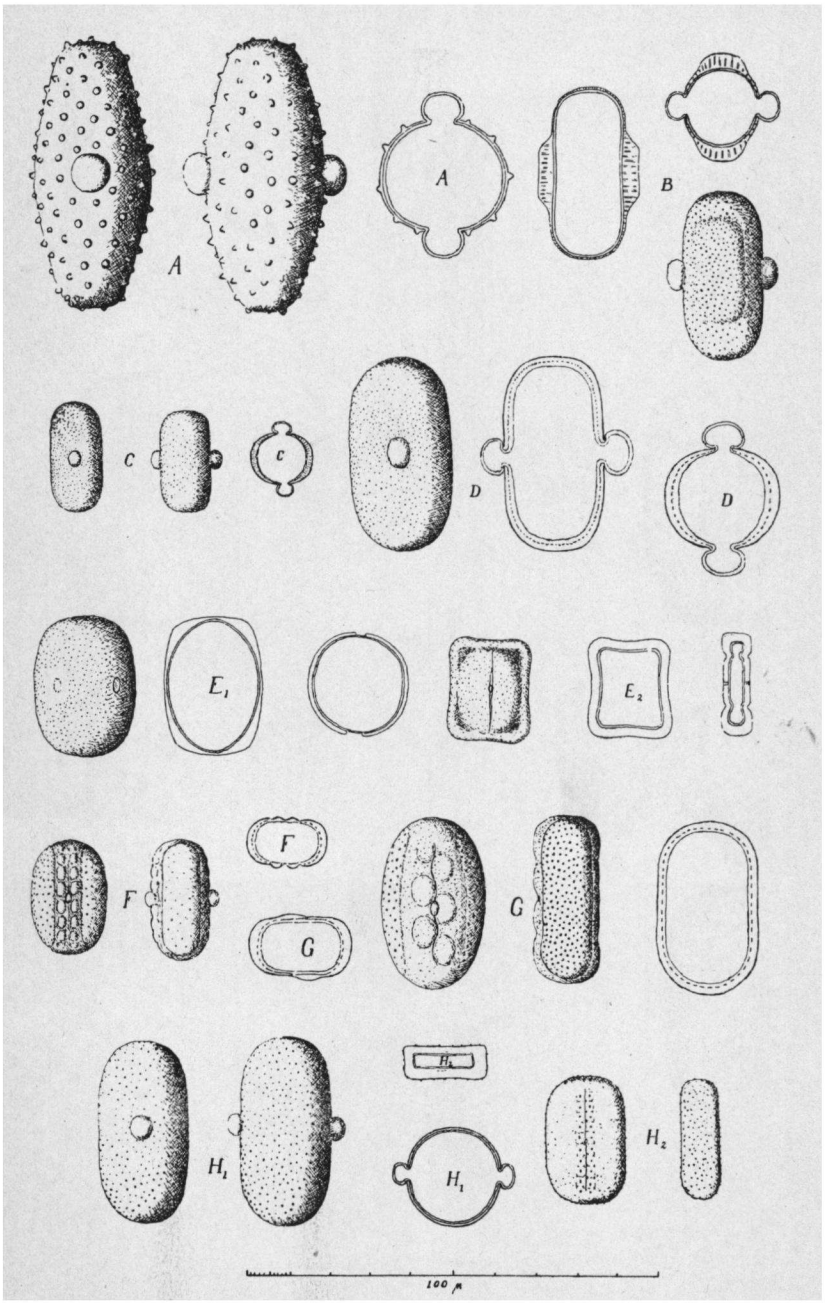
Tab. XV.

A. *Polylychnis fulgens* Brem. (Versteeg n. 313 *); B. *Dactylostegium assurgens* (L.) Brem. (Versteeg n. 828); C. *Dicliptera ciliata* Juss. (Sagot, French Guiana); D. *Asystasia nemorum* N. ab E. (nat. coll. n. 94); E. *A. gangetica* (L.) T. Anders. (Lanjouw n. 68); F. *Pachystachys coccinea* (Aubl.) N. ab E. (Focke n. 136); G. *Herpetacanthus rotundatus* (Lindau) Brem. (Gonggrijp n. 3729); H. *H. melancholicus* N. ab E. (Prinz v. Wied [B], Brazil); I. *Odontonema surinamensis* Brem. (Versteeg n. 898 *); J. *Drejera boliviensis* N. ab E. (coll. ign. III B.B. 23.9.'31).

Tab. XVI.

A. *Justicia acuminatissima* (Miq.) Brem. (Kappler n. 1716); B. *J. secunda* (Vahl) N. ab E. (H. H. Smith n. 1413, Colombia); C. *J. Martiana* (N. ab E.) Lindau (Soeprapto n. 279); D. *J. carthaginensis* Jacq. (Lanjouw n. 1084); E. *J. pectoralis* Jacq. (1. fertile, 2. sterile grain, Lanjouw n. 1302); F. *J. cayennensis* (N. ab E.) Lindau (nat. coll. n. 258); G. *J. obtusifolia* (N. ab E.) Lindau (Focke n. 596); H. *Beloperone modesta* Brem. (1. fertile, 2. sterile grain, Boon n. 1010 *).


A
B
C
D
D
D
E
E
E
F
F
G
H
I
I
J
J
100 M


A
A
A
B
B
C
C
C
D
D
D
E1
E2
F
F
G
G
H1
H1
H2
100 m