THE PODOSTEMACEAE OF THE NEW WORLD

PART I

BY

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CONTENTS

1. INTRODUCTION.

This work is the first part of a taxonomical treatment of the Podostemaceae, in which the American genera and species will be given preference, because they form the largest and best known part of the family.

It deals with a part of the tribe Eupodostemeae viz. with the genus Apinagia, considered by many authors (Warming. Went) to be the most primitive genus of the family, and with its nearest allies, Marathrum, Rhyncholacis, Wettsteiniola, Monostylis, Lophogyne, Jenmaniella and Macarenia.

The General Section contains chapters on the history of our knowledge of the family, its systematical position, subdivision, geographical distribution, habitat, live-cycle, morphology and anatomy. The last three chapters are kept very short; for a more detailed survey of these subjects I refer to the very elaborate publications of other authors.

The Taxonomical Section gives the descriptions of the species with the literature on them, a list of specimens and an indication of the type accompanied by critical remarks on their taxonomy and geographical distribution.

The appendix brings the Latin descriptions of the new genus and the new species, a list of collectors' numbers, a general index, a literature-list and the explanation of the plates.

As a rule only those specimens are quoted of which complete material was available; some incomplete specimens are quoted only when they allowed a reliable identification. Particulars regarding size and colour, as well as vernacular names and comments on the use of the plants are taken from the collectors' labels and from the literature.

The specimens were received on loan from the following herbaria (the abbreviations are those proposed in the provisional Index Herbariorum):

1. Botanischer Garten und Botanisches Museum, Berlin-Dahlem B.
2. British Museum (Natural History), London BM.
3. Jardin botanique de l'Etat, Bruxelles BR.
4. Universitetets Botanik Museum, Copenhagen C.
5. Field Museum of Natural History, Departement of Botany, Chicago F.

6.	Institut de Botanique Systematique de l'Université, Herbier Boissier	G-Bois.
7.	idem, Herbier Delessert	G-Del.
8.	idem, Herbier Hassler	G-Hass.
9.	Gray Herbarium, Harvard University, Cambridge (Mass.), U.S.A.	GH.
10.	Botanische Anstalten der Universität, Göttingen	Gött.
11.	Royal Botanic Gardens, Kew	K.
12.	Rijksherbarium, Leiden	L.
13.	Botanisches Museum, München	M.
14.	Missouri Botanical Garden, St. Louis (Mo), U.S.A.	Mo.
15.	New York Botanical Garden, New York (NY) U.S.A.	NY.
16.	Musée d'histoire naturelle, Phanérogamie, Paris	P.
17.	Naturhistoriska Riksmuseet, Botaniske Avdelningen, Stockholm	S.
18.	Instituto de Botânica (Ex-Departemento de Botânica do Estado), Sao Paulo	SP.
19.	Botanisch Museum en Herbarium van de Rijksuniversiteit, Utrecht	U.
20.	United States National Museum, Herbarium, Washington (DC), U.S.A.	US.
21.	Naturhistorisches Museum, Botanische Abteilung, Wien	W.

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Finally I wish to tender my most sincere thanks to Dr L a n j o u w, Professor of Systematic Botany and Director of the Botanical Museum and Herbarium at Utrecht for his continuous interest, valuable criticism and advice, and to the members of his Staff for their manifold assistence.

2. GENERAL SECTION.

History of our knowledge of the family.

The genus *Mourera* described in 1775 by Aublet was the first representative of the later family *Podostemaceae*, that was made known. This genus and those described in the next period were originally placed in the Monocotyledons, usually in the neighbourhood of the *Najadaceae* (Martius and Zuccarini 1824, Presl 1830 etc.). Richard (1815) was the first to recognize the *Podostemaceae* as a distinct family but he too placed them in the Monocotyledons. He included in this family only the genera *Marathrum* and *Podostemum*, although the genus *Tristicha* had been known from 1806 (Du Petit-Thouars). Between 1835 and 1951 many new species and genera were described viz. by Bongard (1835), von Chamisso (1835), Tulasne (1849, 1852, 1863), Weddell (1873), Warming (1888—1901), Willis (about 1900), Went (1900—1925), Engler (1927—1930) and van Royen (1948, 1950).

The *Hydrostachyaceae* were regarded by Adr. de Jussieu (1849) as a tribe of the *Podostemaceae*, but Warming (1901) raised them to the rank of a family. He was followed herein by Engler (1930), Hutchinson (1930) and others.

Willis (1913) split the *Podostemaceae* into *Tristichaceae* and *Podostemaceae*, but none of the later authors followed him in this respect. Already in 1902 Willis considered the family to constitute an order *Podostemales* and in this he was followed by Hutchinson (1926), Engler (1926, 1930) and Pulle (1938, 1950). Other authors e.g. Eichler (1886), Warming (1888, 1894), Went (1909, 1911), Wettstein (1924), considered them to belong to the *Rosales*, and in 1933 Mauritzon concluded from his cytological studies that the *Podostemaceae* show a close resemblance to the *Saxifragaceae*, *Crassulaceae* and *Rosaceae*. In 1937 Sprague pointed out that the correct family-name is *Podostemaceae* and not *Podostemonaceae*.

According to Engler (1926) the *Podostemaceae* are a very ancient family, which existed already when the continents were so near to each other that birds could transport the seeds from a river in one continent to a river in another; in this way *Tristicha trifaria* would have reached Central America and Madagascar.

In the same manner Koriba and Imamura (1929) tried to explain the migration of some *Hydrobryum* species into Southern Japan. Though the theory sounds attractive, there is little or no proof of its truth.

On the strength of its uniformity it might be supposed that this family, as has been argued in the case of other families (Willis 1922, 1949), is a very ancient one. However, according to Willis this uniformity might also be due to the slight degree of competition, inside the family as well as from plants belonging to the same community. Every seedling has a fair chance to survive as the available space on the rocks is never fully occupied either by *Podostemaceae* or by other plants. This means that there will always be a chance for new varieties, even for those that in the long run will wiped out by stronger competitors. In this connection Went pointed out that intercrossing may take place in the *Podostemaceae* on a comparatively large scale. Many closely similar forms might arise in this way, but these hybridogenous forms and mutants might be of comparatively recent origin. Considered in this way, the indubitably striking uniformity can not be said to give a clue to the age of the family. As regards the constantness of the species only culture experiments will be able to solve this problem.

Fossil *Podostemaceae* seems to be rare, although one might expect that these plants would easily be preserved thanks to the large amount of silica with which they are impregnated. Three fossil *Podostemaceae* were reported by an unknown author in a work called "Index generum plantarum fossilium". This small publication was found among the papers of Warming in Copenhagen.

Taxonomical position and origin of the family.

As pointed out already, Richard (1815) recognized the *Podostemaceae* as a new family, and he placed the latter in the neighbourhood of the *Juncaceae, Butomaceae* and *Alismataceae*. Kunth (1822), Presl and Bartling (1830) followed him and so did Sprengel (1825, 1830) although this author did not realize that *Crenias* (= *Mniopsis*) too was a *Podostemacea*. These authors regarded the *Podostemaceae* as Monocotyledons. Others were of the same opinion, but placed the family in the neighbourhood of the *Najadaceae* (Martius and Zuccarini 1824, Bartling 1830; Schultz 1832), near the *Liliaceae, Pontederiaceae, Restioniaceae, Lemnaceae, Rapateaceae, Juncaceae* and *Orchidaceae* (Presl 1830, St. Hilaire 1824) or near the

Ceratophyllaceae, Callitrichaceae and *Characeae* which at that time were regarded as Monocotyledons, (Reichenbach 1828, Endlicher 1837, 1839, Schultz 1832).

About 1840 the view that the *Podostemaceae* were Dicotyledons became generally accepted. Lindley (1830) had already pointed out that they ought to be considered dicotyledonous on account of their habit, the binary division of the ovary and the vernation of the leaves and he placed the family first in the neighbourhood of the *Piperaceae* and *Monimiaceae,* and in 1846 between the *Piperaceae* and *Elatinaceae.* Furthermore a relation would exist with the *Lacistemmaceae.* Bongard (1835) still considered the family monocotyledonous, but in 2 of his plates an embryo with two cotyledons is depicted.

Griffith (1838), Schleiden (1839) and Gardner (1850) definitely proved that the embryones are provided with two cotyledons. The latter supposed that the *Nepenthaceae* would be the nearest relatives of the *Podostemaceae.* Both families have a distinct perianth with imbricate aestivation, a superior pluri-locular ovary with many anatropous ovules and a superior capsular fruit. The latter dehisces septicidally in the *Podostemaceae* and loculicidally in the *Nepenthaceae.* This is already an important difference, but the seeds do not agree either. Those of the *Nepenthaceae* are albuminous, those of the *Podostemaceae* exalbuminous.

Tulasne (1849, 1852, 1863), Weddell (1873), Bentham and Hooker (1880) and Matthiesen refrained from pointing out a relationship with other families, but Bentham, Hooker and Weddell placed the family between or near the *Nepenthaceae* and *Polygonaceae.* Afterwards Hooker (1890) regarded some representatives of the family as reduced forms of *Scrophulariaceae* and *Lentibulariaceae.* Matthiesen supposed the ancestors of the *Podostemaceae* to have been submerged aquatic plants. Willis (1901—'02) too, assumed a relationship with the *Nepenthaceae,* but placed them as a new order between the *Sarraceniales* and *Rosales.*

Baillon (1888) considered the family as "a type amoindri, aquatique des Caryophyllacées" because of their simple perianth, which is often reduced to mere scales, the kind of placentation, their hypogyny and isostemony. It is true that their seeds are exalbuminous but Baillon pointed out that *Frankenia* (then considered to belong to the *Caryophyllaceae)* did not have albumen in its seeds either. In many respects the genus *Hydrostachys* seemed to correspond with *Frankenia.* The *Hydrostachyaceae* as well as the *Frankeniaceae* are now separated respectively from the

Podostemaceae and the *Caryophyllaceae*, and are even placed in other orders.

Warming (1888, 1894) considered the *Podostemaceae*, as Eichler (1886) had done, to be related to the *Saxifragaceae*, with which they agree in the hypogyny, the free bicarpellary gynaecium, the many anatropous ovules inserted on a fleshy placenta, the free styles and the straight embryo not surrounded by endosperm. According to Warming the flower of the *Podostemaceae* is a reduced form of that of the *Saxifragaceae*. The structure of the vegetative organs and the mode of branching of the *Saxifragaceae* and *Podostemaceae* show according to him many corresponding features.

Thwaites (1864) placed the *Podostemaceae* between the *Orobanchaceae* and the *Acanthaceae*.

Hallier (1905) placed the family at the end of the *Ranales* and in 1908 between the *Sarraceniales* and *Ranales*.

Van der Elst (1909) could not confirm the resemblance between the embryology of the *Saxifragaceae* and *Podostemaceae* which Went had postulated. The latter had assumed that the *Podostemaceae* were related also to the *Crassulaceae*, and his pupil, Miss Rombach (1911) proved that the embryology of the *Crassulaceae* resembled that of the *Podostemaceae;* according to her the *Crassulaceae* had to be considered as an intermediate group between the *Podostemaceae* and the *Rosaceae;* part of the *Podostemaceae* were supposed to have returned to the land and to have given rise to the *Crassulaceae*. Magnus (1913) could not accept this evolution and supposed the *Podostemaceae* to have been developed out of the *Crassulaceae*, which seems to me to be more plausible than the hypothesis of Miss Rombach. It is also possible that the *Podostemaceae* and *Crassulaceae* had the same ancestors.

From this time the position of the *Podostemaceae* remained more or less fixed in the neighbourhood of the *Crassulaceae* and *Saxifragaceae*, although Engler (1926) did not agree with this interpretation and inserted them near the *Urticales* without, however, accepting any relation to that order. Hutchinson (1926) united the *Hydrostachyaceae* and *Podostemaceae* in the order *Podostemonales*, which he brought in close relation to the *Saxifragales;* the latter comprise in his classification the *Crassulaceae, Cephalotaceae* and part of the *Saxifragaceae*. Thus the *Crassulaceae* and *Saxifragaceae* are according to Hutchinson the nearest relatives of the *Podostemonales*. On the other hand he supposed the *Sarraceniales* to be a derived form of the *Saxifragaceae* and in this way the close resemblance between the *Sarra-*

ceniales and *Podostemales* pointed out by Willis becomes comprehensible. Hutchinson regarded the *Saxifragales* as derived from the *Ranales,* but a part of the *Saxifragaceae* were placed as a connecting link between the *Magnoliales* and the *Rosales* as *Cunoniales (Hydrangeaceae, Grossulariaceae).*

In this regard the work of Mauritzon (1933) is of importance; he considered the *Podostemaceae* (and *Hydrostachyaceae*) as the end of a line of evolution starting from the *Rosaceae* and passing through the *Crassulaceae:* in this series an increased reduction of the embryo-sac is observed.

When the interpretations of Hutchinson and Mauritzon are taken together, it becomes clear why so many authors placed the *Podostemaceae* in the *Rosales* (Eichler, Warming, Wettstein etc.). By way of the *Ranales* the *Rosales* would be linked with the *Saxifragales* and these with the *Podostemales.* Thus the following series could be made: *Rosales — Cunoniales* (with *Saxifragaceae p.p.*) — *Magnoliales — Ranales — Saxifragales* (including *Crassulaceae* and *Saxifragaceae p.p.*) — *Podostemales.* The present author suggests that the *Podostemaceae, Crassulaceae* and *Rosaceae* form the final stages of three diverging lines starting from the *Saxifragaceae.* It is of course also possible that the *Crassulaceae* and *Podostemaceae* first formed one line and the *Rosaceae* another and that the *Crassulaceae* and *Podostemaceae* parted later on. The *Podostemaceae* differ so much from the two other families that they are best severed from the *Rosales* as a separate order. In this way we return to the classification of Warming (1888, 1894).

About the origin of the *Podostemaceae* nothing is known with certainty. It is conceivable that the *Crassulaceae* and *Podostemaceae* had the same ancestors and that both families developed in different directions. It might also be that the *Crassulaceae* and *Podostemaceae* sprung separately from the *Saxifragaceae.* However, when this has taken place is impossible to say. It must have been a long time ago, as Willis (1915) points out, for all *Podostemaceae* are adapted to the same environment, and not a single convincing example can be given of an intermediate between this family and families living either in stagnant water or more or less amphibiously. However, according to Willis (1949) it is thinkable that such intermediates have never been present because a single fundamental mutation might have produced so may new features that the family resemblance was entirely lost. The only indication of an intermediate condition is found in a few *Crassulaceae* that are able to emit roots in stagnant water and to produce adventitious shoots along these

roots, but as the formation of adventitious shoots from roots is observed also in land plants, this may be considered a parallel development.

In one of his publications Willis (1915) came forward with the hypothesis that the ancestors of the *Podostemaceae* must have been landplants. He based this i.a. on the seed production and on the relative weight of the seeds. According to him the large amount of seeds produced by each single flower is an argument in favour of the view that the ancestors were landplants, and in a family with a long row of aquatic ancestors, he argues, one would expect to find seeds that are adapted to a distribution by water, i.e. that would be provided with means to remain afloat, but such means prove to be entirely absent. If one assumes that the ancestors were waterplants, he argues, the fact that the seeds immediately sink remains a difficult problem. Another objection raised by him to the supposition that the ancestors were waterplants, is that the latter have nowhere been found. The absence of competition between the *Podostemaceae* and these aquatic ancestors makes it difficult to understand why the latter would have been exterminated for almost every factor that would lead to the extermination of the ancestors, would distray the *Podostemaceae* too.

According to Willis another possibility should be considered, viz. that the ancestors lived on land and sent out roots that crept along the stones of the falls. Along the roots adventitious shoots would have been formed. This type of plants really occurs: Littorella may be quoted as an example. Then a single fundamental mutation would have sufficed to produce a plant that was able to stick to the rock, and this would have been the first *Podostemacea*. Lateron by small mutations types might have been evolved that were better fit to colonize the falls than their ancestors. These small and slow changes may have led to the present polymorphism of the family. According to Willis (1949) this polymorphism is a characteristic of very ancient families. He is of opinion that the mutations gradually decrease in importance and that they become in the end so slight that the differences between the most recently formed representatives of the lower taxa are hardly noticable. This would require a very long time. Willis suggests that owing to more or less extreme conditions of life, mutations may in the case of the *Podostemaceae* have arisen in a more rapid succession than normally, so that the formation of the present mass of species would have taken a shorter time than is usual.

Assuming that the ancestors were altogether exterminated it is, as Willis himself points out, difficult to explain why no trace has been found of them in the fossil flora. The only way out of

the difficulty would be to assume that they arose from landplants like the *Crassulaceae* or the *Saxifragaceae* by means of a single fundamental mutation.

Subdivision.

The subdivision of the family has proved a difficult problem, and in this respect the following words of Willis may be quoted: "Not merely is it extremely hard to place the order in its proper position in a natural system of classification, but it is almost equally difficult, in the present state of our knowledge, to divide it satisfactorily into suborders, genera and species". These words held good in 1901, and they still do now.

The simplest divison is: 1. Species with a distinct perianth, 2. Species without a distinct perianth. On these grounds Bongard (1835) split the family into two separate ones, viz. *Philocrenaceae* and *Podostemaceae*. This division was accepted in principle by Tulasne, who reduced the first family to a subtribe *Chlamydatae (Tristicheae)*, and the latter to a subtribe *Achlamydatae (Lacideae)*. Together they formed the tribe *Eupodostemeae*, which was put in opposition to the tribe *Hydrostachyeae*. The latter has in a later period been raised by Warming on good grounds to family rank, and will not be considered here. The *Lacideae* were divided by Tulasne into *Isolobae* (section *Eulacideae*) and *Anisolobae* (section *Podostemoneae*). The former comprises *Mourera*, *Lacis* (= *Tulasneantha*[1]), *Marathrum*, *Rhyncholacis*, *Ligea*, *Apinagia* and *Lophogyne*, while the *Podostemaceae* include *Podostemum*, *Mniopsis*, *Oserya*, *Devillea*, *Castelnavia*, etc. This system is very useful, and the more recent classifications are all based on it. It rests on the increasing dorsiventrality of the vegetative parts of the plant and on the degree of zygomorphy of the flower.

Weddell (1873) divided the *Podostemaceae* into the suborders *Podostemoneae* and *Hydrostachyeae*. The *Podostemoneae* he divided into the tribes *Tristicheae*, *Weddellineae* and *Eupodostemoneae*. The last tribe was divided into the subtribes *Moureeae* and *Neolacideae*. This division proved to be artificial; for example the *Neolacideae* include genera with free or united stamens besides genera with two stamens borne by an andropodium[2]), i.e. *Neolacis*, *Lophogyne*, *Ceratolacis*, *Podostemum*, etc. In the *Moureeae* genera

[1]) The name Lacis is illegitimate and instead the name Tulasneantha is proposed (See Part 2).

[2]) This name is used when the innermost tepal is separated from the other ones by a stalk. The presence of this tepal distinguishes the andropodium from the basal part of a group of connate stamens.

with stamens in a complete whorl and in the *Neolacideae* those with the stamens in an incomplete whorl were inserted, one more proof of the artificiality of this system. In my opinion, moreover, it would have been better if the *Tristicheae* and *Weddellineae* had been placed as subtribes in a single tribe which would have stood besides the tribe *Eupodostemeae*.

The system of Bentham and Hooker (1880) is in many respects preferable. In the main Hooker follows the division of Tulasne, and he distinguishes:

TRIBE I TRISTICHEAE: Perianth trifid; stamens 1—3; ovary 3-celled (a.o. *Tristicha, Terniola*).

TRIBE II MOUREREAE: Perianth 5-fid or squamiform; stamens 1 to many; ovary 2-celled (*Weddellina, Mourera, Lonchostephus, Lacis (=Tulasneantha), Marathrum, Rhyncholacis, Ligea, Apinagia, Lophogyne*).

TRIBE III EUPODOSTEMEAE: Perianth squamiform; stamens 2 or 3, united or borne on an andropodium; ovary 2-celled, mostly with very unequal carpels (*Podostemum, Castelnavia, Oserya* etc.).

TRIBE IV HYDROSTACHYDEAE.

In this system it is difficult to understand why a genus like *Weddellina*, with a distinct 5-fid perianth, is placed in the same tribe as genera with a squamiform perianth. According to the author this is done because it resembles the genera with squamiform perianth in the 2-celled ovary and the latter character therefore is apparently the only one that counts. Yet it seems to me unjustifiable to base a natural group on a single character and for this reason it would in my opinion be better to place *Weddellina* in a separate tribe beside the tribe *Tristicheae*, as *Weddellina* has, especially in the mode of branching of the sterile shoots and in the flowers much more in common with *Tristicha* than with the true representatives of the *Moureреae*. Even if *Weddellina* is excluded the tribe *Moureреae* is still too heterogeneous, as genera with flowers in 2-sided spiciform monochasia are placed side by side with genera provided with solitary or fascicled flowers.

Baillon (1888) followed in the main the system of Bentham and Hooker. However, *Weddellina* was placed in a separate tribe, but the *Moureреae* still remained a too comprehensive group. Apart from a few alterations his *Eupodostemeae* were similar to the isonymous tribe in the system of Bentham and Hooker. In the works of Baillon and of Bentham and Hooker the

genera *Oserya* and *Devillea* (separated or not) are referred to the *Eupodostemeae*. However, their resemblance with some *Apinagia* species is so striking that Went (1926) proposed to sink the genus *Oserya* s.s. in *Apinagia*.

Warming (1891, 1901) returned to the system of Tulasne. *Weddellina* was inserted with *Tristicha* and *Lawia* in the subfamily *Chlamydatae* (*Tristicheae*). The *Achlamydatae* were broken up, which seems to give a more natural arrangement, into the tribus *Marathreae (Oenone, Marathrum, Rhyncholacis, Lophogyne, Apinagia)*, in which the flowers are solitary or fascicled and actinomorphous or slightly zygomorphous, and into the tribus *Moureeae*, where the flowers are arranged in distinct, 2-sided spiciform monochasia (*Mourera, Lonchostephus, Lacis (= Tulasneantha)*. The third tribus *Eupodostemeae* has markedly zygomorphous flowers and 1—3 stamens which are united or borne by an andropodium (*Oserya, Devillea, Podostemum, Mniopsis* etc). Warming already points out that the subdivision of the *Achlamydatae* is extremely difficult because the dividing lines between the genera are vague; it is expected that this problem will become all the more difficult as the number of species increases.

Willis (1915) united *Tristicha, Dalzellia, Lawia, Terniola* and *Weddellina* into a family *Tristichaceae*, following Bongard (1835) who used for this taxon the name *Philocrenaceae*, after *Philocrena*, a synonym of *Tristicha*. Although the argumentation of Willis is convincing, he led too much emphasis on the differences, and underrated the value of the points of resemblance between the two groups. The latter are to be found in the embryology, the structure of the pollen grains and the anatomy.

Engler (1930) divided the *Podostemaceae* as follows:

SUBFAMILY I *Weddellinoideae (Weddellina)*

SUBFAMILY II *Tristichoideae (Tristicha, Lawia, Terniola, Dalzellia)*

SUBFAMILY III *Podostemonoideae*

tribe 1, Lacideae: stamens free, in a complete, rarely in an incomplete whorl.

subtribe *Apinagiinae:* herbs with elongated internodes *(Oenone, Apinagia)*

subtribe *Marathrinae:* herbs with short internodes *(Marathrum, Rhyncholacis)*

subtribe *Mourerinae:* flowers in a spiciform monochasium *(Mourera, Lonchostephus, Lacis = Tulasneantha)*

tribe 2 Eupodostemoneae: flowers markedly zygomorphous; stamens 1—3, free or united or borne by an andropodium (*Jenmaniella, Lophogyne, Oserya, Castelnavia, Mniopsis, Ceratolacis, Podostemum* etc.).

The resemblance between the *Weddellinoideae* and *Tristichoideae* is so striking that it will be better to unite them into a single subfamily *Tristichoideae*; the distinction in the latter of two tribes, *Weddellineae* and *Tristicheae*, being sufficient to account for the differences between them. The second subfamily will be formed in that case by the *Podostemonoideae*. In Engler's subdivision of the latter, in my opinion, also a few alterations should be made. Of the three subtribes in the tribe *Lacideae* the *Marathrinae* and *Apinagiinae* should be united as the difference in the length of the internodes is illusory; together they will form the *Marathrinae* as opposed to the *Mourerinae*. In the tribe *Eupodostemoneae* Engler included i.a. *Lophogyne, Jenmaniella* and *Oserya*, but the first two might better be placed near *Apinagia* in the *Marathrinae*. Yet it is doubtful whether, in the long run, the *Eupodostemeae* can be kept apart from the *Lacideae*; and as is discussed lateron both are united.

Engler's *Lacideae* are said to possess free stamens, but in the genera *Apinagia* and *Marathrum* some species have been included whose stamens are united. Further the stamens are said to be arranged in a complete or, rarely, in an incomplete whorl, but when the whorl is incomplete the flowers must be zygomorphous and this is said to be a character of the *Eupodostemoneae*. In the latter one find on the other hand a number of genera (*Inversodicraea, Dicraea, Winklerella, Oserya, Devillea*, etc.) in which the carpels are equal or slightly unequal; the zygomorphy of the flower thus rests on the structure of the androecium and is therefore of the same kind as that of *Apinagia* and *Marathrum*. It appears therefore that Engler has not been able to find a single character by the aid of which it would be possible to distinguish his two tribes.

A study of the pollen structure confirmed my distrust in this classification. Simple pollen grains were found to be characteristic for the *Lacideae*, but they were also found in the genera *Castelnavia, Leiothylax*, and *Macropodiella*, which Engler includes in the *Eupodostemeae*, whereas the rest of the latter posses compound, 2- or more-celled pollen.

In view of the objections that have been raised against the older systems I propose the following classification:

SUBFAMILY I TRISTICHOIDEAE: perianth 3- or 5-lobed; young flowers enveloped by a few leaves.

tribe 1. Tristicheae: perianth 3-lobed; stamens 1-3; ovary 3-celled; fertile and sterile shoots on the same stem (*Tristicha* etc.)

tribe 2. Weddellineae: perianth 5-lobed; stamens 5-25; ovary 2-celled; fertile and sterile shoots springing separately from a root (*Weddelline*)

SUBFAMILY II PODOSTEMOIDEAE: tepals reduced to minute scales; young flowers separately or in groups within a sheath consisting of a single leaflike part (spathella).

tribe 1. Moureреae: flowers in 2-sided spiciform monochasia, separately within a sheath (*Mourera, Lonchostephus, Tulasneantha.*)

tribe 2. Eupodostemeae: flowers solitary, fascicled or in extra-axillary inflorescences, but never in spiciform monochasia. Flowers separately or in groups in a sheath; ovary with equal to markedly unequal carpels; staments 1 to many, free or united, sometimes borne by an andropodium; pollen grains 1- to many-celled; fruit with 2 to numerous seeds. (*Marathrum, Rhyncholacis, Apinagia, Lophogyne, Jenmaniella, Wettsteiniola, Oserya, Devillea, Castelnavia, Ceratolacis, Mniopsis, Podostemum,* etc.)

Geographical distribution.

At present the *Podostemaceae* include about 200 species, mainly distributed in the tropics and subtropics of 4 continents. *Podostemum ceratophyllum* and some species of *Inversodicraea* and *Hydrobryum* are the only ones that reach the temperate zone. Most of the *Podostemaceae* are found in America viz. about 140, while eastwards the number gradually decreases; in Africa circ. 40 species are found and in Asia and Australia respectively 20 species and 1. Went (1926) gave a survey of this distribution.

As the *Podostemaceae* live in cataracts and rapids only, the habitats are often far apart. According to descriptions given by botanists each cataract and each set of rapids would have its own species. This is often true, but some species are distributed over more than one cataract or one set of rapids. The area of *Tristicha trifaria* extends over a large part of Africa and America, and although the area of *Mourera fluviatilis* is smaller it still extends over the whole northern part of South America. Most species,

however, have a very restricted area. In this respect it is noteworthy that closely related species often occupy different tributaries of the same river or of some nearby rivers. *Apinagia richardiana* replaces in the Surinameriver *Apinagia versteegiana* of the Coppename-river (Went 1916, 1926). Many other species and genera are restricted to a comparatively small area, for example *Lophogyne* and *Castelnavia* to Central Brazil, and *Rhyncholacis dentata* to Suriname. The genus *Marathrum*, however extends its range over Central America and the northern part of Southern America.

A remarkable range of distribution is shown by the genus Podostemum. The species are found in the first place in North and Central America and in the West Indian islands and secondly in southern Brazil, Uruguay and Paraguay. The last-named area is contiguous with the area in Africa, which on its other side passes into the area in Asia.

Another genus with a curious distribution is Oserya. One species is found in Western Mexico, 3 species in Guyana and NE Brazil and 1 species in Central Brazil. Connecting collections may well be made in the future as the species of this genus are small plants which are easily overlooked.

According to some earlier authors (Corda 1805) one *Podostemacea* described as *Blandowia preissi* has been found in Europe, viz. in the Valumbrosa-valley in Italy on stems of trees or between mosses. It was of course, difficult to believe in a *Podostemacea* living on stems of trees or between mosses and not in running water, and the investigations of Baroni (1900) indeed have proved that this so-called *Podostemacea* is a hepatic, *Targionia epiphylla*. The possibility that *Podostemaceae* might be present in Europe must of course be admitted, as they are found also in the south of Canada, and as some places in Europa would seem to be more suitable habitats than the Canadian St. Laurens river. If they really are absent in Europe this may be due to the circumstance that immigration from the south was prohibited by the Saharadessert.

Habitat.

The *Podostemaceae* live without a single exception in swift-running rivers with a stony bed, especially in waterfalls and rapids (Goebel, Weddell, Went, Willis, Tobler, Accorsi). There they form associations on rocks, occasionally also on the roots of trees growing along the water's edge. These associations belong to the class Saxopodostematea pantropicalia according to

Léonard (1950). As a rule they thrive only when they receive the full light of the sun. The *Podostemaceae* are firmly attached to the substrate by root-hairs or by so-called hapters, which both secrete a gluey substance with which the plant is glued to the rock. Sometimes the roots are only fixed to the rocks at the widened places where the adventitious shoots are formed.

The leaves are very slender and flexible and are often damaged by the strong current. An unusual power of regeneration helps them to overcome many of these injuries (Goebel, Went, Willis, Accorsi).

The community of *Podostemaceae* mixed with some algae and other organisms is called by Dugand (1944) the Tachyrheophyton. According to him this is a better term than Rheophyton as this word merely indicates that the plants live in running water, but not in swiftly running water with a frequently interrupted current. To the present author it would be desirable to add that the Rheophyton comprises those plants that live in running water, and root in a soft soil (clay, sand etc.), while the Tachyrheophyton comprises plants that live in a rapid, often interrupted current and that are attached to a stony substrate. In this case the roots only function as a means for the attachment to the substrate.

During the rainy season the *Podostemaceae* grow vegetatively and when the time approaches in which the waterlevel falls, they begin to develop flowers. Once out of the water the plants flower and very quickly fruits are produced. This whole proces takes place within 24 hours (Went). In the heat of the tropical sun the plants soon wither. Then the outer layers are shed. This is a phenomenon of life for the cells still have a high turgor and they must therefore be fully alive (Went, Goebel, Matthiesen). At the same time the outer layers are cast off, the vascular bundles become lignified. Often only these remains are collected, and this may cause great confusion as it may look as if a new species has been found. *Apinagia psyllophora, A.microcarpa, A.gardneriana* and *A.warmingiana* are examples of descriptions based on such material.

In the growth of the various species a conspicuous zoning has been observed, e.g. for Ceylon by Willis, for Suriname by Went, for Venezuela by Goebel and for Brazil by Tobler (1933). Every species apparently requires its own combination of life-conditions, viz. lightintensity, speed and depth of the currents, and aeration, temperature and purity of the water.

According to Willis the smaller and thalloid species are found in the most exposed places with the strongest current, while the bigger ones are found in calmer water. However, Tobler is of opinion that *Mourera aspera* (a large species) grows in very strong

currents, although Went reports that *M.fluviatilis* (also a large species) is found in calmer water.

Life-cycle.

When the seeds germinate, a primary axis is formed (Willis 1901—'02, Goebel 1893, Accorsi 1944, 1946, etc.) which is, as a rule, strongly reduced and which never flowers (except in *Willisia* and *Sphaerothylax?*, Willis (1901). It is provided with two cotyledons and sometimes with a few more leaves, and with a hypocotyl. The seedling fastens itself with the top of the hypocotyl which is bent downwards to the substrate. From the basal part of the hypocotyl endogenously a root sprouts which assumes in the various genera different shapes and sizes. This root grows rapidly, branches repeatedly and is fastened to the substrate either over its whole length or only at those places where the adventitious shoots will arise. In some Indian species only the part nearest to the hypocotyl is attached to the rock while the top remains floating. Along the margin of these roots the adventitious shoots arise which in the American species form the major part of the plant, while in many Indian species they remain very small. In many American species the branches of the adventitious shoots fuse and form the secondary thalli (Willis 1901).

In several cases the fusion remain confined to the bases of the leaves or of 2-leaved sprouts. In this publication the term "base" is used for the fused parts and includes therefore organs consisting either of entire shoots with several leaves (o.a. *Apinagia, Lophogyne, Oserya, Jenmaniella*), or of shoots with two leaves or of the basal parts of the shoots (*Rhyncholacis, Marathrum,* but some species from other genera as well). The term is also used for the widened parts of the roots from which new adventitious shoots spring *(Marathrum)*.

The adventitious shoots may consist either of an undivided base with the leaves sometimes distichously arranged along the margin or they may be strongly branched, and between these two extremes many intermediates are met with. In the species which are strongly branched the flowers are solitary and in those with undivided base the flowers are solitary or fascicled. In some cases the flowers are arranged in spiciform monochasia and in other ones in extra-axillary inflorescences, and their flowers always alternate with leaf-like bracts; the latter are sometimes more or less reduced.

The flowers vary between actinomorphous and markedly zygomorphous, the number of stamens from one to many, as that of the ovules from two to many. These differences are correlated with

a change from entomophily towards anemophily and autogamy (Willis 1901—'02). The dorsiventrality manifests itself, according to him, first in the vegetative parts and subsequently in the structure of ovary and fruit. The stamens alternate with the tepals but it is not certain whether the latter are to be interpreted as staminodes or as perianth parts. Warming chose the first alternative, but in this publication the term "tepals" is used in a purely descriptive way, i.e. without anticipating on a decision with regard to their morphological value.

The fruit dehisces septicidally, and the sutures are often marked by twin-ribs, which sometimes disappear after the dehiscence. In the young ovary the ribs are sometimes difficult to see, but in a transverse section their vascular bundles are always distinguishable. In a few cases the ribs are formed by folds in the wall and are not or very slightly reinforced by vascular bundles (the whole genus *Rhyncholacis* and *Apinagia penicillata*). The pedicel of the fruit sometimes looks as if it is provided with wings, but these wings are merely folds caused by the shrinking of the tissues. This should be borne in mind when in this publication the pedicel is found described as winged.

When the fruit dehisces, the seeds are shed over the rocks and they stick to the latter by their mucilaginous testa, which desiccates very soon. Unless a wave washes them away which is always possible as the mucilage is soluble in water, they may develop then into new plants.

Morphology and anatomy.

Though it would be possible to give some details on the morphology and anatomy, it seems better to refer the reader to the elaborate extracts of the literature up to 1930 given by Engler. In his work the investigations of Went (1910—'23), Willis (1901—'02) and Matthiesen are recorded and for more details the reader is advised to consult the works of these three botanists. Special attention is asked for the excellent work of Willis, Went and Magnus on the embryology of the *Podostemaceae*.

Incomplete material.

Some authors have founded new species on insufficient material. In many cases the leaves were absent and sometimes no flowers were available. All these species are regarded as dubious and are relegated to an appendix at the end of the genus to which they have been referred. Dubious specimens are quoted after the other

ones under the species to which they probably belong. Among the dubious species are also mentioned those specimens which the present author believes to represent new species, but of which the material proved too incomplete to be described in the proper way. In judging herbarium material one has to be very careful, as after the water has subsided, the plants throw off part of the outer tissues, which causes great changes in their appearance and may make a correct decision impossible. The best way of collecting specimens is to put them in alcohol (60—70 %) or formalin (4 %) or in a mixture of these two fluids. In this mixture the outer tissues are not so easily shed as when they are put in the press. Unfortunately this has been done only in a few cases, and for this reason it is often difficult to decide whether the plants exhibit their original aspect or not. Went realized the importance of this method and made a large collection preserved in alcohol, thus providing the Utrecht herbarium and science in general with precious type-specimens and with specimens of earlier described species in a complete state.

Use.

Economically the *Podostemaceae* are without much importance. According to Standley and Purdie they are in Panama and Colombia used as forage in the dry season. To this end the cattle are driven into the river where they graze on the stones. In Suriname and Venezuela some *Podostemaceae* form a kind of fishfood, while in Madagascar they are eaten by the natives as a salad. Koch-Grünberg, Schomburgk, and Spruce report that some species are burnt to make salt from the ashes. *Marathrum utile* is said to be refreshing and febrifugal.

3. TAXONOMICAL SECTION.

PODOSTEMACEAE Lindl.

Herbs growing in rapids and waterfalls, flowering when the water subsides; variable in size and shape, the smaller ones often thalloid and closely adhering to the rocks, the larger ones with distinct stems; coenobial, with the individuals arising in pairs from long and dorsiventrally flattened roots; in other instances rootless; sterile plants often larger and coarser than the fertile ones. Leaves di-, tri-, or pleiostichous; in the stemless species often united at the base, and with the short stem and the root combined into a thalloid structure (= base) or springing in two rows from an irregularly shaped corm; entire or much divided, sometimes with tufts of filaments on the upper surface or covered with stiff emergences; parenchymatous tissues thrown off when the plants emerge from the water; leaves sometimes with a lateral stipule or with one or two intrapetiolar stipules. Flowers either solitary or fascicled and inserted between the leaf-bases or at the end of brachyblasts or in extra-axillary inflorescences which sometimes are confined to special shoots, or in 2-sided spiciform monochasia, the flowers alternating with leaf-like bracts; each flower enveloped by a thin spathella or by a few leaves or 10—20 flowers within a single coriaceous spathella. Flowers hermaphrodite, actinomorphic or zygomorphic; pedicel sometimes with a cup- to disc-like widening at the top. Young flowers erect or pendulous; tepals 2 to many, either petaloid or reduced to minute scales, free or united; stamens 1 to many, alternate with the tepals, in 1 or 2 complete whorls or in an incomplete whorl or confined to one side of the flower, free or united; sometimes 2 or 3 stamens borne by an andropodium; anthers sagittate, dehiscing longitudinally with 2 slits, introrse or extrorse, basifixed or dorsifixed; pollen 1- to many-celled; flowers anemophilous or entomophilous, sometimes autogamous; ovary superior, sometimes obliquely inserted or nearly perpendicular to the pedicel; 1- to 3-celled, sometimes borne by a short gynophore; carpels equal or unequal, on the outside ribbed, keeled or smooth; dissepiments thin; placenta axillary, with 2 to numerous anatropous ovules with 2 integuments; styles 1—3, very variable in shape and size, free or cohering, each at the top with a single sometimes indistinct stigma. Fruit 1—3-locular, the 2- or 3- locular septifragal; in fruits with unequal valves the smallest one usually caduceous; seeds 2 to many, without endosperm; embryo straight.

Type-species: *Podostemum ruppioides HB* (= *Apinagia ruppioides (HB)Tul.*)

Distribution: About 200 species mainly distributed in the tropics; a few species reaching the subtropical and temperate regions (See plate 1, map 1 a.)

Subfamily 1. **Tristichoideae** Engler.

Either small, thalloid or strongly branched herbs with fertile and sterile shoots springing from the same base and with a similar structure or medium-sized herbs with branched sterile shoots and with unbranched fertile shoots springing from the same root, densely covered with, sometimes squamiform, leaves; either tristichous or on the fertile shoots in one case distichous, triangular, ovate or lanceolate, entire or with 2—6 teeth at the top or irregularly arranged but then squamiform. Flowers 1 to many, when young enveloped by a few leaves, hermaphrodite, with a 3- to 5-lobed, petaloid perianth; stamens 1 to many, in a complete or incomplete whorl or confined to one side; anthers introrse, pollen grains ellipsoidal 1-celled, trisulcate; ovary 2- or 3-celled, with equal carpels, ribbed; placenta 2- or 3-sulcate, thick, with many ovules; styles 3, linear or 1 and then filiform provided with a disc-like widening at the top. Fruit similar to the ovary, with 2 or 3 persisting valves.

Subfamily 2. **Podostemoideae** Engler.

Very small to large herbs with or without a distinct stem and with distinct leaves or thalloid, often coenobial with the individuals arising from strongly branched roots, sometimes without roots; fertile and sterile individuals in the same coenobium. Leaves distichous, varying in shape and size, smooth to scabrid on one surface and often covered with a large number of tufted filaments; intrapetiolar stipule present or absent. Flowers 1 to many; each flower originally enveloped in a membranaceous clavate spathella or 10—20 flowers in a common coriaceous spathella, hermaphrodite; tepals 2 to many, scale-like; stamens 2 to many, free or united, in 1 or 2 complete whorls or in an incomplete whorl or confined to one side, sometimes 2 or 3 stamens borne by an andropodium; anthers introrse or extrorse; pollen grains 1- to many-celled; ovary 2- or by reduction 1-celled, with equal or unequal carpels, smooth or ribbed, midribs sometimes winged, rounded, attenuate or stipitate at the base, placenta 2-sulcate, with 2 to many, large to very small

ovules; styles 2, varying in shape and size, entire or divided. Fruit similar to the ovary; the 2 equal or unequal valves both persisting or the smaller valve caducous.

Key to the subfamilies of the **Podostemaceae:**

1. a. Young flowers enveloped by a few leaves: with a distinct 3- to 5-lobed perianth; ovary 2- or 3-celled; leaves tristichous or in the fertile shoots in one case distichous or irregularly distributed, membranaceous or scale-like . . . . . Subfamily 1. **Tristichoideae**
   b. Young flowers enveloped by a membranaceous spathella or some flowers in a single, coriaceous, clavate spathella; perianth consisting of scale-like tepals; ovari 1- or 2-celled; leaves distichous . . . . . Subfamily 2. **Podostemoideae**

Key to the American genera of the subfamily **Tristichoideae:**

1. a. Flowers with 3 petals; stamens 1; ovary 3-celled . . . **Tristicha**
   b. Flowers with 5 petals; stamens 5—25; ovary 2-celled . **Weddellina**

Key to the American genera of the subfamily **Podostemoideae:**

1. a. Each spathella with a single flower 2
   b. 10—20 flowers within a single large spathella . . . **Macarenia**
2. a. Flowers in a branched or unbranched spiciform monochasium, distichous; if not so, then the leaves very rough on the upper side . . . 3
   b. Flowers never in a spiciform monochasium; leaves never rough . 5
3. a. Stamens free 4
   b. Stamens united . . . . . **Tulasneantha**
4. a. Styles cristate; filaments widened . . . . . **Lonchostephus**
   b. Styles and filaments filiform . . . . . **Mourera**
5. a. Anthers dehiscing introrsely 8
   b. Anthers dehiscing extrorsely 6
6. a. Anthers basifixed; flowers with a single stamen; ovary with 6—14 ribs . . . . . **Oserya**
   b. Anthers dorsifixed; flowers with 1—6 stamens; ovary with up to 8 ribs 7
7. a. Ovary usually and the fruit always borne by a gynophore. Flowers with 1—6 stamens . . . . . **Jenmaniella**
   b. Neither the ovary nor the fruit borne by a gynophore. Flowers with 1—3 stamens . . . . . **Apinagia**
8. a. Stamens 1 to many, completely free 14
   b. Stamens 2 to many, borne by an andropodium or united (sometimes at the base only) 9
9. a. Ovary smooth . . . . . **Mniopsis**
   b. Ovary ribbed 10
10. a. Valves of ovary and fruit distinctly unequal . . . **Castelnavia**
    b. Balves equal or slightly unequal 11
11. a. Pinnae stipellate; leaves never with a stipule at the base; fruit provided with 12 ribs and borne by a short gynophore . . . **Wettsteiniola**
    b. Pinnae never stipellate. Leaves sometimes with a stipule at the base; fruit and ovary with 6 or 8 ribs, not borne by a gynophore (except in the fruit of Apinagia divertens) 12
12. a. Styles rostriform, rigid 22
    b. Styles not rostriform, flexible 13
13. a. Stamens 2, borne by an andropodium; pollen grains 2-celled **Podostemum**
    b. Stamens 1 to many, not borne by an andropodium, but sometimes united at the base; pollen grains 1-celled . . . . . *(See key Marathrum/Apinagia p. 22)*
14. a. Valves of fruit and ovary distinctly unequal . . . **Castelnavia**
    b. Valves equal or slightly unequal 15

15. a. Styles cristate . . . . . Lophogyne
    b. Styles not cristate 16
16. a. Styles rostriform, rigid, sometimes membranaceous at the top, marcescent; ovary and fruit with more or less distinctly winged midribs . . . . . Rhyncholacis
    b. Styles not rostriform, falling off when the fruit ripens; ovary and fruit without winged midribs 17
17. a. Ovary and fruit ribbed 18
    b. Ovary and fruit without ribs 21
18. a. Fruit and ovary borne by a short gynophore 19
    b. Fruit and ovary without gynophore . . . . . *(See key Marathrum/Apinagia p. 22)*
19. a. Ovary and fruit with 6 or 8 ribs 20
    b. Ovary and fruit with 14 ribs . . . . . Monostylis
20. a. Fruit erect . . . . . Jenmaniella
    b. Fruit pendulous . . . . . Apinagia
21. a. Flowers with a single stamen; individuals in groups of 2 or 3 at the . . . . . Devillea
    b. Flowers with 1 to many stamens; individuals opposite or subopposite along branched roots; styles usually filiform or subulate never knob-like . . . . . Apinagia
22. a. Stamens 2 borne by an andropodium . . . . . Ceratolacis
    b. Stamens 2 to many not borne by an andropoduim 23
23. a. Midrib of ovary and fruit winged . . . . . Rhyncholacis
    b. Ovary and fruit with 6 winged ribs . . . . . Marathrum

Key to the genera **Marathrum** and **Apinagia**:

1. a. Ovary and fruit with 10—14 ribs . . . . . Apinagia
   b. Ovary and fruit provided with to 8 ribs 2
2. a. Plants with distinct internodes . . . . . Apinagia
   b. Plants without distinct internodes 3
3. a. Fruit Pendulous . . . . . Apinagia
   b. Fruit erect 4
4. a. Ovary and fruit with 6 ribs . . . . . Apinagia
   b. Ovary and fruit with 8 ribs (rarely 6-ribbed in the ovary) Marathrum

THE GENUS APINAGIA AND SOME OF ITS NEAREST ALLIES.

The genus *Apinagia* and its allies *Marathrum, Rhyncholacis, Wettsteiniola, Jenmaniella, Monostylis* and *Macarenia* form a part of the tribus *Eupodostemeae*. The reasons for regarding these genera as near allies are the following:

The genus *Apinagia*, sensu meo, (*Apinagia* Tul. and *Oenone* Tul). includes i.a. species with a more or less branched stem and with the flowers in extra-axillary inflorescences, for example *A.treslingiana, A.staheliana* and *A.longifolia*. As will be pointed out more in detail (p.) these inflorescences resemble those of the thalloid species of *Apinagia*, a.o. *A.imthurnii, A.crispa, A.leptophylla* and *A.latifolia*. The flowers are solitary in these inflorescences and alternate with leaf-like bracts. A reduction of these leaves and finally their complete suppression lead to forms

resembling the stemless genera *Marathrum* and *Rhyncholacis*. In the latter and partly also in *Marathrum* the flowers are solitary. The genus *Marathrum* can for the main part be derived directly from the stemless species of *Apinagia*. For this reason it is sometimes difficult to separate these two genera not in the least because in both genera the stamens are placed in a complete or incomplete whorl, while ovary and fruit in *Marathrum* and in some species of *Apinagia* also are 8-ribbed. In *Marathrum capillaceum, M.trichophorum* and the main part of *Apinagia* the ovary is provided with 6 ribs. The presence of a more or less distinct intrapetiolar stipule in *Marathrum* enables us to separate the greater part of its species from those of *Apinagia*, although in some species of *Apinagia* too an intrapetiolar stipule is present. The habit of the leaves of the genus *Marathrum* is different. They are repeatedly pinnate or pinnate with repeatedly forked pinnae. The leaves of *Apinagia* for the main part are provided with tufts of filaments above, but some species (*A.riedelii, A.fluitans*) have repeatedly forked leaves. In that case the *Apinagia* species are strongly branched, while all the *Marathrum* species are stemless. This last character is found in some *Apinagia* species too (*A.divertens* etc.). However, it is still possible to separate *Apinagia* and *Marathrum:*

Apinagia: Ovary provided with up to 14 ribs; but in those cases in which the ovary has 8 ribs the plant has a distinct, sometimes strongly branched, stem, which is never the case in *Marathrum*.

Marathrum: Ovary 8- or 6-ribbed; in those cases in which the ovary is provided with 6 ribs the plant is stemless. This combination of characters, however, is found in some *Apinagia* species also, but in the 2 *Marathum* species with these characters the ribs are winged and the style more or less boat-shaped or spoon-shaped and teethed along the margin. These characters are not found in *Apinagia*.

The genus *Apinagia* is better to define towards *Rhyncholacis* although there are two species of *Rhyncholacis* that have many characters in common with *Apinagia*, viz. *Rh. oligandra* and *Rh. nitelloides;* the latter was actually placed in *Apinagia* by Wedd ell. The genus *Rhyncholacis*, however, is easily distinguishable from *Apinagia* by the more or less winged midrib of the valve and by the rigid, rostriform styles. Some species of *Apinagia* have one rib on each valve and this is always the midrib. This makes it conceivable

that in another genus this midrib may be more distinct than in *Apinagia*. The presence of an indistinctly winged midrib in *Rh. nitelloides* and *Rh. oligandra* therefore is an indication of the near affinity between *Rhynholacis* and *Apinagia*.

From the genera *Rhynholacis* and *Marathrum* one is able to come towards the *Mourereae* by accepting in *Marathrum* and *Rhyncholacis* a prolongation of the receptaculum on which the flowers are formed, especially in those species which are provided with fascicled flowers. An intermediate stage is found in *Mourera alcicornis* where the spiciform monochasium remains very short and where the flowers therefore are more or less fascicled.

The genus *Wettsteiniola* resembles *Apinagia* (Section *Hymenolacis*), *Marathrum* and *Rhyncholacis* in the fascicled flowers, but differs from these three genera in the presence of stipels at the base of the pinnae. The best place for this genus seems to be besides *Apinagia*.

Lophogyne closely resembles *Apinagia* and Tulasne and Weddell were certainly right in placing it near the latter, for except in the differential characters (the form of the styles) the genus closely resembles *Apinagia*. The equal carpels and valves of ovary and fruit, the similarity in habit with e.g. *A.divertens*, the one-celled, 3-sulcate pollen grains, and the free stamens point to a close relation between these two genera.

Monostylis is a somewhat aberrant and isolated genus on account of its very different pollen grains. It agrees in some of its characters with *Jenmaniella* (the stipitate ovary), with the section *Hymenolacis* of *Apinagia* (the 14-ribbed ovary) and with the section *Eu-apinagia* (the styles and leaves) but has many characters of its own (the pollen grains and the anthers which are deeply incised at both ends).

Jenmaniella is placed near *Apinagia* by its 6-ribbed ovary, its habit and its one-celled, 3-sulcate pollen grains. Moreover the stamens are placed in a complete or incomplete whorl and sometimes are confined to one side of the flower, but sometimes there are 2 stamens borne by an andropodium. The stamens, if more than 2 are present, often differ in size and those at the ventral side are larger than those at the dorsal side. This means that the dorsiventrality is more pronounced than in *Apinagia* and that it resembles the very marked dorsiventrality observed in genera like *Oserya, Podostemum, Castelnavia* etc. It differs from *Apinagia* by the keeled intrapetiolar stipules; they are sheath-like in *Apinagia*.

The genus *Macarenia* is placed near *Apinagia* as its flowers closely resemble those of *Apinagia*, e.g. *A.leptophylla, A.crispa*. It is an isolated genus as 10—20 flowers are enveloped in a single

large spathella. A more detailed survey of the relations of this genus with *Marathrum* and *Rhyncholacis* is given at p. 126.

Various abbreviations.

Fl. Months during which fruiting specimens have been collected.
Fr. Months during which flowering specimens have been collected.
If only the name of a month is given then the material is sterile.
s.n. Unnumbered specimen.

APINAGIA Tul. em. v. Royen

Very small to large coenobia consisting of subopposite or opposite individuals springing from branched roots; the individuals either thalloid or provided with a single unbranched stem and the flowers in extra-axillary inflorescences, or strongly branched with terminal and axillary flowers; sometimes with the flowers in compound but strongly contracted inflorescences springing from the base of an unbranched stem or of a leaf. Leaves distichous, in the thalloid species united at the base; of different shape and size, pinnatinerved, palmatinerved or nerveless; often with tufts of filaments at the upper side; petiole often distinctly sheated at the base. Flowers solitary or fascicled; the juvenile spathella clavate to nippelshaped, often papillate; the mature one infundibuliform to tubuliform; tepals 2 to many, in a complete or incomplete whorl or confined to one side of the flower, sometimes accompanied by 1 to 3 additional ones inserted at different height on the staminal column, either free or united with the staminal column; stamens 1 to many, in one or 2 complete whorls or in an incomplete whorl or confined to one side; filaments at first subulate, afterwards lanceolate, membranaceous, distinctly ribbed, sometimes keeled; anthers sagittate; thecae sometimes unequal, introrse or extrorse; pollen grains ellipsoidal, 3-sulcate; ovary ellipsoidal to ovoid or obovoid, consisting of 2 equal or, rarely, slightly unequal carpels, provided with 2—14 long ribs, with 2 long ribs and 4 shorter ones or without ribs; ribs sometimes reduced to just visible lines or replaced by grooves; styles cylindrical to linear, free or cohering, flaccid. Fruit similar to the ovary, something pendulous.

Proposed lecto-type: *Apinagia fucoides* (Mart. & Zucc.) Tul.

Distribution: About 50 species, distributed from the Northern and Central part of South America to Argentina, Bolivia, Peru, Colombia and Venezuela.

Taxonomy.

From the very first the genera *Apinagia* and *Oenone* have been a source of trouble to the botanists who occupied themselves with this family, and some of them proposed to unite the two genera. Went and Warming were the most recent exponents of this view.

Both genera, as well as the very similar *Ligea*, were founded by Tulasne in 1849. The genus *Ligea* was characterized by numerous stamens arranged in an incomplete whorl and by a smooth fruit, *Oenone* by numerous stamens in a complete whorl and a smooth fruit, while in *Apinagia* it was assumed that the stamens were inserted in a complete whorl and that the fruit was provided with ribs. In 1852 Tulasne united *Oenone* and *Ligea* to a single genus *Ligea*, characterized by stamens inserted in a complete or incomplete whorl and by a smooth fruit. The genus *Apinagia* was characterized in the same way as in 1849. Weddell (1873) changed the name *Apinagia* into *Neolacis*, and transferred some species of *Ligea* to this genus. The genus *Oenone* was reestablished by him, and the two genera were characterized as follows: *Oenone* with the stamens in a complete whorl, and a smooth fruit; *Neolacis* with the stamens in an incomplete whorl (in *N.richardiana* sometimes in a complete whorl) and with a fruit provided with up to 14 ribs.

Baillon (1886)[1]) came to the conclusion that the genera *Oenone* and *Apinagia* could be kept apart on the strength of one character only: *Oenone* would include the species with the stamens in a complete whorl and *Apinagia* those with the stamens in an incomplete whorl. That this differential character too can not be regarded as general will be demonstrated below. Engler

[1]) ... Puisque les Apinagia ont les organs végétatifs, tantôt des Marathrum et tantôt des Oenone (Ligea), ce n'est pas par ces caractères-là qu'on a pu songer à les distinguer. Or, les Ligea ont, dit-on, 2—8 étamines, et l'on accorde aux Apinagia 2—5 étamines. Les styles des premiérs sont dits subteretes, et ceux des derniers lineares; je ne vois pas là de difference sérieuse. Quand les Ligea ont le fruit costé, il l'est obscurément, tandis que les côtes des Apinagia seraient proéminentes. Mais il n'y a là qu'une nuance. On dit, il est vrai, que les Apinagia sont "plantae parvae" (Benth. & Hook.) Mais j'en ai sous les yeux qui sont bien aussi grands que plusieurs Oenone. Comme d'autre part l'Apinagia riedelii, par exemple, a tout à fait le même mode de végétation, de ramification et d'inflorescence que le Ligea secundiflora de Tulasne, if faut arriver à admettre qu'il y a bien des transitions d'un genre à l'autre. Et si l'on veut continuer à les considérer comme distincts, il faut admettre comme limite le mode de disposition de l'androcée. Là où il formera le verticille complet, nous aurons un Oenone et là où le verticille sera imparfait, nous redonnaîtrons un Apinagia ... *(H. Baillon, Bull. mens. soc. Linn. Paris 81 (1886).*

(1930) distinguished between genera with the stamens in a complete or an incomplete whorl. This difference is an insufficient ground for separating the two genera and Engler's key moreover is impracticable as it does not consider the stemless species that are found in the two genera.

The species inserted by Tulasne (1852) in *Ligea* are *L.longifolia, L.flexuosa, L.richardiana, L.secundiflora* and *L.alcicornis.* In the genus *Apinagia* (section *Euapinagia*) he included *A.psyllophora, A.divaricata, A.fucoides, A.riedelii* etc. The two other sections of *Apinagia* recognised by him will be considered lateron. In *Ligea* (1852) the fruit is smooth and the stamens are arranged in a complete or incomplete whorl. In the species described by Tulasne this is generally correct. However, there are exceptions for in *Ligea longifolia* the fruit has distinct ribs, viz. 2 long ribs and 4 short ones. Besides, in this species and also in *L.flexuosa* the stamens are sometimes, although very rarely, arranged in an incomplete whorl. In *Apinagia fucoides,* on the other hand, one sometimes find flowers with the stamens arranged in a complete whorl, and Weddell already pointed out that the fruit of some *Apinagia* species are smooth. The differences given by Tulasne and by himself are therefore by no means general. An investigation into the other characters of these two genera reveals similar incongruities. For example in *Oenone* one chiefly finds species with an unbranched or but slightly branched stem, and with the flowers in extra-axillary inflorescences, while the *Apinagia* species are strongly branched with the flowers solitary at the end of the branches. According to Weddell this distinction would be satisfactory, provided that *Ligea secundiflora* and *L.richardiana* are transferred to *Apinagia.* His *Oenone* includes species with a distinct slightly branched or unbranched stem, while the stamens are present in a complete whorl or incomplete one and the fruit are smooth. His *Neolacis* (= *Apinagia* and *Ligea* p.p.) comprises the strongly branched species with 6—14-ribbed fruits. On the base of these characters *Oenone* and *Neolacis* could be separated but then the deviation pointed out above in *Ligea longifolia* and *L.flexuosa,* must be ignored. This obviously was done by Weddell. The inclusion of a number of new species in *Oenone* by Pulle, Went and Engler, (*O.guyanensis, O.staheliana, O.capillarifolia* etc.) and a better insight, based on new collections of *O.richardiana* made the generic delimitation given by Weddell quite useless. In the Utrecht herbarium one finds specimens of *O.staheliana* (Lanjouw 723) which shows the characters given above for *Oenone,* viz. an unbranched stem or a stem provided with a few short branches

only, and flowers in extra-axillary inflorescences besides branched specimens which closely resemble some *Neolacis* species, e.g. *N.richardiana*. The same applies to a specimen of *Oenone longifolia* in the Cambridge herbarium. In recent collections of *Neolacis richardiana* (e.g. A. C. Smith 3022, 2647, 2140) one finds on the other hand an approach to *Oenone*. On the one hand there are forms which closely resemble the strongly branched *Apinagia* species, e.g. *A.secundiflora*, but on the other hand one sees forms with the flowers in more or less distinct, unbranched extra-axillary inflorescences, which closely resemble the drawing given by Tulasne, in his monograph, of *Oenone longifolia*. The same variations are found in *O.treslingiana*, be it slightly less distinct.

Similar anomalies are to be observed in the stamens, which may be arranged either in a complete or in an incomplete whorl. In the strongly ramified *Apinagia digitata* the flowers posses a complete whorl of stamens. On account of its habit one would expect to find the stamens of the species arranged in an incomplete whorl. The same situation is found in *Oenone Hulkiana*, but in this case forms with stamens in an incomplete whorl are known also. *Oenone guyanensis* too has in the majority of its flowers the stamens in a complete whorl. In recent collections of *Oenone longifolia* too flowers with the stamens in an incomplete whorl are found and these specimens proved to be strongly branched, be it slightly less than in *Oenone richardiana*.

In the presence or absence of ribs in the ovary and fruit too deviations from the scheme given above can easily be found. In *Apinagia exilis* e.g. we find smooth fruits, but the plant is strongly branched. In the first character it agrees with *Oenone*, while the second character is usually met with in *Apinagia*. *Oenone flexuosa* has like *O.longifolia*, *O.guyanensis* and *O.treslingiana*, 2 to 8 ribs in the ovary and fruit, while the ovary and fruit of *Apinagia minor*, which is strongly branched, have 2 distinct ribs.

These facts led to the conclusion that not a single character (those discussed above are regarded as the most important ones) is sufficiently general to be used for the distinction of the two genera. One might try to find a combination of characters, but, as has already been pointed out, this too proves impossible. The unbranched or but slightly branched stem of *Oenone* and the strongly branched stem of *Apinagia*, combined with the arrangment of the stamens in a complete whorl in the former and in an incomplete whorl in the latter, might seem to be a ground for separating the two genera. These characters are more or less distinctly correlated, but this is no general rule. The species with an unbranched or but slightly branched stem are mainly found in

the northern part of the area occupied by the two genera, while the repeatedly branched species are found in the south (*See plate 2*). However, the occurence of branched specimens in the northern species and of unbranched or but slightly branched specimens in the southern ones appears to invalidate this distinction. The only possible solution seems to be to unite *Apinagia* and *Oenone*.

For the name of the combined genus one has the choice between four names, viz. *Apinagia, Oenone, Ligea,* and *Neolacis*. The last name was used by Weddell and was taken from the section *Neolacis* of *Lacis* in the work of Schiede (1835). This section included *Lacis fucoides* and *Lacis disticha,* but Tulasne (1852) was the first to refer the species of this section to a new genus, for which he used the name *Apinagia*. The introduction by Weddell in 1873 of the new generic name *Neolacis* was therefore inadmissable. *Oenone* was sunk by Tulasne in *Ligea* and may for this reason be discarded. In this the choice is limited to *Apinagia* and *Ligea* and as *Apinagia* was a more natural group than *Ligea,* it seems thus this name deserves preference.

In the genus *Apinagia* Tulasne, Weddell and others distinguished the sections *Eu-apinagia, Chamaelacis* and *Hymenolacis*. The first section includes strongly branched species like *A.secundiflora, A.richardiana,* etc.; the section *Chamaelacis* species with very small stems and stemless, i.e. thalloid, species, while the third section *Hymenolacis* (incl. *Blandowia* Tul.) consists of thalloid species whose ovary and fruits are provided with 10—14 ribs, a character by which the section is immediately distinguishable from the two other ones, whose ovary and fruits are either smooth or provided with 2 to 8 ribs. The section *Chamaelacis* can better be dropped as some species of the section *Eu-apinagia,* e.g. *A.versteegiana* and *A.richardiana,* occur in two forms: some specimens are thalloid while other ones have distinct, strongly branched stems. Between these extremes several intermediate stages are found. This is especially clear in the rich alcohol-material of *Apinagia versteegiana* collected by Went. It is noteworthy that these forms are often found on the same root. Besides these group of species there is another one which occur also in two forms: some specimens posses stems with short fleshy internodes, while other ones are thalloid. In this group there are but few flowers and the whole specimen agrees in this respect with a single inflorescence of e.g. *A.longifolia, A.treslingiana, A.staheliana.* This group includes species like *A.imthurnii, A.latifolia, A.leptophylla,* and *A.crispa*. Their stamens are inserted either in a complete or in an incomplete whorl and the ovary may be smooth or ribbed

and in these characters the group therefore obscures the limits between *Apinagia* and *Oenone* especially the limits between the section *Chamaelacis* of *Apinagia* and between *Oenone*.

It is relatively easy to separate the species of this genus. On account of the high degree of variability shown by several species, it was necessary to insert these latter at various places in the key.

The genus is divided by me into three sections: *Eu-apinagia, Hymenolacis* and *Wentia*. The former two include species with introrsely dehiscing anthers, while the last one is confined to species in which the anthers dehisce extorsely. The section *Hymenolacis* is recognisable by its 10- to 14-ribbed ovary and fruit, by its fascicled flowers and by the absence of leaves (always?). I have included in this section *A.guairaensis* and *A.membranacea*, but it is possible that these two species belong to *Wettsteiniola*. As the material seen by me is leafless or is not seen at all I was unable to take a decision. In the section *Eu-apinagia* the genus *Oenone* and the section *Eu-apinagia* of the earlier authors are united. Thus one finds included in this genus thalloid species, species with an unbranched or slightly branched stem as well as species with strongly branched stems. In this section 10 species have been described i.e. *A.minor, A.arminensis, A.boliviana, A.crispa, A.fimbrifolia, A.fluitans, A.digitata, A.parvifolia, A.platystigma* and *A.rangiferina*.

A.minor resembles *A.pygmaea* but has shorter tepals, longer anthers and a smooth ovary and fruit. *A.arminensis, A.crispa* and *A.platystigma* are inserted near *A.leptophylla, A.latifolia* and *A.imthurnii*. *A.arminensis* closely resembles *A.marowynensis*, but has a less distinct stem, shorter and narrower filaments on the leaves, more numerous and longer stamens, shorter styles and a longer ovary and fruit; the stamens moreover are arranged in a complete whorl. *A.crispa* resembles *A.imthurnii, A. latifolia* and *A.leptophylla*, but differs from the first one in the longer styles and the acute filaments on the leaves. From *A.latifolia* and *A.leptophylla* this species differs in the lobes of the leaf which are here dissected in many segments and in the two other species entire. In this connection Went's remarks are important. He supposes that *A.richardiana, A.marowynensis* and *A.versteegiana* may cross freely, and that some specimens which have been regarded as different species, may in reality be hybrids. The same is suspected of *A.marowynensis, A.crispa* and *A.arminensis*. These three species occur in the Arminafalls in Suriname and their close mutual resemblance points in the same direction. Whether this is true can be ascertained only by experiments.

A.platystigma resembles *A.latifolia* and *A.richardiana*, but in this species the styles cohere over a greater distance. The leaves are palmatinerved while in *A.latifolia* the leaves are pinnatinerved. The top of the styles is flattened and emarginate, while in *A.richardiana* the top is subulate and entire.

A.fimbrifolia, *A.parvifolia*, *A.boliviana* and *A.peruviana* are four easily distinguishable species. They are all recognisable by their united stamens, and by their 1 or 2 squamiform tepals inserted between the latter, but at different levels, or by the 1 to 3 lanceolate tepals which are at the base united with the filaments. In *A.boliviana* the stamens are united up to a different height, with or without lanceolate tepals between them. *A.parvifolia* also shows united stamens, and the leaves are highly characteristic as the rachis is winged and provided at irregular intervals with dentate appendages.

A.fluitans can be distinguished by its very long, slender, repeatedly forked leaves, by the narrow segments and by the base of the leaf with its sheathlike widening. *A.digitata* obtained its name from the leaves which resemble the fingers of a hand. In habit it resembles *A.secundiflora*, *A.versteegiana*, *A.richardiana* etc., but the stamens are inserted in a complete whorl and the leaves are palmatinerved.

In the earlier described species some changes had to be made. Of *A.riedelii* many specimens have been collected, but of several of them the leaves are absent and as the flower closely resembles that of *A.gardneriana* and of *A.fluitans* it is difficult to decide whether they really belong to *A.riedelii*. These specimens are cited as dubious ones.

A.gardneriana, *A.uruhuana*, *A.warmingii* are regarded as dubious species because they have been based on material in which either leaves or the flowers were lacking.

A.capillarifolia Engler is reduced to a variety of *A.corymbosa*, as they differ only in the greater length of the filaments on the leaves. In young leaves the filaments are as long as those of *A.corymbosa*, but in the older ones they become much longer. The variety *exilis* of *A.corymbosa* is regarded as a distinct species, as the top of the leaf and of its lobes is strongly divided, in contrast with *A.corymbosa* where the top is entire. *A.microcarpa* Engler and *A.uleana* Engler proved indentical with *A.corymbosa* var. *capillarifolia*. *A.corymbosa* differs from *A.richardiana* in the 6 very short ribs at the base of the fruit and ovary; the ovary and fruit of *A.richardiana* are provided with 2 long ribs and 4 short ones.
Oenone othmeri proved to be identical with *A.corymbosa*, while *O.uleana* had to be given another name as the name *Apinagia uleana* existed already when *Oenone uleana* was transferred to *Apinagia*. I call it *A.tenuifolia*.

A.penicillata and *A.pilgeri* form a new section *Wentia*, characterized by extrorse anthers. *Apinagia nana* proved to be identical with. *A.pilgeri* and was united that species. The distribution of *A.pilgeri* is very remarkable: there is one locality in Suriname and a second in Central Brazil. However, this species is a very small one, and may have been overlooked in the intervening region.

Geography (See plate 2).

The genus is distributed over Brazil, Guyana, some parts of Venezuela and Colombia, Peru, Bolivia, Paraguay and Uruguay, but it has its main distribution in Guyana, while a second center is found in SW and Central Brazil. The less differentiated species such as *A.richardiana* are found over the whole area, but in Guyana and the adjoining parts forms of a different type are met with. A group of species comprising *A.crispa, A.leptophylla, A.latifolia* etc. is almost restricted to Guyana, while another group of species consisting of *A.longifolia, A.tenuifolia, A.surumuensis* etc. extends its area somewhat further westwards. *Apinagia's* center of origin may have been situated in Guyana as in these parts the genus proves to be most polymorphic, and the Richardianagroup might represent the most ancient type, the Crispa and Longifoliagroup being more recent developments.

Key to the sections:

1. a. Anthers dehiscing extrorsely . Section III. **Wentia** v. Royen (p. 66)
   b. Anthers deshiscing introrsely 2
2. a. Fruit and ovary with 1—14 ribs . . . . . Section II: **Hymenolacis** Tulasne (p. 65)
   b. Fruit and ovary with 0—8 ribs . . . . . Section I: **Eu-apinagia** Tul. em. v. Royen (p. 32)

Section: EU-APINAGIA Tul. em. v. Royen.

Very small to large species with a distinct, branched or unbranched stem or stemless and thalloid. Leaves of different shape and size, often provided with tufts of filaments. Flowers in extra-axillary inflorescences and each flower alternating with a leaf-like bract or flowers solitary. Stamens 1 to many, in one or two complete whorls or in an incomplete one or shifted to one side of the flower. Ovary smooth to 8-ribbed. Fruit similar to the ovary.

Key to the species[1]).

1. a. Stamens in 1 or 2 complete whorls 2
   b. Stamens in an incomplete whorl or shifted to one side of the flower 31
2. a. Leaves pinnate; the pinnae formed by fascicles of linear, up to 15 cm long, segments; rachis terete, about 1 cm wide, sometimes with a squamiform stipule at the base . . 3. **A.guyanensis** (Pulle) v. Royen
   b. Leaves not pinnate, if pinnate, the rachis always less than 3 mm wide 3
3. a. Leaves pinnate with the pinnae repeatedly forked, or leaves repeatedly pinnate 4
   b. Leaves subentire, pinnatilobed to pinnatisect or palmatilobed to -sect. Top and lobes often dissected 7
4. a. Stamens 3—6 5
   b. Stamens 7—32 6
5. a. Stamens 3—6. Tepals 1.5—2.8 mm long. Leaves up to 45 cm long . . . . . 21. **A.fluitans** v. Royen
   b. Stamens 5—6. Tepals 0.5—1.5 mm long. Leaves up to 12 cm long . . . . . 14. **A.glaziovii** (Warm.) v. Royen
6. a. Ultimate divisions of the leaf filiform, numerous. Stamens 7—22 . . . . . 30. **A.batrachifolia** (Mildbr.) v. Royen . . . . . forma *longistyla* v. Royen
   b. Ultimate divisions of the leaf lanceolate-linear, few. Stamens 19—32 . . . . . 30. **A.batrachifolia** (Mildbr.) v. Royen . . . . . forma *batrachifolia*
7. a. Nerves in the leaves prominent beneath, especially at their base . 8
   b. Nerves not prominent beneath 23
8. a. Leaves on the upper side without tufts of filaments 9
   b. Leaves on the upper side with tufts of filaments 10
9. a. Midrib flexuose. Leaves pinnatinerved, 3—15 cm long. Stems with distinct internodes . . . . . 2. **A.flexuosa** (Tul.) v. Royen
   b. Leaves palmatinerved, about 3 cm long. Stems with short indistinct internodes . . . . . 35. **A.leptophylla** (Goebel) v. Royen
10. a. Leaves with a marginal vein, subentire, i.e. at the top only divided into a few segments; the tufts of filaments in 2 rows. Stamens 20—30 . . . . . 8. **A.treslingiana** (Went) v. Royen
   b. Leaves without a marginal vein 11
11. a. Herbs without internodes or the internodes very short. Leaves slightly longer than wide 12
   b. Herbs with distinct internodes. Leaves much longer than wide . . 13
12. a. Leaves up to 10 cm long. Styles 1—1.5 mm long. Stamens 7 . . . . . 34. **A.latifolia** (Goebel) v. Royen
   b. Leaves up to 5 cm long. Styles 0.5—1 mm long. Stamens 7—19. . . . . 36. **A.platystigma** v. Royen
13. a. Strongly branched herbs. Stamens 1—18 (See also A.staheliana) . 14
   b. Herbs with a single distinct main stem provided with a few short subsimple flowering branches or with the flowers in extra-axillary inflorescences 17
14. a. Leaves palmatinerved, palmatilobed to palmatisect 15
   b. Leaves pinnatinerved 16
15. a. Top and lobes of the leaf dissected. The tufted filaments on the upper side of the leaf 1—3.5 mm long. Stamens 8—14 . . . . . 10. **A.digitata** v. Royen
   b. Top and lobes entire. The tufted filaments on the upper side of the leaf 1—4 mm long. Stamens 1—10 . 12. **A.richardiana** (Tul.) v. Royen
16. a. Leaf entire to pinnatilobed, the tufted filaments 1—2 mm long. Stamens 10—18. . . . . 11. **A.hulkiana** (Went) v. Royen

[1]) *A.psyllophora* Tul. & Wedd. is on account of the incomplete material not included in the key. Its description is found on page 54.

b. Leaf pinnatilobed to -sect, the tufted filaments 1—4 mm long. Stamens 1—10 . . . . . 12. **A.richardiana** (Tul.) v. Royen

17. a. Top of the leaf strongly dissected, with 8—27, up to 5 cm long segments 18
b. Top of the leaf and lobes entire or divided into a few short, up to 8 mm long, segments 19

18. a. Tufts of filaments in 2 distincts rows Topsegments of the leaf lanceolate to linear, up to 5 cm long. Primary nerves numerous, slightly branched . . . . . 6. **A.staheliana** (Went) v. Royen
b. Tufts of filaments irregularly spread. Topsegments of the leaf filiform, up to 5 mm long. Primary nerves few . . . . . 5. **A.multibranchiata** (Matth.) v. Royen

19. a. Fruit and ovary with 6 or 8 long ribs 20
b. Fruit and ovary with 2 long ribs or with 2 long ribs and 4 shorter ones 21

20. a. Styles about 1 mm long. Stamens 25—30. Internodes of the stem distinctly winged . . . . . 4. **A.kochii** (Engler) v. Royen
b. Styles about 2.5 mm long. Stamens 13—15. Internodes sometimes slightly winged . . . . . 9. **A.tenuifolia** v. Royen

21. a. Leaves subentire to pinnatilobed, 3 cm wide or less, densely covered with tufts of filaments. Herbs with one distinct main stem and a number of 2 leaved side-branches 22
b. Leaves pinnatilobed to pinnatisect, up to 5 cm wide, with relatively numerous filaments above. Herbs with one distinct main stem and a number of several-leaved side-branches . . . . . 1. **A.longifolia** (Tul.) v. Royen

22. a. Internodes winged. Top of the leaf dissected . . . . . 7. **A.surumuensis** (Engler) v. Royen
b. Internodes not winged. Top of the leaf slightly dissected . . . . . 5. **A.multibranchiata** (Matth.) v. Royen

23. a. Lobes of the leaf entire, often of irregular shape 24
b. Lobes of the leaf divided 26

24. a. The tufted filaments up to 6 mm long. Stamens 1—30 25
b. The tufted filaments up to 10 mm long. Stamens 9—16 . . . . . 7. **A.surumuensis** (Engler) v. Royen

25. a. Stamens 1—10. Anthers 1—1.5 mm long. Pollen grains 14 × 13 μ . . . . . 12. **A.richardiana** (Tul.) v. Royen
b. Stamens 10—30. Anthers 1—2.5 mm long. Pollen grains 17 × 10 μ . . . . . 1. **A.longifolia** (Tul.) v. Royen

26. a. Leaves with a distinct midrib and parallel, primary nerves; tufts of filaments in 2 more or less distinct rows 6. **A.staheliana** (Went) v. Royen
b. Leaves either palmatinerved or pinnatinerved but then with few parallel nerves. which are far apart, tufts of filaments scattered 27

27. a. Leaves palmatinerved. Lobes and top divided in many segments . . 28
b. Leaves pinnatinerved, with few primary nerves; lobes entire or divided into a few short segments, sometimes in many segments 29

28. a. Herb with distinct internodes. Stamens 9—12. . 10. **A.digitata** v. Royen
b. Herb thalloid. Stamens 5—8 . . . . . 31. **A.crispa** v. Royen

29. a. Herbs with distinct stem and internodes 30
b. Herbs with rather indistinct, fleshy internodes. Stamens 5—10 . . . . . .17. **A.arminensis** v. Royen

30. a. Stamens 2—7. The tufted filaments of the leaf 1.5—4 mm long . . . . . 16. **A.marowynensis** (Went) v. Royen
b. Stamens 10—30. The tufted filaments on the leaf 3—6 mm long . . . . . 1. **A.longifolia** (Tul.) v. Royen

31. a. Plants thalloid 32
b. Plants with a distinct stem; internodes sometimes fleshy or very short 37

32. a. Fruit pendulous, borne by a distinct gynophore 39. **A.divertens** Went
b. Fruit erect 33

33. a. Stamens free 34

b. Stamens united up to a different height 58
34. a. Lobes of the leaves entire 35
b. Lobes of the leaves divided into filiform segments or leaves repeatedly pinnate or pinnate with repeatedly forked pinnae 36
35. a. The tufted filaments on the leaf 1—2 mm long . 32. **A.goejei** Went
b. The tufted filaments on the leaf 1—4 long . . . . . 12. **A.richardiana** (Tul.) v. Royen
36. a. Stamens 5 or more. Leaves pinnatilobed to -sect, with tufts of filaments above . . . . . 33. **A.imthurnii** (Goebel) v. Royen
b. Stamens 1—3. Leaves pluripinnate or pinnate with repeatedly forked pinnae, without tufted filaments . . . . . 38. **A.pusilla** Tul.
37. a. Leaves entire to pinnatilobed. Stamens 6—14 38
b. Leaves pinnatilobed to repeatedly forked or pinnate. Stamens mostly less than 6 (see also A.imthurnii) 39
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47. a. Fruit and ovary with 6 short ribs 48
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53. a. Stamens 8—12 . . . . . 33. **A.imthurnii** (Goebel) v. Royen
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1. **Apinagia longifolia** (Tul.) v. Royen, nov. comb. — *Oenone longifolia* Tul. (1849) 96; Walpers (1852) 434; Weddell (1873) 58; Warming (EP 1891) 18; Pulle (1906) 193; Engler (1930) 37 — *Ligea longifolia* (Tul.) Tul. (1852) 86—88, t. 4.

Herb of medium-size. Stem distinct, 5—30 cm high, unbranched or slightly branched, sometimes strongly branched, internodes winged, up to 2 cm long, 2—5 mm diam. Leaves pinnatilobed to pinnatisect, 3—20 cm long, 0.5—5 cm wide, membranaceous, pinnatinerved, midrib slightly flexuose, not or barely, but sometimes distinctly prominent beneath, with many tufts of linear, 3—6 mm long, acute filaments above, lobes lanceolate, up to 35 mm long, up to 10 mm wide, obtuse, sometimes in the basal lobes slightly dissected at the top. Flowers in branched extra-axillary inflorescences, pedicel 1—6 cm long, mature spathella infundibuliform up to 2.5 cm long; tepals 10—17, in a complete whorl, about 0.8 mm long; stamens 10—30, from 5—7 mm long, anthers 1—2.5 mm long, acute, base of the thecae obtuse, pollen grains, 17 μ high, 10 μ diam; ovary ellipsoidal to obovoid, 2.5—4 mm high, 1.5—2 mm diam; styles

filiform, slightly compressed at the top, cohering at the base, 1.5 mm long or less. Fruit similar to the ovary, each valve with a single distinct rib in the middle of each valve and a shorter rib at each side; pedicel 4—9 cm long.

Type: Schomburgk 437, in P, duplicates in B, BR, C, CGE, G.-Boiss., G.-Del., GH, K, L, U, W; collected in British Guyana.

Distribution: British Guyana and Suriname.

British Guyana: Near Berbice, Schomburgk 437, fl. fr. (B, BR, C, CGE, G.-Boiss., G.-Del., GH, K, L, P, U, W); Essequibo-river, Twasinki-falls, A. C. Smith 2140, fl. fr. Sept. (F, G.-Del., K, NY, S, U, US); Essequibo-river. Appun 1656, fl. fr. (K); idem, Jenman 1174, fl. fr. Sept. (K); Berbice, Anderson 754, fr. (K).
Suriname: Marowyne-river, Kappler ed. Hohenacker 2072, fl. fr. Sept. (Gött., L, P, U, W); idem, Armina-falls, Went 457 (U); Coppename-river, Zuidkreek, Geyskes 964, fr. Sept. (U); without locality, Kappler 160 (U).

2. **Apinagia flexuosa** (Tul.) v. Royen, nov. comb. — *Ligea flexuosa* Tul. (1852) 88—89, t. 5; Walpers (1858) 780 — *Oenone flexuosa* (Tul.) Weddell (1873) 58; Warming (EP 1891) 18, f. 4; Engler (1930) 18, f. 14.

Herb of medium size. Stem distinct, 10—25 cm high, 2—4 mm diam, unbranched or slightly branched, flexuose, internodes distinctly winged, about 1 cm long. Leaves lanceolate, 3—15 cm long, 0.5—4.5 cm wide, margin undulate, base cuneate, decurrent; membranaceous; pinnatinerved, midrib flexuose, prominent beneath. Flowers in extra-axillary inflorescences, alternating with leaf-like bracts, pedicel 2—4 cm long, mature spathella infundibuliform, 1.5—2.5 cm long, tepals 15—20, in a complete whorl, lanceolate, about 1 mm long; stamens 20—25, from 5.5—7 mm long, anthers about 1 mm long, obtuse, base of the thecae obtuse, pollen grains, 17 μ high, 11 μ diam; ovary ellipsoidal, 3.5—5 mm high, 1.5—2 mm diam, terete, acute, with 8 indistinct ribs; styles filiform, 1.5—3 mm long, cohering at the base, papillate. Fruit similar to the ovary, each valve with 3 or 5 indistinct ribs.

Type: Leprieur s.n. in P, duplicates in C, F; collected in French Guyana.

Distribution: French Guyana and Suriname.

French Guyana: Lecombe-river near St. Brodel, fl. fr. Aug. (C, F, P); without any details, Appun 1756, fl. fr. (K).
Suriname: Kleine Saramacca-river, side creek, Florschütz 1403, fr. March (U).

3. **Apinagia guyanensis** (Pulle) v. Royen, nov. comb. — *Oenone guyanensis* Pulle (1906) 193, t. 7; Went (1910) 18—21, t. 5 f. 61—66; Engler (1930) 38.

Medium-sized to large stemless herb. Base branched, fleshy, 5—10 cm high, 2—4 cm wide. Leaves pinnate, up to 70 cm long (or longer?), apart or united with the fertile parts, but if apart then placed on a circular, thalloid base which is about 2.5 cm in diam, rachis terete, fleshy, up to 1 cm diam, at the base united with 2 squamiform, up to 1 cm long stipules, pinnae repeatedly forked, 3—16 cm long, ultimate divisions lanceolate-linear, with a distinct nerve, 2—5 mm long. Flowers white to pinkish, solitary, in fascicles at the top of the branches of the base, alternating with leaf-like bracts, pedicel 2—12 cm long, mature spathella infundibuliform, 12—18 mm long; tepals 8—15, in a complete whorl, rarely in an incomplete whorl, lanceolate, 0.5—1 mm long; stamens 8—23, from 4—7 mm long, anthers 1.5—2.5 mm long, obtuse to acute, base of the thecae obtuse to acute, pollen grains yellowish, known in a young state only; ovary ellipsoidal, 2.5—4 mm high, 1.5—2 mm diam, subacute, slightly compressed, with 6 ribs, only marked as 6 lines; styles filiform, 1—2 mm long long, obtuse, cohering halfway or less, slightly papillate. Fruit similar to the ovary, each valve with 3 ribs.

Type: Versteeg 808, in U, duplicates in BM, K; collected in Suriname.

Distribution: Southern parts of Suriname and French Guyana.

Suriname: Upper Tapanahony, Grandafoetoe-falls, Versteeg 808, fl. fr. Aug. (BM, K, U).

French Guyana: Rio Oyapock, Grande Roche, v. Luetzelburg 20207, fl. fr., 20207 A, fl. fr, 20251, fl. fr., 20287, fl. July (M); Salto Manõa, v. Luetzelburg 20242, fl. fr., 20311 fl. July (M); Salto Guamã, v. Luetzelburg 20325, fl. fr. July (M); Salto Crignon, v. Luetzelburg 20339, fl. fr. July (M); Salto Mon Père, v. Luetzelburg 20360, fl. fr. July (M).

4. Apinagia kochii (Engler) v. Royen, nov. comb. — **Plate 3, f. 1—4** — *Oenone kochii* Engler (1927) 1; idem, (1930) 38.

Small to medium-sized herb. Stem branched, flexuose, about 8 cm high, internodes terete to subterete, winged, about 1 cm long and 3 mm diam. Leaves entire to pinnatilobed, 10—25 cm long, 2—2.5 cm wide, lobes sometimes dentate or crenulate; pinnatinerved, midrib prominent at both sides, primary nerves not or slightly prominent, top obtuse, base cuneate, petiole up to 1.5 cm long, slightly winged, old leaves smooth, young leaves with many tufts of short ellipsoidal papillae (young filaments?). Flowers white, in forked extra-axillary inflorescences, pedicel 3—3.5 cm long, mature spathella infundibuliform up to 12 mm long; tepals 15—20, lanceolate, 0.5—1

mm long; stamens 25—30, from 4—6 mm long, anthers emarginate, 1.5—2.5 long, base of the thecae obtuse or emarginate, pollen grains 18 μ high, 13 μ diam; ovary ellipsoidal, 2.5—4.5 mm long, about 1.5 mm diam, obtuse, terete, 8-ribbed, but the sutural ribs indistinct, the 6 other ribs widening and less prominent towards the top; styles subulate, about 1 mm long, obtuse, slightly cohering at the base. Fruit similar to the ovary.

Type: Koch-Grünberg 10 in B; collected in the borderregions of Venezuela and Brazil.

Distribution: Once collected.
Vernacular name: Carurú.

Rio Uraricuera, fl. fr. Jan. (B).

5. **Apinagia multibranchiata** (Matth.) v. Royen, nov. comb. — *Oenone multibranchiata* Matthiesen, (1908) 3—9, 48, t. 1, 5, 6 f. 81, 90c; Engler (1930) 36, 38, f. 28 A, B.

Medium-sized to large herb with a few short side-branches and a distinct, terete, 10—80 cm high stem, at the base up to 10 mm diam. Leaves lanceolate to ovate, 5—15 cm long, 0.5—3 cm wide, dissected at the top, entire to pinnatilobed and the lobes parted, base cuneate, petiole terete, 1—5 mm long, about 1.5 mm diam; membranaceous, pinnatinerved, midrib prominent at either side, primary nerves distinct, veins very narrow, upper side with many tufts of linear, acute, nerveles 4—6 mm long filaments. Flowers alternating with bract-like leaves, at the end of brachyblasts, pedicel 3—4 cm long, mature spathella infundibuliform, up to 2 cm long; tepals 8—13, lanceolate, about 0.5 mm long, stamens 12—25, from 5—6 mm long, anthers obtuse, 2—2.5 mm long, truncate or emarginate, base of the thecae obtuse, pollen grains 17 μ high, 13 μ diam; ovary ellipsoidal to obovoid, 3.5—4 mm high, about 1.5 mm diam, subacute; styles subulate, 1—1.5 mm long, slightly compressed, obtuse to emarginate, cohering at the base. Fruit similar to the ovary, with a single white line on the middle of each valve and a rib at either side, prominent at the base only, pedical up to 8 cm long.

Type: Othmer s.n., in B, duplicates in C, U; collected in Venezuela.

Distribution: Once collected.

Caroni-river, Revaloso-falls, fl. fr. Jan. (B, C, U).

6. **Apinagia staheliana** (Went) v. Royen, nov. comb. — *Oenone staheliana* Went (1926) 14—24, t. 3 f. 20—21, t. 4 f. 22—25.

Medium-sized to large, up to 2 m long herb. Stem unbranched or branched, flowering parts sometimes united at the base only with the sterile stems and then branched, internodes up to 2.5 cm long. Leaves lanceolate, 10—30 cm long, lamina 1—15 cm long, longer or shorter than the dissected apical part, top 5—15 cm long, with many times forked, lanceolate-linear, 1—5 cm long, 1—3 mm wide, segments, base cuneate; sessile or with a terete 0.2—1 cm long petiole; membranaceous to cartilagineous, pinnatinerved, midrib sometimes prominent at both sides, primary nerves numerous, simple or slightly branched, at the top more apart; with tufts of lanceolate, acute, 3—6 mm long filaments, in 2 more or less distinct rows. Flowers red to white, in up to 25 cm high extra-axillary inflorescences or along a branched stem, united at the base only with the sterile part, but sometimes inflorescences repeatedly forked, pedicel 2—7 cm long, mature spathella infundibuliform 1—2.5 cm long; tepals 10—15, triangular to lanceolate, 0.5—1 mm long; stamens 8—27, in an incomplete whorl or in 1 or 2 complete whorls, 5—8 mm long, anthers 1.5—2 mm long, emarginate, obtuse or mucronate, pollen grains, 17 μ high, 12 μ diam; ovary ellipsoidal, 4—6 mm high, 1.5—2 mm diam, subacute, terete, with 6 distinct ribs; styles filiform to spathulate, 1—1.5 mm long, cohering at the base, papillate at the top. Fruit similar to the ovary, pedicel 8—15 cm long.

Type: Stahel 11, in U; collected in Suriname.

Distribution: Suriname and British Guyana.

Suriname: Kabalebo-river, Avanavero-falls, Stahel 11, fl. fr. Aug. (U); idem, Pulle s. n., fl. fr. Sept. (U); Coppename-river, Raleigh-falls, Lanjouw 721, 963, fl. fr. Sept. (U); Suriname-river, Mussoemba-falls, Tresling 110, fr. July (U); Corantyne-river, Wonotobo, Rombouts 77, fl. fr. Aug. (U); idem, above Lucie-river, Stahel 7000, fr. Aug. (U); idem Stahel 6995, fl. fr. Aug. (U); idem Stahel 54, (U); without locality, Stahel s. n., fl. (U).
British Guyana: Corantyne-river, Kabalebo-falls, Im Thurn s.n., fl. fr. Sept. (K); idem, Jenman 344, fr. Oct. (K).

7. **Apinagia surumuensis** (Engler) v. Royen, nov. comb. — Plate 6 f. 18—24 — *Oenone surumuensis* Engler, (1927) 2; idem (1930) 37.

Medium-sized, 3—40 cm high herb. Stem slightly branched, internodes slightly compressed, winged, up to 3 cm long, 1—4 mm diam. Leaves lanceolate, 2—12 cm long, 1—3 cm wide, pinnatilobed, pinnatinerved, midrib sometimes flexuose, prominent at either side,

primary nerves prominent near the midrib only, upper side with many tufts of lanceolate to spathulate, 3—10 mm long filaments; base cuneate, top obtuse to acute, petiole terete to 3-sided, slightly amplexicaule, 3—11 mm long, up to 2 mm diam; lobes triangular, obtuse or very slightly dissected at the top, up to 8 mm long and 3 mm wide. Flowers in few-flowered side-branches, pedicel 2—4.5 cm long, mature spathella infundibuliform 1—1.5 cm long; tepals 7—15, triangular, with 1 or 2 tops, in a complete or incomplete whorl, up to 1 mm long; stamens 6—16, in a complete or incomplete whorl, 4—5.5 mm long, anthers about 2 mm long, obtuse, acute or emarginate, base of the thecae obtuse, pollen grains 16 μ high, 13 μ diam; ovary ellipsoidal, 2—4 mm high, 1—2 mm diam; styles filiform, 1—1.5 mm long, free or slightly cohering at the base, papillate. Fruit similar to the ovary, each valve with a single rib in the middle and one on either side, prominent at the base only; pedicel 3—6.5 cm long.

Type: Ule 8127 in B, duplicates in K, L, G.-Del.; collected in Northern Brazil.

Distribution: Northern Brazil, in the borderregions with British Guyana.

Brazil: Rio Surumu, Ule 8127, fl. fr. Aug. (B, G.-Del., K, L); idem, Imelufalls, Ule 7963, fl. fr. Jan. (B, G.-Del, K, L, NY, S, US); Igarapé Tiporem, v. Luetzelburg 21411, 21872, fl. fr. Sept. (M); Igarapé Uirctoe, v. Luetzelburg 21846, fl. fr. Sept. (M).
British Guyana: Rupununi-river, Sawariwan-creek, Myers 5480. fl. fr. Nov. (K).

8. **Apinagia treslingiana** (Went) v. Royen, nov. comb. — *Oenone treslingiana* Went in Pulle (1909) 266; Went (1910) 22—25, t. 6 f. 67—72; idem (1912) 12—13, t. 2 f. 8—10; Engler (1930) 37, f. 28 D.

Medium-sized herb. Stem unbranched or slightly branched, up to 15 cm high, internodes terete, up to 3 cm long, 3—6 mm diam. Leaves lanceolate, 10—20 cm long, up to 2 cm wide, entire, pinnatinerved, nerves prominent beneath, passing into a distinct prominent marginal vein; coriaceous; upper side with many tufts of lanceolate, acute 1.5—4 mm long filaments; top acute, divided in 3—5 mm long segments, base cuneate, with or without a terete, up to 1 cm long, 3—4 mm diam, petiole, decurrent. Flowers in extra-axillary inflorescences with a fleshy base, alternating with leaf-like bracts, pedicel 1—8 cm long, mature spathella infundibuliform, 1—1.5 cm long; tepals 12—15, in a complete whorl, triangular, 0.5—1 mm long; stamens 20—28, in 2 whorls, 3—7 mm long,

anthers 2.5—3 mm long, acuminate to obtuse, base of the thecae obtuse; pollen grains known in a young state only; ovary ellipsoidal, 3—4 mm long, 2—2.5 mm high, obtuse, slightly compressed, with 6 indistinct ribs, visible as lines only; styles cylindrical, 0.5—1 mm long, cohering over a long distance, papillate at the top. Fruit similar to the ovary, each valve with 3 ribs.

Type: Tresling 110, in U; collected in Suriname.

Distribution: Suriname.

Suriname-river, Mussoemba-falls, fl. July (U); idem, Sisabo-falls, Tresling 113, fl July; Gran Rio, Sintia-dam, Hulk s.n., fl. Aug (P, U); Corantyne-river near mouth of Lucie-river, Stahel 6995, fl. fr. Aug. (U); Upper Koetari, last falls, Stahel 7007, fl. fr. Nov. (U); Upper Gran Rio, Maupé-dam, Stahel 197, Febr. (U).

9. **Apinagia tenuifolia** v. Royen, nom. nov. — *Oenone uleana* Engler, (1927) 1—2; idem Engler (1930) 37.

Medium-sized herb. Stem flexuose, branched, up to 25 cm high; internodes terete sometimes slightly winged, up to 3 cm long and 3 mm diam. Leaves lanceolate, 20—30 cm long, up to 1.5 cm wide, membranaceous, pinnatinerved, midrib prominulous on either side; upper side with numerous tufts of lanceolate, acute, up to 6.5 mm long, filaments; top entire (?); slightly sinuate along the margin, base cuneate, petiole up to 2.5 cm long. Flowers in few-flowered side-branches, between leaf-like bracts, pedicel up to 7 cm long, mature spathella infundibuliform, up to 15 mm long; tepals 13—15, ovate to lanceolate, with 1 or 2 acute tops, 0.5—1 mm long; stamens 13—15, up to 8 mm long; anthers up to 2 mm long, mucronate, obtuse or emarginate, base of the thecae obtuse to mucronate; pollen grains 18 μ high, 13 μ diam; ovary ellipsoidal, up to 5 mm high, and 1.5 mm diam, acute, terete, with 8 flat, prominulous ribs; styles terete, up to 2.5 mm long, capitulate, cohering halfway. Fruit similar to the ovary, each valve with 3 prominulous ribs.

Type: Ule 7588 in B, duplicate in K; collected in Northern Brazil.

Distribution: Rio Branco.

Caracarahy-rapids, Ule 7588, fl. fr. Oct. (B. K).

10. **Apinagia digitata** v. Royen, nov. sp. — **P. 128 and plate 5 f. 10—12.**

Medium-sized herb. Stem branched, 2.5—20 cm high; internodes up to 4 cm long and 3 mm diam. Leaves up to 10 cm long and

6 cm wide, palmatinerved, nerves prominent beneath, especially at the base, above with few tufts of lanceolate, acute, 2—8 mm long filaments; rhombiform (sometimes asymmetric), lanceolate or spathulate, pinnatipartite to -sect, lobes triangular to lanceolate, up to 4 cm long and 3 mm wide, at the top a few times forked, the ultimate segments lanceolate, acute, nerveless, up to 8 mm long; petiole cuneate, 1—3.5 cm long, 1—4 mm wide. Flowers white to pink, pedicel 4—7 cm long, mature spathella infundibuliform, up to 2.5 cm long; tepals 9—12, about 0.5 mm long, lanceolate, acute; stamens 8—14, in a complete whorl, 4—5.5 mm long, anthers 2—2.5 mm long, acute, base of the thecae obtuse; pollen grains 16 μ high, 12 μ diam; ovary ellipsoidal, 3—3.5 mm high, 1.5—2 mm diam, obtuse, terete, with a lighter coloured line in the middle of each carpel; styles compressed, 1—1.5 mm long, compressed, lanceolate, cohering at the base, slightly papillate, sometimes emarginate. Fruit similar to the ovary, with a single white line in the middle of each valve and a very short rib on either side.

Type: Sagot 1112, in U, duplicates in C, G.-Boiss., Gött., K, P. S. W; collected in French Guyana.

Distribution: French Guyana.

Maroni-river, first rapids, Sagot 1112, fl. fr. (C, G.-Boiss., Gött., K, P, S, U, W); Rio Oyapock: Roche Crignon, v. Luetzelburg 20267, fl. fr. July (M); idem, Grande Roche, v. Luetzelburg 20286, fr. July (M); idem, idem, 21685, fr. Aug. (M); idem, idem, 21727, fr. Aug. (M); idem, Cachoeira Xiriry, v. Luetzelburg 20325, fr. July (M); idem, Roche Mon Père, v. Luetzelburg 20360, fr. July (M); idem, Salto Araribô, v. Luetzelburg 21938, fr July (M); without any details, Blanchet s.n., fl. fr. (BM).

11. **Apinagia hulkiana** (Went) v. Royen, nov. comb. — *Oenone hulkiana* Went in Pulle (1912) 139; idem Went (1912) 10—11, t. 1, f. 5—6, t. 2, f. 7; Engler (1930) 36.

Small, branched or unbranched herb. Stem 2—5 cm high, internodes terete, up to 10 mm long, up to 2 mm diam. Leaves lanceolate, 1—10 cm long, 2—15 mm wide, entire, repandous to pinnatilobed, membranaceous, pinnatinerved, midrib prominulous on either side, above with many tufts of lanceolate, acute, 1—2 mm long filaments; top obtuse to acute; base cuneate; lobes lanceolate to triangular, obtuse, 2—3 mm long; petiole slightly compressed, up to 7 mm long, decurrent. Flowers axillary and terminal, pedicel 2—3.5 cm long, mature spathella infundibuliform, 1—1.5 cm long; tepals 10—14, in a complete or incomplete whorl, lanceolate, about 0.5 mm long; stamens 10—18, in a complete or incomplete whorl, 2.5—4.5 mm long, anthers 1—2 mm long, slightly acuminate or

emarginate, base of the thecae obtuse; pollen grains 15 μ high, 13 μ diam; ovary ellipsoidal, 2—2.5 mm high, 1—1.5 mm diam, obtuse to acute, rounded to strongly attenuate at the base; styles filiform, 1—1.5 mm long, sometimes compressed at the top, cohering to a third. Fruit unknown.

Type: Hulk s.n., in U, duplicates in B, BM, C, P; collected in Suriname.

Distribution: Guyana.

Suriname: Awala-dam, Upper Suriname-river, Hulk s.n., fl. Aug. (B, BM, C, P, U).
British Guyana: Essequibo-river, Itanime-falls, A. C. Smith 2145, fl. Sept. (NY).

12. **Apinagia richardiana** (Tul.) v. Royen, nov. comb. — *Ligea richardiana* Tul., (1849) 96; idem (1852) 89—92, t. 6; Walpers (1852) 434—435; idem (1858) 780 — *Neolacis richardiana* (Tul.) Weddell, (1873) 59—60 — *Oenone richardiana* (Tul.) Warming, Warming (EP 1891) 18; Pulle (1906) 193; Went (1910) 26—29, t. 7 f. 73—79; idem (1912) 15, t. 2 f. 11; idem (1926) 24—26, t. 9 f. 55—60; v. Royen, (1948) 382 — *Lacis chrysanthemum* Schnitzlein, (1843—1870) t. 85 f. 7.

Smal to medium-sized herb. Stem strongly branched, 0.5—30 cm high, internodes terete, slightly winged, 3—40 mm long, 2—12 mm diam in the smaller specimens absent. Leaves elliptical or asymmetric rectangular to rhombiform, up to 10 cm long, and up to 4 cm wide, top obtuse, base cuneate, decurrent; pinnatilobed to -sect or bipinnatilobed to -sect, lobes triangular to lanceolate; pinnatinerved or palmatinerved or with 1 or more distinct pinnatinerved main veins, nerves sometimes prominent, veins present; upper side with many tufts of lanceolate, acute, 1—4 mm long filaments. Leaves sometimes cuneate with a few lobes at the top. Flowers pink to white, terminal and axillary, seldom in loose extra-axillary inflorescences, pedicel 2—6 cm long, mature spathella infundibuliform 0.5—2 cm long; tepals 4—10, in a complete or incomplete whorl or confined to one side, spathulate to lanceolate, acute to acuminate, 1 mm long or less; stamens 3—10, in a complete or incomplete whorl, 3—5 mm long, anthers 1—1.5 mm long, acute to emarginate, base of the thecae obtuse; pollen grains 14 μ high, 13 μ diam; ovary ellipsoidal, 2—3 mm high, 1—1.5 mm diam, obtuse, terete; styles subulate to cylindrical, 0.5—1.5 mm long, free or slightly cohering at the base. Fruit similar to the ovary, with a single rib in the middle of each valve and one on either side prominent at the base only.

Type: Richard s.n., in P; collected in French Guyana.

Distribution: Venezuela, Guyana, Northern Brazil.

French Guyana: Courou and La Mana-river, Richard s.n., fl. fr. (P); La Mana-river, Poiteau s.n., fl. fr. (B, P, W); Comté-river, Leprieur s.n., fl. fr. (F, P); without locality, Perrotet 1821, fr. (P).

Suriname: Kabalebo-river, Duivels-falls, Tresling 7, fl. fr. Aug. (U); Coppename-river, Raleigh-falls, Lanjouw 722, fl. fr. Sept. (U); idem, Lanjouw 979, fl. Sept. (U); idem, Kwama-creek, Stahel 4637, fl. fr. April (U); Saramacca-river, Gran Dam, Maquire 24923,, fl. fr. Oct. (F, K, NY, U, US); idem, Toekoemoetoe-creek, Maguire 24912, fl. fr. Oct. (F, K, NY, U, US) (cited as Apinagia secundiflora non (Tul.) Pulle by v. Royen (1948) 382); Tapanahony-river, Versteeg s.n., fl. fr. Aug. (U); idem, Waremapan-soela, Geyskes 3, 11, July (U); idem, Drietabbetje, Florschütz 509, 511, 512, fl. fr. Dec. (U); idem, Gran Hollo-falls, Florschütz 522, fl. fr. Dec. (U); Litani-river, Rombouts 784, fl. fr. Aug. (U); Suriname-river, Mammadam-falls, Went s.n., fl. fr. July (K, P, U); Dam Sara-creek, Florschütz 168, fr. Nov. (U); Corantyne-river, above Lucie-river, Stahel 6996, fl. fr. Aug. (U); Marowyne-river, Gonsoetoe-falls, Florschütz 541, fr. Dec. (U); idem, Lamaké-falls, Florschütz 544, fr. Dec. (U); Kabalebo-river, Avanovero-falls, Florschütz 2102, fl. fr. April (U).

British Guyana: Kabalebo-river, Jenman 343, fl. fr. Oct. (K); idem, Im Thurn s.n., fl. fr. Sept. (K); Kuyuwini-river, A. C. Smith 3022, fl. fr. Febr. (F, G.-Del., K, Mo, S, U, US); Puruni-river, Thomas-falls, Jenman 7606, fl. fr. Oct. (BM, C, K, NY, U); Essequibo-river, Onoro-creek, A. C. Smith 2647, fl. fr. Dec. (F, G.-Del., K, Mo, NY, S, U, US); Barima-river, Arakaka-falls, Jenman 6960, fl. fr. May (K); Demerara-river, Jenman 6703, fl. fr. June (K); without locality, Martin s.n., fl. fr. (BM, C, K); idem, Schomburgk 436, fl. fr. (B, BM, CGE); idem, Appun 1718, fl. fr. (K).

Venezuela: Near Villa de Repocta, De Grosourdy 13 (P); Raudales. Rio Icabarú, Cardona 2172, fr. Sept. (US); idem, Cardona 2172 a, fl. fr. Sept. (US); Caura-river, Mura-falls, Williams 11278, fl. fr. Febr. (F, US).

Brazil: Prov. Ceára, without locality, Schwacke 1301, fl. (C); idem, Glaziou A, fl. fr (C); Rio Tieté, Riedel 44, fl. fr. (C, P); idem, Freiré Allemão A, fl. fr. (P); Igarapé Quitabahú, v. Luetzelburg 21255, fr. Nov., 21256 Nov., 21677, fl. Nov., 21868, fl. Nov. (M).

13. **Apinagia fucoides** (Mart. & Zucc.) Tul., (1849) 98; idem Tul. (1852) 101—102; Walpers (1852) 435; idem (1858) 781; Tul. (1863) 246; Warming (EP 1891) 19; Engler (1930) 38 — *Lacis fucoides* M. & Z., (1824) 5—6, tab. 2; von Chamisso, (1853) 504; Mohl, (1835) 222, 311 — *Neolacis fucoides* (M.& Z.) Weddell, (1873) 61.

Medium-sized herb. Stem slightly branched, flexuose, up to 25 cm high, internodes slightly compressed, sometimes slightly winged, up to 2.5 cm long and up to 4 mm diam. Leaves cuneate, up to 8 cm long, pinnatipartite to -sect, lobes triangular to lanceolate up to 1 cm long, dissected at the top, ultimate segments lanceolate, acute, nerveless, up to 3 mm long; palmativerved with 3—10 slightly branched nerves; upper side with few tufts of lanceolate, acute, up to 3.5 mm long filaments; petiole 3-edged, sometimes winged, decurrent. Flowers terminal and axillary, pedicel 1—2 cm

long, mature spathella with a few brown papillae at the top, infundibuliform, up to 8 mm long, tepals 3—6 in a complete or incomplete whorl or confined to one side, lanceolate, acute, up to 2 mm long, stamens 3—6, from 3—4 mm long, in a complete or incomplete whorl, anthers up to 1.5 mm long, obtuse to mucronate, base of the thecae acuminate or obtuse; pollen grains 17 μ high, 12 μ diam; ovary ellipsoidal, up to 2 mm high, about 1 mm diam, obtuse to subacute, terete to slightly compressed, 6—8-ribbed; styles spathulate, about 1 mm long, emarginate at the top, free. Fruit similar to the ovary, each valve with 3 or 5 ribs.

Type: Martius 2056 in M, duplicates in B, L, P, W; collected in Brazil.

Distribution: Eastern Brazil.

Rio Itahype, prov. Bahia, Martius 2056, fl. fr. Dec. (B, L, M, P, W); Rio Urucula, prov. Goyaz, Glaziou 21984, fl. fr. June (BR, C, G.-Del., L, P, S, US); Rio Arrassuahy, prov. Minas Geraes, fl. fr. (C, P); Rio Bahú, prov. Matto Grosso, Lindman A 2959, fl. May (S); without locality, Glaziou 16312, (C, P); idem, Hauchet s.n. (G.-Del.).

14. **Apinagia glaziovii** (Warming) v. Royen, nov. comb. — *Ligea glaziovii* Warming, (1888) 465—467, 481, t. 22 f. 11—16, t. 23 f. 1—14; idem, Warming (EP 1891) 18 — *Oenone glaziovii* (Warming) Engler, (1930) 38.

Medium-sized. Stem strongly branched, 4—25 cm high; internodes terete or slightly compressed, sometimes winged, 1—5 mm diam. Stem sometimes fleshy with fleshy branchlets. Leaves pinnate, up to 12 cm long, with the pinnae repeatedly forked; decurrent, sometimes widened at the base, ultimate divisions filiform, 1—3 mm long. Flowers terminal, pedicel 1—2 cm long, mature spathella narrowly tubuliform to infundibuliform, 1—1.5 cm long; tepals 5 or 6, in a complete whorl, triangular, obtuse, 0.5—1.5 mm long; stamens 5 or 6, from 4.5—7 mm long, anthers 1—1.5 mm long, with 1 or 2 obtuse tops, base of the thecae acute; pollen grains 19 μ high, 14 μ diam; ovary ellipsoidal, 2—4 mm high, 1.5—2 mm diam, obtuse, with 6 indistinct ribs; styles subulate, 1—2 mm long, sometimes slightly compressed, widened and emarginate at the top, free or cohering. Fruit similar to the ovary, each valve with 3 distinct ribs.

Type: Glaziou 15444 in C, duplicates in B, F, G.-Del., K, P, US; collected in SE-Brazil.

Distribution: Once collected.

Caraça, prov. Minas Geraes, fl. fr. June (B, C, F, G. Del., K, P, US).

15. **Apinagia riedelii** (Bongard) Tul., (1849) 98; idem (1852) 102—104, t. 8, f. 1; Walpers (1852) 436; idem (1858) 781; Tul. (1863) 246—247, t. 75 f. 1; Warming (1888) 461—464, t. 21 f. 11—22, t. 22 f. 1—10; idem (EP 1891) 19, f. 10, 15 A-D; Mildbraed, (1904) 40; Massolongo, (1918) 43; Engler (1930) 38, f. 13, *19 — Lacis riedelii* Bongard, (1835) 75, t. 3 — *Neolacis riedelii* (Bong.) Weddell (1873) 61—62.

Small to medium-sized. Stem distinct, up to 40 cm high, flexuose strongly branched, internodes terete, sometimes slightly winged, up to 2 cm long. Leaves pinnate, 0.5—25 cm long, pinnae repeatedly forked, ultimate divisions filiform, 1—4 mm long, petiole 3—8 cm long, 1—2 mm diam, with a distinct wing running down the internodes. Flowers axillary and terminal, pedicel 1—3 cm long, mature spathella infundibuliform to tubuliform, 2—5 mm long, tepals 3 or 4, in an incomplete whorl, 1—1.5 mm long, lanceolate, with 1 or 2 acute tops; stamens 2 or 3, confined to one side, 2—3.5 mm long, anthers 1—1.5 mm long, with 1 or 2 acute tops, base of the thecae emarginate, obtuse of mucronate; pollen grains 15 μ high, 13 μ diam; ovary obovoid, 2—3 mm high, 1—2 mm diam, obtuse, terete, 8-ribbed; styles subulate or compressed and emarginate at the top, 0.5—1 mm long, slightly cohering at the base, papillate. Fruit similar to the ovary, each valve with 3 ribs.

Type: Riedel 392 in Le-I, duplicates in BM, C, P. G.-Boiss.; collected in SE Brazil.

Distribution: South-eastern Brazil.

Rio Tieté, prov. Sao Paulo, Riedel 392, fl. fr. Aug. (BM, C, G.-Boiss., Le-I, P); idem, Salto de Ytú, Massucchelli 2, fl. fr. March (K) (Apinagia nitelloïdes non Weddell, cited by Massolonga in (1918) 43—44, f. 1—4); Cachoeira do Engenko, prov. Sao Paulo, Riedel 43, fl. fr. May (C); Rio Caretão, prov. Goyaz, Weddell 2090, fl. fr. (K, P); Rio das Perlas, Pohl 1798, fl. fr. (W); Rio Negro, prov. Rio de Janeiro, Glaziou 13141, fl. fr. June (C, F, P); Rio Parahyba, prov. Rio de Janeiro, Schwacke 3299, fl. fr. July (Gött.); without locality, Vauth s.n. (W); idem, Riedel s.n. (B).

Dubious specimens:

Rio dos Indios, prov. Goyaz, Glaziou 21987, fl. fr. Aug. (C, K, NY, P); Rio Babylonica, prov. Goyaz, Glaziou 21985, fr. Aug. (C, K, NY, P); Rio Uruhu, prov. Goyaz, Glaziou 21981, fl. fr. July (C, F, K, P, US); Ponzo de Passa Tres, prov. Goyaz, Glaziou 21989, fr. Aug. (C, F, K, P, US); idem, Glaziou 21990, fl, fr. Aug. (C, K, P); without locality, prov. Goyaz, Ule 173, fl. fr. Aug. (US); Rio Parahyba, prov, Rio de Janeiro, Glaziou 13145, fl. fr. July (BM, C, K, P); Rio de Almas, prov. Goyaz, Glaziou s.n., fl. fr. Aug. (C); without any details, Glaziou 15442 A (C), idem, Glaziou 22008, (C).

16. **Apinagia marowynensis** (Went) v. Royen, nov. comb. — *Oenone marowynensis* Went in Pulle, (1909) 266; Went (1910) 33—34, t. 9 f. 86—88; Engler (1930) 38.

Medium-sized herb. Stem branched, up to 15 cm high, internodes terete, 0.5—2 cm long. Leaves lanceolate, 2—8 cm long, pinnati-partite to -sect, lobes narrow, up to 4 cm long, dissected at the top; membranaceous; ultimate divisions acute, narrow, nerved, 1—7 mm long; top of the leaf like those of the lobes, base cuneate; pinnati-nerved; above with tufts of lanceolate, acute, 1.5—4 mm long, filaments; petiole terete to slightly compressed, 2—2.5 cm long. Flowers white, terminal and axillary, pedicel 1—2.5 cm long, mature spathella infundibuliform, 2—15 mm long; tepals 2—6, lanceelate to filiform, acute, 1 mm long or less; stamens 2—7, in a complete or incomplete whorl, or confined to one side, 2—5.5 mm long, anthers 1—1.5 mm long, obtuse to acute, base of the thecae obtuse; pollen grains known young only; ovary ellipsoidal, obtuse, 1.5—3 mm high, about 1.5 mm diam, terete, with a single light coloured line in the middle of each carpel; styles cylindrical to subulate, 1—1.5 mm long, obtuse, slightly cohering at the base, papillate. Ripe fruit unknown.

Type: Went jr. s.n. in U, duplicates in BM; collected in Suriname.

Distribution: Suriname.

Marowyne-river, Armina-falls, Went jr. s.n., fl. Oct. (BM, U); Coppename-river, Raleigh-falls, Went sr. s.n., fl. July (U); idem, Lanjouw 721, fl. Sept. (U).

17. **Apinagia arminensis** v. Royen, nov. sp. — P. 128 and plate 8 7—9.

Small herb. Base thalloid or irregularly forked, 1—3 cm long, branches gradually passing into the leaves. Leaves crowded; pinnati-partite to -sect, 1—6 cm long, 3—8 mm wide, membranaceous, with 2—4 main ribs which are pinnatinerved; at the upper surface with few tufts of lanceolate, acute, 1—3.5 mm long filaments; top of lobes and leaf dissected, ultimate segments lanceolate, acute, very narrow, 1—4 mm long; lobes triangular to lanceolate, 3—20 mm long. Flowers few, axillary, pedicel 1—4 cm long, mature spathella infundibuliform, about 5 mm long; tepals 7—10, triangular to lanceolate, 0.5—0.8 mm long, with 1 or 2 acute tops; stamens 5—10, in a complete or incomplete whorl, 3.5—5 mm long, anthers 2—3 mm long, truncate, acute or emar-

ginate, base of the thecae obtuse, pollen grains 14 μ high, 13.5 μ diam; ovary ellipsoidal, obtuse, terete, 2.5—3 mm long, up to 1.5 mm diam, with a lighter coloured line in the middle of each carpel and a shorter one on either side; styles cylindrical or slightly compressed and spathulate, 0.5—1 mm long, cohering at the base. Ripe fruit unknown.

Type: Lanjouw 536 in U, collected in Suriname.

Distribution: Suriname and French Guyana.

Suriname: Marowyne-river, Armina-falls, Lanjouw 536, fl. Aug. (U.)
French Guyana: Rio Oyapock, Cachoeira, Guama, v. Luetzelburg s.n. fl. July (M).

18. **Apinagia secundiflora** (Tul.) Pulle, (1906) 194 — *Ligea secundiflora* Tul., (1849) 97; idem, (1852) 92—94, t. 7 f. 1; Walpers (1852) 435; idem (1858) 780; Bentham & Hooker, (1880) 111; Baillon, (1888) 270 — *Neolacis secundiflora* (Tul.) Weddell, (1873) 62 — *Apinagia secundiflora* (Tul.) Engler, (1930) 38 — *Oenone secundiflora* (Tul.) Engler, (1927) 2.

Small to medium-sized herb. Stem much branched, up to 15 cm high, internodes terete, winged, up to 3 mm diam. Leaves ovoid to elliptical, 1—4 cm long, pinnatipartite to -sect, sometimes bipinnatipartite, base cuneate, decurrent, top obtuse or repand, lobes irregularly repand or more deeply incised; coriacous; main ribs 1—3, each pinnatinerved, the nerves prominent beneath, veinlets absent. Flowers terminal and axillary, pedicel 0.5—1 cm long, mature spathella infundibuliform, papillate at the top, up to 7 mm long, tepals 2 or 3, lanceolate, with 1 or 2 acute tops, up to 0.5 mm long; stamens 2 or 3, confined to one side, 2—7 mm long, anthers 1—1.5 mm long, obtuse, base of the thecae obtuse; pollen grains known in a young state only; ovary ellipsoidal to ovoid, 1.5—2.5 mm high, about 1 mm wide, obtuse, terete to slightly compressed, 6-ribbed; styles subulate, 0.5—1 mm long, slightly cohering at the base. Fruit similar to the ovary, each valve with 5 ribs, but 2 of them indistinct.

Type: Hostman 1323 in K, duplicates in BM, P, W; collected in Suriname.

Distribution: Suriname.

Near Paramaribo, Hostman 1323, fl. fr. (BM, K, P, W); without locality, Hostmann 2832, fl. fr. (G.-Del.).

19. **Apinagia versteegiana** (Went) v. Royen, nov. comb. —

Oenone versteegiana Went in Pulle, (1909) 266; Went (1910) 30—32, t. 8 f. 80—85; Engler (1930) 38.

Herb of different shape and size. Stem branched up to 15 cm high, internodes up to 1.5 cm long and 1—7 mm diam, or plants thalloid; stems compressed, much branched, winged. Leaves cuneate to spathulate, 0.5—4 cm long, uinnatilobed to -sect. lobes triangular to lanceolate, obtuse, 0.5—15 mm long, 1—6 mm wide; pinnatinerved, nerves not prominent, sometimes palmatinerved and the bundles prominent; above with tufts of lanceolate to spathulate, acute, 1—2 mm long filaments; sessile, decurrent. Flowers terminal or axillary, pedicel 1—1.5 cm long, mature spathella infundibuliform, 4—10 mm long, sometimes with many darkly coloured hairs at the top; tepals 3—5, lanceolate, acute, about 0.5 mm long; stamens 2—6, confined to one side, 6—10 mm long, anthers 1.5—2 mm long, subacute or emarginate, base of the thecae obtuse; pollen grains ellipsoidal 14 μ high, 13 μ diam; ovary ellipsoidal to obovoid, 2—4 mm high, about 1 mm diam; styles cylindrical to subulate, 1—2 mm long, slightly cohering at the base, strongly papillate. Fruit similar to the ovary, each valve with 3 indistinct ribs; pedicel 3—9 cm long.

Type: Versteeg 809, in U, duplicate in K, P; collected in Suriname.

Distribution: Suriname.

Upper Tapanahony-river, Versteeg 809, fl. fr. Aug. (K, P, U); Suriname-river, Kabelstation, Went s.n., fl. Sept. (U).

20. **Apinagia ruppioides** (HBK) Tul., (1849) 98; idem (1852) 99—100; Walpers (1852) 435; idem (1858) 781; Engler (1930) 38. — *Podostemum ruppioides* HBK, (1815) 197, non 246; Kunth, (1822) 259; Sprengel, (1825) 95 — *Lacis ruppioides* (HBK) Bongard, (1835) 78 — *Neolacis ruppioides* (HBK) Weddell, (1873) 61.

Medium-sized, branched herb, about 15 cm high, with flexuose branches, internodes up to 2 cm long and 2 mm diam, terete. Leaves repeatedly forked, membranaceous, about 10 cm long, ultimate divisions lanceolate-linear, nearly filiform, acute, distinctly nerved, up to 10 mm long (or longer?), spathella unknown. Flower unknown but according to Kunth with 1 forked filament and the anthers at the top of it. Fruit ovoid, up to 4 mm high, with 3 distinct, prominent and 2 less distinct ribs.

Type: Humboldt & Bonpland s.n. in B, duplicate in C; collected in Venezuela.

Distribution: Once collected.

Orinoco-river between Atures, Santa Barbara and Esmeraldas, fl. fr. May (B, C).

21. **Apinagia fluitans** v. Royen, nov. sp. — **P. 128 and plate 8 f. 10—12.**

Small herb, 5—10 cm high. Stem branched at the top, internodes sometimes slightly winged, up to 4 cm long, 1—2 mm diam. Leaves repeatedly pinnate or forked, up to 45 cm long; ultimate divisions filiform, 1—5 cm long; pinnae with a distinct nerve, strongly compressed to membranaceous; base of the leaf vaginate, slightly amplexicaule, sheath 5—12 mm long, 1—3 mm wide. Flowers terminal and axillary, pedicel 3—25 mm long, mature spathella trumpethshaped, 3—15 mm long; tepals 3, lanceolate, acute, 1.5—3 mm long; stamens 2, confined to one side, 3—7 mm long, anthers 1.5—2 mm long, obtuse or mucronate, base of the thecae obtuse, pollen grains 18 μ high, 13 μ diam; ovary ellipsoidal, 2.5—3 mm high, 1—1.5 mm diam, acute, base strongly attenuate, with 6 distinct and 2 very indistinct ribs; styles ribbon-like to narrowly 3-sided, acute, free, slightly papillate, about 1.5 mm long. Fruit similar to the ovary, each valve with 5 long ribs and sometimes also with 2 short ones.

Type: Baldwin 2996, in US; collected in Bolivia.

Distribution: Once collected.

Rio Abuná, Fortaleza, Colonia Territory, fl. fr. July (US).

22. **Apinagia divaricata** Tul. & Weddell, (1849) 97—98; idem (1852) 98—99, t. 7 f. 3; Walpers (1852) 435; idem (1858) 781; Tul. (1863) 245, t. 75 f. 2; Engler (1930) 38. — *Neolacis divaricata* (Tul. & Wedd.) Wedd., (1873) 60.

Of small size. Stem distinct, often already branched at the base, up to 5 cm high, branches flexuose, radiating fan-shaped, internodes terete, up to 1 cm long and 1.5 mm diam. Leaves cuneate to rhombiform, up to 3 cm long and wide, pinnatilobed to -partite, membranaceous, nerveless or with a few indistinct main ribs radiating from the base, sessile, widened at the base, decurrent with a distinct wing, reaching and uniting with the base of the next leaves, lobes and top triangular to lanceolate, at the top divided into a few narrow, forked up to 2 mm long segments. Flowers terminal and axillary, pedicel up to 4.5 cm long, young as wel as

mature spathella unknown; tepals 5, stamens 5[1]). Fruit ellipsoidal to obovoid, about 2 mm high, obtuse, 6-ribbed.

Type: Weddell s.n., in P, duplicates in C, F, K; collected in Central Brazil.

Distribution: Once collected.

Rio Araguay, fr. June (C, F, K, P).

23. **Apinagia minor** v. Royen, nov. sp. — **See p. 129 and plate 6 f. 1—10.**

Small slightly branched herb. Stem flexuose, up to 4 cm high, internodes terete, up to 1 cm long. Leaves cuneate, irregularly pinnatipartite, up to 2.5 cm long, up to 1 cm wide, sessile, decurrent, lobes triangular, obtuse to acute, rarely divided at the top into a few segments, main ribs 2 or 3, palmatinerved, slightly prominent; upper side with tufts of lanceolate up to 1 mm long filaments. Flowers axillary and terminal, pedicel 1—3 mm long; mature spathella infundibuliform, about 3 mm long; tepals 4, linear, acute, about 0.5 mm long; stamens 3, from 2—2.5 mm long, confined to one side, anthers about 0.8 mm long, obtuse, base of the thecae obtuse; pollen grains 17 μ high, 13 μ diam; ovary ellipsoidal, about 1.5 mm high, 1 mm diam, obtuse, styles filiform, 1 mm long or less, free, papillate. Fruit similar to the ovary, each valve with a single rib.

Type: Spruce 555, in P, duplicate in K; collected in Northern Brazil.

Distribution: Once collected.

Rio Aripecuru, prov. Para, fl. fr. Dec. (K, P).

24. **Apinagia corymbosa** (Tul.) Engler var. **corymbosa**, Engler (1930) 38. — **Plate 3 f. 8—13** — *Neolacis corymbosa* (Tul.) Wedd., (1873) 60 — *Ligea richardiana* Tul. var. *corymbosa* Tul. (1849) 96; idem (1852) 90 — *Oenone othmeri* Matthiesen, (1908) 13—14, 48, t. 2, t. 6 f. 35—40, t. 9 f. 90b; Engler (1930) 38.

Small herb, 4—18 cm high, strongly branched, internodes terete, sometimes slightly winged, up to 2.5 cm long and 2 mm wide. Leaves 1—4 cm long, pinnatisect to bi-pinnatisect, membranaceous, mostly distinctly nerved, lobes obtuse or irregularly shaped, upper side with a few tufts of filiform, about 0.8 mm long threads. Basal leaves sometimes pinnatilobed with a cuneate base, palmatinerved.

[1]) The description of the flower is according Tulasne!

Flowers axillary and terminal, pedicel 0.5—1.5 cm long, mature spathella infundibuliform, 4—9 mm long; tepals 3—6, lanceolate, about 0.5 mm long; stamens 2—5, confined to one side, 2—4 mm long, anthers up to 1 mm long, ovate, obtuse to mucronate at the top, base of the thecae obtuse, pollen grains 16 μ high, 12 μ diam; ovary ellipsoidal, 1—2.2 mm high, about 1 mm diam, obtuse; styles subulate, up to 1.5 mm long, obtuse, narrowed at the base, papillate, free or cohering at the base. Fruit about 2.5 mm high, valves at the base with 3 short ribs, midrib sometimes slightly longer.

Type: Schomburgk 436 in P, duplicates in C, K, L, U, US, W; collected in British Guyana.

Distribution: In the borderregions of British Guyana, Suriname, Venezuela and Brazil.

British Guyana: without locality, Schomburgk 436, fl. fr. (C, K, L. P. U, US, W).
Suriname: Upper Tapanahony-river, Zandkreek-soela, Geyskes 860, fl. fr. Sept. (U).
Venezuela: Caroni-river, Pica-pica-falls at Bokita, Othmer s.n., fl. fr. (B, C).
Columbia: Mura-rapids, André 6, fl. fr. Dec. (K).
Brazil: Rio Aripecuru, prov. Para, Spruce s.n., fr. Jan. (K, P).

Var. **capillarifolia** (Engler) v. Royen, nov. comb. — **Plate 3 f. 5—7** — *Apinagia capillarifolia* Engler, (1927) 3—4; idem (1930) 38 — *Apinagia microcarpa* Engler, (1927) 3; idem (1930) 38 — *Apinagia uleana* Engler (1927) 3; idem (1930) 38.

Differs from var. corymbosa in the slightly longer leaves (up to 4 cm) but mainly in the much longer filaments at the upper surface of the leaf (3—5 mm long). One finds in the type that the filaments are very short in young leaves and are becoming longer when the leaf grows older, until they reach the length of 5 mm. But in A.corymbosa do the filaments, even in older leaves not reach this length.

Type: Ule 30 (?), in B, collected in Brazil.

Distribution: Northern Brazil.

Brook in the Serra do Mel, Rio Branco tributary, Ule 30 (?), fl. Oct. (B.) falls in the Lower Surumu, Ule 7964, fl. fr. Jan. (B, K, L); Pracaná-brook, Rio Branco, Ule 10 (?), fl. fr. Febr. (B).

25. **Apinagia exilis** (Tul.) v. Royen, nov. comb. — *Ligea richardiana* Tul. var. *exilis* Tul., (1849) 96; idem (1852) 90 — *Neolacis corymbosa* (Tul.) Wedd., var. *exilis* Tul., Wedd. (1873) 60.

Differs from A.corymbosa in the top of the leaf and lobes which

are dissected in many nearly filiform threads and the absence of the tufts of filaments on the upper surface of the leaf. Ultimate divisions lanceolate, nearly filiform, nerveless, up to 3 mm long. For the rest similar to Apinagia corymbosa. Pollen grains 15 μ high, 11 μ diam.

Type: Schomburgk 434, in P, duplicates in BM, C, CGE, K, L, US, W; collected in British Guyana.

Distribution: British Guyana and Suriname.

British Guyana: without locality, Schomburgk 434, fl. fr. (BM, C, CGE, K, L, P, US, W), Essequibo-river, Conawarook-rapids, Guppy 6380, fl. fr. Oct. (BM, U).
Suriname: Corantyne-river, above Lucie-river, Stahel 7000, fl. fr. Aug. (U).

26. **Apinagia psyllophora** Tul. & Wedd., Tul. (1849) 97; Tul. (1852) 97—98; Walpers (1852) 435; idem (1858) 781; Tul. (1863) 244—245 — *Neolacis psyllophora* (T. & W.) Wedd., (1873) 60 — *Apinagia psyllophora* (T. & W.) Engler, (1930) 38.

Small strongly branched herb, 15—20 cm high. Leaves similar to those of A.divaricata, with a distinct wing running down the internodes, imperfectly known. Flowers terminal and axillary, pedicel 15—25 mm long, mature spathe 8—15 mm long, tepals and stamens unknown; ovary ellipsoidal, obtuse, 3 mm high, 1.5 mm diam, with 8 indistinct ribs. Styles 2, linear, about 1 mm long. Fruit similar to the ovary.

Type: Weddel s.n., Central Brazil, in P, duplicates in C, F, K; collected in Central Brazil.

Distribution: Once collected.

Lower Rio Tocantin, fr. (C, F, K, P).
The material is very incomplete and could not provide any good details to include it in the key to the species.

27. **Apinagia pygmaea** (Bongerd) Tul., (1849) 99; idem, Tul. (1852) 105—106; Walpers (1852) 436; idem (1858) 781; Tul. (1863) 247; Engler (1930) 38 — *Lacis pygmaea* Bongard, (1835) 77, t. 5 — *Neolacis pygmaea* (Bong.) Wedd., (1873) 60—61. — **Plate 4 f. 1—8.**

Small herb, 1—3 cm high, branched; internodes terete, winged, up to 5 mm long. Leaves elliptical, up to 1.5 cm long, pinnatilobed to -partite, lobes lanceolate, dissected at the top, 2—6 mm long, top of the leaf dissected into a few narrow, about 3 mm long segments; sessile, base cuneate, decurrent; palmatinerved with 2—4 ribs; above

with tufts of lanceolate, about 1 mm long filaments. Leaf sometimes cuneate with 2 or 3 lobes at the top. Flowers axillary, pedicel 6—10 mm long, mature spathella infundibuliform, up to 5.5 mm long; tepals 3 or 4, up to 1.5 mm long, lanceolate, acute, stamens 2 or 3, from 2—3 mm long, confined to one side, anthers 1—1.5 mm long, obtuse, base of the thecae obtuse; pollen grains 17 μ high, 13μ diam; ovary ellipsoidal, 1.5—2 mm high, about 1 mm diam, acute, terete to slightly compressed, with 6 ribs, which are most distinct at the base; styles spathulate, about 1 mm long, acute or emarginate, slightly cohering at the base, papillate. Fruit similar to the ovary, each valve with 3 ribs, pedicel about 1 cm long.

Type: Riedel 393, in Le-I, duplicates in B, BM, G.-Boiss., K, NY, P, S, U; collected in Brazil.

Distribution: Once collected.

Guayandaba, Riedel 393, fl. fr. July (B, BM, G.-Boiss., K, NY, P, S, U).

28. **Apinagia yguazuensis** Chod. & Vischer, (1917) 241, f. 176 4, 6, 7, f. 184—186, f. 197.

Small slightly branched herbs, with a distinct branched, up to 4 cm high stem, internodes terete, up to 6 mm long, winged. Leaves pinnatipartite to pinnatifid, 1—4 cm long, sessile, with a narrow wing decurrent, base cuneate, lobes of the leaf triangular, 2—10 mm long, 2—5 mm wide, dissected at the top, ultimate divisions lanceolate, nerveless, 2—4 mm long; top of the leaf dissected similar to those of the lobes; distinctly nerved; above with tufts of spathulate, acute, 0.5—1 mm long filaments. Flowers known young only; tepals 3, lanceolate, up to 1 mm long; stamens 2, about 1.5 mm long, slightly united at the base, anthers 1—1.5 mm long, obtuse, base of the thecae obtuse; pollen grains known in a young state only; ovary ellipsoidal, about 1.5 mm high, about 1 mm diam, obtuse, rounded at the base, with 2 slightly unequal carpels; styles subulate, about 0.5 mm long, obtuse, free. Fruit unknown.

Type: Chodat & Vischer 341, in G.-Hassler, duplicate in G.-Boiss.; collected in Paraguay.

Distribution: Once collected.

Rio Yguazu, Chodat & Vischer 341, fl. Oct. (G.-Boiss., G.-Hassler).

29. **Apinagia brevicaulis** Mildbread, (1904) 42 — **Plate 4 f. 9—10.** — *Apinagia brevicaulis* Mildbraed & Engler, Engler (1927) 4.

Small branched herb, 1—2 cm high. Stem flexuose, internodes terete, distinctly winged, 1—3 mm long. Leaves pinnate, 1—2 cm long, petiole about 3 mm long, terete, narrowly winged, slightly amplexicaul, primary pinnae about 3 mm long, carrying a few alternating bundles of nearly filiform, membranaceous, nerveless, 1.5—2 mm long secondary pinnae. Flowers lilac, axillary, pedicel about 1 cm long, mature spathella campanulate to infundibuliform, about 5 mm long; tepals 4—6, free or united with the filaments, lanceolate, acute, about 1 mm long; stamens 3—5, confined to one side, 4—6 mm long, anthers up to 1 mm long, mucronate, base of the thecae obtuse or emarginate; pollen grains 18 μ high, 11 μ diam; ovary ellipsoidal to ovoid, about 3 mm high, subacute, strongly attenuate at the base, with 8 ribs; styles subulate, about 1.5 mm long, obtuse, cohering at the base, sometimes 3-sided at the base. Fruit similar to the ovary, each valve with 3 distinct and 2 indistinct ribs.

Type: Passarge & Selwyn 814, in B; collected in Venezuela.

Distribution: Once collected.

Cuchivero-island, at the base of the large falls, fl. fr. Febr. (B).

30. **Apinagia batrachifolia** (Mildbr.) v. Royen, nov. comb., forma **batrachifolia** — **Plate 6 f. 11—17** — *Oenone batrachifolia* Mildbread, (1905) 147; Engler (1930) 37.

Of small size. Base thalloid. Leaves repeatedly pinnate or pinnate with repeatedly forked pinnae, 4—9 cm long, ultimate divisions lanceolate, nerveless, acute, up to 5 mm long, petiole at the base provided with a more or less distinct, acute, up to 6 mm long sheath. Flowers solitary, pink to red, pedicel with 2—4 wings, widened at the top, 3—8 cm long, mature spathella infundibuliform, up to 1.5 cm long; tepals 9—19, triangular, squamiform or lanceolate, acute, up to 0.8 mm long; stamens 19—32, in one or two whorls, 5—6.5 mm long, filaments sometimes forked, anthers up to 2 mm long, acute or with 2 obtuse tops, base of the thecae obtuse, pollen grains 15 μ high, 13 μ diam; ovary obovoid, 3—4.5 mm high, 1.5—2 mm diam, obtuse or subacute, strongly attenuate at the base, provided with 6 ribs which are most prominent at the base; styles subulate, up to 1.5 mm long, cohering halfway or more, papillate. Fruit with 2 equal valves, each with 3 ribs.

Type: Ule 6113, in B, duplicates in F, G.-Del., L; collected in Western Brazil.

Distribution: Brazil.

Rio Madeira: Marmellos-falls, Ule 6113, fl. fr. April (B, F, G.-Del., L); idem Cachoeira Cabeça de Anta, Schultes & Cordeiro 6521, fl. fr. Aug. (US, U).

Forma **longistyla** v. Royen, nov. forma — **See p. 131.**

Differs form the forma batrachifolia in the more and filiform ultimate divisions, the wider petiole of the leaf, in less stamens (7—22) and in the longer style (2—2.3 mm.); pollen grains 16 μ high, 13 μ diam.

Type: v. Luetzelburg 20301, in M; collected in Eastern Brazil.

Distribution: Eastern Central Brazil.

Rio Oyapock, Salte Mañoa, v. Luetzelburg 20301, fl. fr. July (M); idem, v. Luetzelburg 20297, fl. fr. July (M); Colonia de Gongugy, prov. Bahia, Curran 540, fl. fr. Aug. (GH).

31. **Apinagia crispa** v. Royen, nov. sp. — **P. 129 and plate 5 f. 7—9.**

Small stemless herb. Base of irregular shape, thalloid, up to 2.5 cm wide. Leaves rhombiform to asymmetric rectanglar, 1—5 cm wide, contracted in a cuneate, 3—5 mm wide base; pinnatilobed to pinnatipartite, lobes triangular to lanceolate, 3—10 mm long, at the top dissected into very narrow forked segments, ultimate divisions lanceolate, 1—5 mm long, nerves several, in bundles, slightly branched, palmatinerved, prominent above; above with tufts of spathulate, acute, 1—3.5 mm long filaments. Flowering plants smaller than sterile ones. Flowers few, axillary, pedicel 1—2.5 cm long, mature spathella infundibuliform, 5—8 mm long; tepals 5—8, in a complete whorl, lanceolate, acute 1 mm long or less; stamens 5—8, from 4—5.5 mm long, anthers 1.5—2 mm long, acute, base of the thecae obtuse; pollen grains 14 μ high, 13.5 μ diam; ovary ellipsoidal, 2—2.5 mm high, 1—1.5 mm diam, obtuse, strongly attenuate at the base; styles cylindrical, obtuse, cohering at the base, strongly papillate, 1—1.5 mm long. Fruit unknown.

Type: Lanjouw & Lindeman 2010, in U; collected in Suriname.

Distribution: Once collected.

Marowyne-river, Armina-falls, fl. Febr. (U).

32. **Apinagia goejei** Went in Pulle, (1909) 206; Went (1910) 38—42, t. 11 f. 97—105; Engler (1930) 38.

Small stemless species. Leaves cunate, 2—4 cm long, 3—5 mm wide at the base, top lobed to partite or leaves lanceolate and pinnatilobed to -partite, lobes obtuse; distinctly palmatinerved, ner-

ves prominent above; with few tufts of lanceolate, 1—2 mm long filaments above. Flowers[1]) known in a young state only; tepals 3, confined to one side, lanceolate, 0.5 mm long; stamens 2, confined to one side, from 1.5—2 mm long, anthers op to 2 mm long, subacute; pollen grains unknown; ovary ellipsoidal, obtuse, rounded at the base, with 2 slightly unequal carpels, ribs unknown; styles 2, filiform, cohering at the base, 1 mm long. Fruit unknown.

Type: De Goeje s.n., in U, duplicates in K, P;, collected in Suriname.

Distribution: Suriname.

Marowyne-river, De Goeje s.n., Aug. (K, P, U); Suriname-river, Mussebafalls, Tresling 81, July (U).

33. **Apinagia imthurnii** (Goebel) v. Royen, nov. comb. — *Oenone imthurnii* Goebel (1893) 347, 376—377, f. 104, tab. 30 f. 1, 2; Matthiesen (1908) 12, 49, t. 6 f. 32—34; Engler (1930) 38.

Small to medium-sized, branched, up to 10 cm high herb; internodes short or absent, fleshy, compressed, up to 5 mm long, up to 7 mm diam. Leaves pinnatilobed to -partite, up to 10 cm long, and up to 3.5 cm wide, lobes triangular, strongly dissected at the top, ultimate segments lanceolate, with a distinct nerve, up to 5 mm long; top of the leaf similar to those of the lobes; base cuneate tapering into the square to compressed up to 2 cm long, and up to 4 mm diam, petiole which sometimes carries a narrow keel above and is sometimes slightly winged, slightly sheated at the base, sheath sometimes distinctly pointed; pinnatinerved, primary and secondary nerves prominent at either side, veinlets reticulating; above with many tufts of lanceolate, obtuse, up to 5 mm long filaments. Flowers solitary, pedicel up to 3 cm long, mature spathella infundibuliform, up to 10 mm long; tepals 8—12, lanceolate, about 0.7 mm long; stamens 8—12, from 3—4 mm long, anthers 1—2 mm long, obtuse or truncate, base of the thecae obtuse; pollen grains 15 μ high, 11 μ diam; ovary ellipsoidal to ovoid, 3.5—4.5 mm high, 1—1.5 mm diam, obtuse; styles cylindrical, 0.5—1 mm long, obtuse, papillate, cohering at the base. Fruit similar to the ovary, each valve with a single rib in the middle and one less distinct and somewhat shorter on either side.

Type: Goebel s.n., in M, duplicates in C, K, U; collected in British Guyana.

Distribution: Once collected.

[1]) The description of the flower is extracted from Went (1910) as in the material not a single flower could be found.

Amakuru-river, Goebel s.n., fl. fr. Jan. (C, K, M. U).

In Pulle, (1906) 194 and Went (1910) 5—7, t. 1 f. 1, t. 3/4 f. 17—60 and Went (1912) 14 a species is named Oenone imthurnii Goebel, but the material is poor and it is difficult to decide whether this is true. This specimen will be regarded as dubious: Went s.n., Marowyne-river, Armina-falls, fr. Oct. (U).

34. **Apinagia latifolia** (Goebel) v. Royen, nov. comb. — *Oenone latifolia* Goebel (1893) 375—376, t. 26 f. 1, 2; Matthiesen, (1908) 49, t. 6 f. 20—31, t. 9 f. 90a; Engler (1930) 38.

Small to medium-sized herb. Stem repeatedly branched, up to 15 cm high, internodes short or absent, up to 10 mm long, slightly compressed or terete, fleshy. Leaves lanceolate to spathulate or deltoïd, up to 10 cm long and 4 cm wide, entire to pinnatisect, lobes triangular to lanceolate, obtuse, up to 1.5 cm long and up to 1 cm wide; pinnatinerved with distinctly reticulated veins, midrib prominent at either side, mainly at the base, above with few tufts of lanceolate to spathulate, obtuse, 2—5 mm long filaments; base cuneate, petiole squared to compressed, up to 2.5 cm long and up to 4 mm wide, above sometimes provided with a small keel, sometimes slightly winged, at the base with a distinct, slightly pointed sheath, top of the leaf similar to those of the lobes. Flowers in slightly branched inflorescenses and/or always solitary, mature spathella infundibuliform, up to 2.5 cm long; tepals 7, triangular to lanceolate, about 0.8 mm long; stamens 7, from 3—5 mm long, anthers 2—2.5 mm long, obtuse to truncate, base of the thecae obtuse; pollen grains known in a young state only; ovary ellipsoidal, 3—4 mm high, 1—1.5 mm diam, subacute, attenuate at the base; styles cylindrical, up to 1.5 mm long, cohering at the base, obtuse, papillate. Fruit similar to the ovary, each valve with a single line in the middle and 1 very short rib at either side.

Type: Goebel s.n., in M, duplicate in C, K, U; collected in British Guyana.

Distribution: Once collected.

Barima-river, Goebel s.n., fl. fr. Jan. (C, K, M, U).

35. **Apinagia leptophylla** (Goebel) v. Royen, nov. comb. — *Oenone leptophylla* Goeb. (1893) 377, t. 30 f. 3, 4; Matthiesen, (1908) 50; Engler (1930) 38.

Small stemless species, up to 5 cm long and wide. Base irregular, up to 1 cm long. Leaves cuneate to flabelliform, up to 4 cm long and 3 cm wide, pinnatilobed to -sect, fleshy, sessile or provided with

an up to 5 mm long petiole, the latter slightly compressed and somewhat sheathed at the base; palmatinerved with a few veins; lobes irregularly roundish to lanceolate, entire, obtuse, up to 1 cm long and 5 mm wide. Flowers only known in a young state, juvenile spathella club-shaped, acute, slightly papillate, up to 3.5 mm long, pedicel up to 3 cm long; tepals 6—8, lanceolate, 0.5 mm long or less; stamens 6—8, in a complete whorl, each about 2.5 mm long, anthers about 1 mm long, obtuse to emarginate, base of the thecae obtuse; pollen grains known in a very young state only; ovary and styles imperfectly known. Fruit unknown.

Type: Goebel s.n., in M, duplicates in C, U, collected in British Guyana.

Distribution: Once collected.

Mazaruni-river, Goebel, s.n., fl. Jan. (C, M, U).

36. **Apinagia platystigma** v. Royen, nov. sp. — **P. 129 and plate 8 f. 3—6.**

Small stemless herb or stem with very short internodes, up to 5 cm high. Leaves of different shape, up to 5 cm long and 2 cm wide, pinnatilobed to -partite, membranaceous, with 2—5 main ribs, which are prominent beneath in the basal parts of the older leaves, upperside with tufts of lanceolate, up to 5 mm long filaments; lobes triangular to lanceolate, up to 15 mm long and 10 mm wide, sometimes asymmetric rhombiform; pinnately nerved; base cuneate; sometimes provided with a distinct petiole. Flowers white, axillary, pedicel up to 4.5 cm long, mature spathella infundibuliform to campanuliform, slightly papillate at the top; tepals 7—10, in a complete whorl, lanceolate, acute, 0.3—0.8 mm long; stamens 7—19, from 3—6 mm long, anthers 1.5—2.5 mm long, obtuse, connective sometimes exceeding the top, base of the thecae mucronate; pollen grains 15 μ high, 11 μ diam; ovary ellipsoidal to ovoid, 3—3.5 mm high, 1—1.5 mm diam, subacute, with a single indistinct line in the middle of each carpel; styles 0.5—1 mm long, cylindrical, sometimes flattened at the top and emarginate, cohering halfway or less, often bent downwards. Fruit similar to the ovary, with a single rib in the middle of each valve and one at either side, prominent at the base only.

Type: v. Luetzelburg 20224, in M; collected in Northern Brazil.

Distribution: Once collected.

Rio Oyapock, Cachoeira Grand Massará, fl. fr. July (M).

37. **Apinagia rangiferina** v. Royen, nov. sp. — **P. 130 and plate 5 f. 1—6.**

Small stemless species with a nearly circular base which is about 1 cm in diam. Leaves repeatedly forked, up to 4 cm long, ultimate segments lanceolate, 2—9 mm long, acute, very narrow, nerveless, primary pinnae sometimes up to 3 mm wide but then membranaceous, petiole up to 2 cm long, compressed at the base, passing into a narrow sheath. Flowers solitary, pedicel up to 1 cm long, mature spathella infundibuliform 3—5 mm long; tepals 3, lanceolate, 1—1.5 mm long; stamens 2, from 2.5—3 mm long, anthers about 1 mm long, obtuse to apiculate, base of the thecae obtuse; pollen grains globose, 14 μ diam; ovary ellipsoidal to ovoid, 1.5—2 mm high, about 1 mm diam, obtuse, with 6 more or less distinct ribs; styles mainly subulate, about 0.5 mm long, but sometimes widened and compressed at the top and slightly cohering at the base, papillate. Fruit similar to the ovary, each valve provided with 3 ribs.

Type: Glaziou 22001, in C, duplicate in U; collected in Brazil.

Distribution: Once collected.

Rio Bacalhao, prov. Goyaz, fl. fr. July (C, U).

38. **Apinagia pusilla** Tul., (1849) 99; Tul. (1852) 104—105, t. 7 f. 11; Engler (1930) 39 — *Neolacis pusilla* (Tul.) Wedd., (1873) 63.

Small species. Base about 0.5 cm high. Leaves repeatedly forked, up to 4 cm long, ultimate divisions filiform, up to 2 mm long. Flowers solitary, pedicel up to 2.5 cm long, mature spathella narrowly tubuliform, up to 8 mm long; tepals 2 or 3, lanceolate, acuminate, about 0.5 mm long; stamens 1 or 2, about 2.5 mm long, anthers unknown, ovary ellipsoidal, up to 2 mm high, about 1 mm in diam, with 6 distinct ribs, styles unknown. Fruit similar to the ovary.

Type: Schomburgk s.n., in K; collected in British Guyana.

Distribution: Once collected.

Without any details, Schomburgk s.n., fl. fr. (K).

39. **Apinagia divertens** Went in Pulle, (1909) 267; idem, Went (1910) 35—38, t. 10 f. 89—96; Engler (1930) 39.

Small stemless species. Base thalloid, about 1 cm long, and 1.5 cm wide. Leaves a few times forked, 1—2 cm long, ultimate divisions lanceolate to filiform, 2—4 mm long, petiole thin. Flowers axillary,

pedicel 3—5 mm long, mature spathella infundibuliform 2—3 mm long; tepals 4, about 0.5 mm long, narrowly lanceolate, arranged in an incomplete whorl, stamens 3, from 3—4 mm long, confined to one side, anthers 1.5—2 mm long, acute, base of the thecae obtuse; pollen grains 19 μ high, 17 μ diam; ovary ellipsoidal, 1—1.5 mm high, borne on a short gynophore, subacute, slightly compressed, consisting of 2 equal or unequal carpels and provided with 6 ribs; styles subulate, up to 1 mm long, obtuse, unequal, slightly cohering at the base, papillate. Fruit curving downwards, pedicel 4—5 mm long. Ripe fruit unknown.

Type: Versteeg 908, in U, duplicate in K, P, collected in Suriname.

Distribution: Once collected.

Upper Tapanahony, fl. Oct. (K, P, U).

40. **Apinagia spruceana** (Wedd.) Engler, (1930) 39 — *Neolacis spruceana* Wedd. (1873) 64—65.

Small thalloid species, 0.5—2 cm in diam. Leaves up to 2 cm long repeatedly forked or pinnate, petiole cuneiform compressed, membranaceous, with 2 sheathes at the base, distinctly crested above, ultimate segments lanceolate, nerveless, up to 1.5 mm long very narrow. Flowers solitary, pedicel up to 3 cm long, mature spathella tubuliform, up to 5 mm long; tepals 1—4, in a complete or incomplete whorl, linear, up to 1.5 mm long; stamens 1 or 2, up to 2.5 mm long united at the base only, confined to one side, anthers about 1 mm long, obtuse, base of the thecae mucronate, pollen grains 16 μ high, 14 μ diam; ovary ellipsoidal, up to 3 mm high and 2 mm diam, obtuse, compressed, with 2 unequal carpels, each provided with 3 indistinct ribs; styles subulate, obtuse, free about 0.5 mm long. Fruit similar to the ovary.

Type: Spruce s.n., in K; collected in Brazil.

Distribution: Once collected.

Near San Antonio, Amazone-river, (K).
According to Weddell the ovary and fruit are provided with 10 ribs, but there are only 6.

41. **Apinagia fimbrifolia** v. Royen, nov. sp. — **P. 130 and plate 8 f. 13—17.** — *Apinagia crulsiana* Warming. (1911) 574, nomen nudum.

Small stemless species. Base cuneiform, up to 3.5 cm wide and up to 2.5 cm high. Leaves up to 25 cm long either repeatedly

pinnate or once pinnate but then with repeatedly forked pinnae, petiole 2—8 cm long, up to 1.5 mm diam, with 2 distinct sheathes at the base, pinnae ascending at an angle of less than 30°, ultimate divisions filiform, up to 3 mm long. Flowers axillary, pedicels 2—5 cm long, mature spathella tubuliform, up to 20 mm long; tepals 2—7, in a complete or incomplete whorl, squamiform, 0.5 mm long or less, 1 or 2 tepals often inserted in different levels at the back of the fused filaments and alternating with the individual stamens; stamens 2 or 3, confined to one side, up to 7.5 mm long, united; anthers 1—1.5 mm long, obtuse, base of the thecae obtuse to subacute; pollen grains 19 μ high, 15 μ diam; ovary ellipsoidal, up to 4 mm high and 2 mm diam, obtuse, sometimes subobliquely inserted on the pedicel, distinctly 6-ribbed; styles spathulate, up to 1 mm long, compressed, obtuse to emarginate. Fruit similar to the ovary, each valve with 3 distinct and 2 indistinct ribs, the latter are the marginal ones.

Type: Glaziou 21982, in P, duplicates in C, F, G.-Del., K, S; collected in Eastern Brazil.

Distribution: Once collected.

Rio Paranaúa, prov. Goyaz, Glaziou 21982, fl. fr. May (C, F, G.-Del., P, S).

42. **Apinagia boliviana** v. Royen, nov. sp. — **P. 130 and plate 7 f. 1—16.**

Small herb. Base irregularly ellipsoidal, sometimes branched, 0.5—2.5 cm in diam, carrying along the margin the leaves and flowers. Leaves pinnate, up to 6.5 cm long, sessile, widened at the base, sometimes vaginate, pinnae 1—8 mm long, a few times forked, ultimate divisions up to 1 mm long, very narrowly lanceolate, nerveless. Flowers axillary, pedicels 0.5—1.5 cm long; tepals 2 or 3, lanceolate, acute, 1.5—2.5 mm long, when the flower posseses but a single stamen one on either side of the latter; when there are 2 stamens the 3rd tepal is inserted at the place where the 2 filaments become free and it proves to be shorter than the other ones; stamens 1 or 2, confined to one side, from 3—3.5 mm long, more or less united, anthers 0.5—1 mm long, obtuse to mucronate, base of the thecae obtuse; pollen grains 18 μ high, 12 μ diam; ovary ellipsoidal, 2—3.5 mm high, 1.5—2 mm diam, acute, subobliquely inserted on the pedicel, consisting of equal or unequal carpels and provided with 6 distinct ribs; styles when young strongly flattened, top truncate, emarginate or lobed, the mature style cuneiform, emarginate, flattened, papillate, up to 1 mm long. Fruit similar to the ovary, each valve with 5 ribs.

Type: Williams 1570, in NY; collected in Bolivia.

Distribution: Bolivia.

Apolo, Williams 1570, fl. fr. Sept. (NY); idem, Williams 1569, fl. fr. Aug. (NY); Rio Coroico, prov. Yungas, Weddell s.n., fl. fr. Oct. (P).

43. **Apinagia peruviana** (Weddell) Engler, (1930) 38 — **Plate 7 f. 25—28** — *Neolacis peruviana* Weddell, (1873) 64.

Small stemless species. Leaves united to a narrowly cuneiform, branched base, which is about 1.5 cm long and 1 cm wide. Leaves 3 or 4 times pinnate, indistinctly nerved, sheated at the base, up to 3 cm long, primary pinnae up to 10 mm long, ultimate divisions lanceolate, about 1 mm long, nerveless; petiole compressed, up to 3.5 mm wide, margins membranaceous, sometimes keeled above. Flowers axillary, pedicel 1—1.5 cm long; tepals 3 or 4, lanceolate, united with the filaments, 1—1.5 mm long; stamens 2 or 3 confined to one side, from 4—4.5 mm long, united at the base, anthers about 1.5 mm long, obtuse, base of the thecae obtuse; pollen grains 18 μ high, 14 μ diam, ovary ellipsoidal, 3.5—4 mm high, 1.5—2 mm diam, sometimes obliquely inserted, acute, carpels equal or unequal and with 6 distinct ribs; styles subulate, 0.5 mm long, obtuse or acute, free or slightly cohering. Fruit similar to the ovary, each valve with 3 very distinct and 2 indistinct marginal ribs; pedicel 1.5—2 cm long.

Type: Lechler 2298, in W, duplicates in G.-Boiss., Gött., P; collected in Peru.

Distribution: Once collected.

Rio San Gaban, Lechler 2298, fl. fr. (G.-Boiss., Gött., P, W).

44. **Apinagia parvifolia** v. Royen, nov. sp. — **P. 130 and plate 7 f. 17—24** — *Apinagia intermedia* Warming, in Glaziou (1911) 574, nomen nudum.

Small herb with a very short stem, the latter 1—3 cm long, branched. Leaves several times pinnate, about 1 cm long, primary pinnae few, with a fairly wide rachis, the other pinnae filiform, ultimate segments filiform, 0.5—1 mm long, rachis of the leaf narrowly winged, the wings provided at irregular places with small irregular appendages; slightly sheathed at the base. Flowers axillary, solitary, pedicel 2—3.5 cm long, mature spathella infundibuliform, up to 15 mm long; tepals 2—5, up to 0.5 mm long. linear to squamiform, one on either side of the united stamens and often

1—3 squamiform tepals on the back of the united filaments and alternating with them, stamens 2—4, united, confined to one side, about 2.5 mm long, anthers 1—1.5 mm long, obtuse, base of the thecae obtuse to acute; pollen grains 23 μ high, 15 μ diam; ovary ellipsoidal, about 2.5 mm high, obtuse, with 6 ribs; styles obovoid, about 1 mm long, compressed, mucronate at the top, attenuate at the base, free, papillate. Fruit similar to the ovary, each valve with 3 ribs.

Type: Glaziou 21992, in U, duplicates in C, F, P; collected in Brazil.

Distribution: Once collected.

Rio Gama, prov. Goyaz, fl. fr. Nov. (C, F, P, U); idem Glaziou 21991, fl. fr. Nov. (C).

Section: HYMENOLACIS Tul.

Hepatic-like, stemless herbs with an irregularly branched, strongly compressed base. Flowers in fascicles or solitary between the branchings or protruding from caves in the base; stamens 2—4, confined to one side; ovary consisting of 2 unequal carpels; 10—14-ribbed. Fruit with 2 persisting valves, both valves with 5—9 ribs.

Key to the species:

1. a. Fruits with 5 ribs on each valve. Leaves repeatedly pinnate, ultimate segments in fascicles. Parana-river . . 46. **A.guairaensis** Fiebr.-Gertz.
   b. Fruits with 7—9 ribs on each valve. Leaves unknown. Guayandaba . . . . . 45. **A.membranacea** (Bong.) Tul.

45. **Apinagia membranacea** (Bong.) Tul. (1849) 99; idem (1852) 105—106; Walpers (1852) 436; idem (1858) 781; Tul. (1863) 248; Engler (1930) 39. — *Lacis membranacea* Bongard (1835) 76, t. 4 — *Neolacis membranacea* (Bongard) Wedd. (1873) 64.

Small herb; base about 3 cm in diam. Leaves unknown. Flowers borne by an 1—4 cm long pedicel, sometimes winged, mature spathella infundibuliform, rather solid, up to 10 mm long; tepals 4 or 5, membranaceous, subulate at the top, with 1 or 2 tops, 1.5—3 mm long, united at the base with the filaments; stamens 3 or 4, from 4—5.5 mm long, anthers about 1 mm long, base slightly incised, base of the thecae mucronate; pollen grains 20 μ high, 15 μ diam; ovary ellipsoidal, 2—4 mm high, 1—1.5 mm diam, acute, slightly compressed; with 12 or 14 ribs; subobliquely inserted

on the pedicel; styles subulate, 1—2 mm long, slightly cohering at the base. Fruit similar to the ovary, each valve with 7 ribs, but 2 of them indistinct.

Type: Riedel 391, in Le-I, duplicates in B, BM, G.-Boiss., GH, K, L, NY, P, S, U; collected in Brazil.

Distribution: Once collected.

Guayandába, Riedel 391, fl. fr. July (B, BM, G.-Boiss., GH, K, L, Le-I, NY, P, S, U).

46. **Apinagia guairaensis** Fiebrig-Gertz, (1930) 12—98, f. 1—60.

Small species, 1—10 cm in diam, fleshy. Leaves repeatedly pinnate, 4—6 mm long, along the margin of the base, petiole terete, ultimate segments in bundles, filiform. Flowers borne by an 1—2 cm long pedicel; tepals 2—4, linear, 3—4 mm long; stamens 1—4, up to 5 mm long, anthers about 1 mm long, obtuse or emarginate; ovary ellipsoidal to ovoid, 3—4 mm high, with 10 ribs; styles 1 mm long, cylindrical, truncate (?), papillate at the top. Fruit similar to the ovary, each valve with 5 ribs; pedicel 4—6 cm long.

Type: Rojas 3871, in Asuncion; collected in Paraguay.

Distribution: Once collected.

Guayra-falls, Parana-river, Rojas 3871, fl. fr. Sept. (Asuncion).

Section: WENTIA v. Royen[1])

Small stemless species. Flowers solitary; tepals 3—5, in a complete or incomplete whorl; stamens 2 or 3, confined to one side; ovary consisting of 2 equal or unequal carpels, provided with 6 grooves or 14 ribs. Anthers dehiscing extrorse.

Key to the species:

1. a. Ovary and fruit with 6 grooves. Leaves repeatedly forked, up to 7.5 cm long. . . . . 47. **A.penicillata** (v. Royen) v. Royen.
   b. Ovary and fruit with 14 ribs. Leaves ovoid, up to 2.5 mm long top strongly dissected. . . . . 48. **A.pilgeri** Mildbread.

47. **Apinagia penicillata** (v. Royen) v. Royen, nov. comb. **Plate 4 f. 11—26** — *Oenone penicillata* v. Royen, (1948) 382—383.

[1]) *Wentia* v. Royen nov. sect. — *Antheris dehiscentibus extrorsis.* Named in the honour of Went who in a lecture proposed to insert A.nana in a new genus. This species later proved to be identical with A.pilgeri.

Base cuneiform, up to 2 cm high and wide. Leaves repeatedly forked, up to 7.5 cm long, sheathed at the base with a 3—5 mm long sheath, ultimate divisions filiform, 0.5—2 mm long. Flowers borne by an 1—1.5 cm long pedicel, mature spathella infundibuliform, 8—10 mm long; tepals 3—5, in a complete or incomplete whorl, filiform, acute, 0.5—1 mm long; stamens 2 or 3, confined to one side. 2—2.5 mm long, anthers up to 1.5 mm long, obtuse, base of the thecae obtuse or emarginate, pollen grains 18 μ high, 14 μ diam; ovary ellipsoidal, 2—3 mm high, 1—1.5 mm diam, subobliquely inserted on the pedicel, provided with 2 equal or unequal carpels, compressed, 6-edged, each carpel with 3 thin longitudinal lines, grooved at the inner side, prominent at the outside; styles pyramidal or spathulate, slightly emarginate, widened at the base, free, papillate, 0.5 mm long or less. Fruit similar to the ovary, with 3 distinctly prominent grooves on each valve; pedicel 1—2.5 cm long.

Type: Maguire 24927, in NY, duplicate in, F, K, U; collected in Suriname.

Distribution: Once collected.

Saramacca-river, near Gran Dam, fl. fr. Oct. (F, K, NY, U).

48. **Apinagia pilgeri** Mildbraed, (1904) 41; Engler (1930) 39 — *Apinagia nana* Went (1926) 31—33, t. 6 f. 31—36 — **Plate 3 f. 14—16.**

Very small herb. Base thalloid, 2—8 mm wide. Leaves ovoid, up to 2.5 mm long and up to 2 mm wide, at the top strongly dissected, with forked segments, nerveless. Flowers borne by an up to 2 mm long pedicel; spathellas sunken deeply into the tissues of the base, juvenile one obtuse to mucronate, solid, mature one slightly exceeding the base, up to 1.5 mm long; tepals 3, filiform, confined to one side, obtuse, up to 1 mm long; stamens 2, from 0.5—1.5 mm long, anthers up to 0.5 mm long, obtuse, base of the thecae obtuse, thecae sometimes unequal, pollen grains unknown; ovary ellipsoidal, about 1 mm high and about 0.5 mm diam, acute, with 14 ribs styles filiform, slightly cohering at the base, strongly papillate, up to 0.5 mm long. Fruit similar to the ovary, each valve with 9 ribs, but the 2 marginal ribs indistinct; pedicel 2—4 mm long.

Type: Pilger 834, in B; collected in Central Brazil.

Distribution: Central Brazil and Suriname.

Brazil: Rio Formosa. prov. Mattogrosso, Pilger 834, fl. fr. May (B).
Suriname: Suriname-river, Dieti- and Lusubanja-falls, Went s.n., fl. fr. Sept. (U); idem, Wakkibassa-falls, Stahel s.n., fl. fr. (U).

DUBIOUS SPECIES.

1. **Apinagia dissecta** (Wedd.) Engler, (1930) 38 — *Neolacis dissecta* Wedd., (1873) 62.

Small stemless species. Base about 1 cm long. Leaves cuneate, up to 5 cm long, at the top with lanceolate lobes which are dissected at the top, ultimate divisions filiform, petiole up to 1 cm long. Flowers axillary along leafless stems of stem provided with small, up to 0.5 mm long leaves at the top and up to 3 mm long leaves at the base, juvenile spathe obtuse, mature one unknown; tepals 2 or 3, linear-lanceolate, very acute, about 1.5 mm long; stamens 1 or 2, about 1.5 mm long, anthers obtuse to subacute, about 1 mm long pollen grains 16 μ high, 12 μ diam; ovary ellipsoidal, about 2 mm high, with 6 ribs; styles filiform, 0.5 mm long, slightly papillate, free. Fruit unknown.

Type: Aug. St. Hilaire s.n., prov. Minas Geraes, Brazil, in P.

Distribution: Once collected.

It is uncertain whether the 2 specimens in the typecollection, one sterile, the other fertile but without leaves, belong to one species. The description given above might include 2 species.

2. **Apinagia uruhuana** Glaziou, (1911) 575, nomen nudum.

Of this species only fruits are known and these might belong to different species.

Type: Glaziou 21986, Rio Uruhu between Jaragua and Goyaz, prov. Goyaz, July, in P, duplicates in C, K.

The material in Paris includes Castelnavia princeps Tul., as well as in the material in Copenhagen.

3. **Apinagia warmingii** Glaziou, (1911) 575, nomen nudum.

Of this species too only fruits are known. The very long pedicels of the fruit (up to 7 cm long) are characteristic.

Type: Glaziou 21991, Rio Ponte Alta, prov. Goyaz, July, Brazil, in P, duplicate in C, F, K.

4. **Apinagia gardneriana** Tul., (1849) 98; idem (1852) 100—101; Walpers (1852) 485; idem (1858) 781; Tul. (1863) 245—246; Warming (1888) 460—461, t. 21 f. 1—10; Glaziou, (1911) 574;

Engler (1930) 38 — *Neolacis gardneriana* (Tul.) Wedd., (1873)61.

Small herb with strongly branched, 15—20 cm high stem. Leaves unknown. Flowers axillary and terminal, pedicel 3—4 cm long, tepals 4—7, lanceolate, obtuse, about 0.7 mm long; stamens 3—6, about 4 mm long, anthers about 1.5 mm long, obtuse, base of the thecae obtuse; ovary ellipsoidal, 4—5 mm high, 1.5—2 mm diam; styles subulate, free, about 1 mm long. Fruit similar to the ovary, each valve with 5 ribs.

Type: Gardner s.n., in K, duplicate in BM, collected in Brazil.

Distribution: Prov. Ceara and Minas Geraes.

Rio Salado, prov. Ceara, Gardner s.n., fr. (BM, C, K, P,); Rio Arassuahy, prov. Minas Geraes, Glaziou 13138, fr. May-June (C, P).

The leaves are very poor but are provided with tufts of threads above. Their exact form can not be reconstructed. Flowers are unknown too.

5. **Apinagia** nov. sp.?

Small to large herb, with a strongly branched stem, up to 60 cm high; internodes up to 4 cm long, distinctly winged and up to 3 mm diam. Leaves pinnatipartite to -sect, up to 12 cm long, up to 5 cm wide, top obtuse, lobes obtuse, up to 3 cm long, up to 1 cm wide, base cuneate, pedicel narrowly cuneate up to 3 cm long and up to 3 mm wide. Leaf membranaceous, pinnatinerved, nerves not prominent; with a narrow, short wing running down the internodes. Flowers unknown. Fruit with 2 equal valves each with 3 distinct ribs, up to 3 mm long, pedicel up to 3 cm long.

Collection: D. B. Pickel 63, Tapera-river, Pernambuco-river, Brazil, in GH, duplicate in F.

Distribution: Central Brazil.

Tapera-river, Pernambuco-river, Pickel 63, fr. Nov. (F, GH); Rio Caeté, Huber 1783, Dec. (G.-Boiss.)

This species closely resembles A.richardiana, but differs in the distinctly petioled leaves, while the petiole is very narrow. The 6-ribbed fruits too are different from those of A.richardiana, which has only 2 ribs. Owing to lack of flowers it is impossible to describe this species as a new one.

2. MARATHRUM HB

Small to medium-sized stemless coenobia; sterile individuals often larger and coarser than the fertile ones and provided with a thalloid or irregular, sometimes branched base. Leaves either distichous or inserted along the margin of the base, sometimes with a distinct intrapetiolar stipule; either repeatedly pinnate or repeatedly forked or subentire with a few lobes along the margin. Flowers 1 to many, solitary or fascicled; pedicel slightly and gradually enlarged at the top or, more rarely abruptly enlarged; tepals 3—25, in a complete or incomplete whorl, squamiform to filiform, in the species with an enlarged top of the pedicel inserted on the latter's margin; more or less united with the base of the filaments; stamens 2—25, in a complete or incomplete whorl or confined to one side of the flower, free or united at the base; filaments lanceolate-linear, membranaceous, 3-sided at the base, sometimes branched; anthers dehiscing introrsely; pollen grains ellipsoidal or subglobose, 3-sulcate; ovary 2-celled, ellipsoidal, attenuate at the base, consisting of 2 equal or subequal carpels, 6 or 8-ribbed; the ribs sometimes winged; styles 2, always cohering at the base, often emarginate at the top, sometimes papillate. Fruit similar to the ovary.

Type: *Marathrum foeniculaceum HB.*

Distribution: About 25 species in Central America, the West Indian islands and the NW part of South America.

Taxonomy.

The genus was founded by Humboldt and Bonpland (1808) with one species. Tulasne already pointed out that their drawings contain several inaccuracies.

The genus is extremely difficult to separate from *Apinagia*, and there are a few species which might just as well be referred to *Apinagia* as to *Marathrum*, e.g. *Marathrum pauciflorum*, *M.striatifolium*, *M.aeruginosum* and *Apinagia batrachifolia*. One might try to separate the two genera on account of the fact that the leaves of *Marathrum* are provided with intrapetiolar stipules and those of *Apinagia* not, but it appears that in some species of *Apinagia* too this stipule is present. Warming points out (1901) that this character can not be regarded as taxonomically important as it returns in almost every genus. However, the intrapetiolar stipules of *Marathrum* are of a somewhat unusual shape for they are distinctly pointed. Sometimes the widened top of the pedicel may

be used as an indication but in several cases this swelling is missing. In *Apinagia* at any rate the pedicels are never widened. All the species of *Marathrum* are stemless, but so are a few *Apinagia* species. The ovary and fruit of *Marathrum* are usually 8-ribbed, but in some species they are 6-ribbed, as this is the rule in *Apinagia*. The leaves of *Marathrum* are repeatedly pinnate or forked and this in only the case in very few species of *Apinagia* (*A.fimbrifolia, A.glaziovii, A.riedelii* and *A.fluitans*) but on the other hand, other details point more to *Apinagia* than to *Marathrum*. The styles in Marathrum are usually of the same type, viz subulate, with a widened and emarginate top. This type of style is never found in *Apinagia*. Using a combination of characters it is still possible to separate *Marathrum* and *Apinagia* (see p. 23). Perhaps if more material is found, the objection against uniting the genera will disappear, but at present there are difficulties both in uniting as well as in maintaining the two genera.

Marathrum is easy to define towards the other genera of this group and no observations about these affinities need be made. The genus comprises a few species which might seem to form a link with the *Mourerinae*, but in the latter the flowers are always borne in spiciform monochasia and in this group in fascicles only. This character has already been discussed in the chapter dealing with *Apinagia* and its allies (see p. 24).

Pulle (1906) described *Lophogyne capillacea* as a species differing from its allies in the widened styles. Went already pointed out that this plant differed too much from the *Lophogyne*-type. Engler (1927) described the same species from Venezuela under the name *Marathrum nervosum*.

Engler's generic identification seems correct to me, though the specific epithet *nervosum* will have to be replaced by *capillaceum*, this name being older. This species has spathulate styles and an ovary provided with 6 winged ribs, a character which had not been observed in other *Marathrums*. The leaves closely resemble those of several *Marathrum* species and the intrapetiolar stipules are distinctly pointed. These characters seems to be sufficient to warrant the inserting of this species in *Marathrum*. Its name therefore becomes *Marathrum capillaceum*.

M.trichophorum is a new species which shows many points of resemblance with *M.capillaceum*, especially in the flower. The stamens are shifted to one side, the ovary is provided with 6 winged ribs and the styles resemble those of *M.capillaceum*. The leaves resemble those of *M.oxycarpum*.

M.aeruginosum resembles *M.capillacea* and *M.trichophorum* in

the 6 winged ribs, but the two last named species have 2 additional ribs on the sutures. Often the stamens are united.

In *M.striatifolium* the stamens are always united, but up to very different levels. Here too they are shifted to one side.

In *M.minutiflorum* 4 forms are recognised by me, viz. forms *intermedium* v. Royen, *forma diversifolium* v. Royen, while *M.indifferens* v. Royen and *M.allenii* Woodson are reduced to the rank of forms.

M.elegans resembles *M.schiedeanum* and *M.haenkeanum* in the widened top of the pedicel, but differs from both in the much wider ultimate divisions. It is strange that Warming united *M.tenue* with *M.schiedeanum*, for in *M.tenue* the top of the pedicel is not widened and the 2 or 3 stamens are shifted to one side of the flower. In the type material of *M.tenue* no flowers were found by Liebmann. After carefull examination one flower was detected with 2 stamens. My supposition that *Neolacis myriophylla* Wedd., *Marathrum kerberi* Engler and *Blandowia myriophylla* (Wedd.) Nuttall would belong to one species and that the latter might be united with *M.tenue*, therefore proved to be correct, for all these species have 2 or 3 stamens only. The winged petiole of the leaf may be quoted as another common character.

Oenone phellandrifolia Engler proved to be a *Marathrum* for its fruit is 8-ribbed, it is a stemless plant, the styles cohere halfway or more and the leaves are of the *Marathrum* type. This species closely resembles *M.squamosum*, and differs only in the more numerous stamens and in the longer and wider ultimate divisions of the leaves. On the strength of these common characters this species will be regarded as a variety of *M.squamosum*. *M.stenocarpum* was considered by Weddell a variety of *M.schiedeanum* but the top of the pedicel is not widened. This, and also some minor differences, was sufficient reason for raising this variety to specific rank. The stamens in this species reach at the most halfway the ovary.

Geography (See plate 2).

The area of the genus covers the West Indian islands, Central America and the NW and N part of South America as far eastwards as Suriname. The greater part of the species is found in Central America and the NW region of South America. Eastwards only isolated localities are known, but this may partly due to the fact that these regions are not well investigated. In the peripheral part of the area a few species are found which deviate conspicuously from the normal type of *Marathrum*. They are *M.trichophorum*, in Central America, *M.capillaceum* in the northern coastal

districts of South America. *M.aeruginosum* in Venezuela and *M.striatifolium* in Peru. These species are characterized by the 2 or 3 more or less distinctly united stamens which are shifted to one side, a fruit provided with 6 winged ribs with or without 2 additional ribs on the sutures, and more or less boat- or spoon-shaped styles with a more or less dentate margin. In the other species the styles are linear and compressed at the top and emarginate.

Key to the species:

1. a. Leaves either entire or pinnatilobed to -partite; lobes either entire or dissected at the top into a few narrow segments . . 5. M.utile Tul.
   b. Leaves either repeatedly pinnate or forked, or pinnate with repeatedly forked pinnae 2
2. a. Pedicel at least in the fruit distinctly widened at the top . . 3
   b. Pedicel not widened at the top 6
3. a. Leaves mostly repeatedly forked; pedicel of the fruit up to 3 cm long . . . . . 1. M.foeniculaceum HB
   b. Leaves repeatedly pinnate; pedicels various 4
4. a. Anthers about 1 mm long; ultimate divisions of the leaf subfiliform, up to 2.5 mm long; rachis of the leaf straight or flexuose . . . . . 2. M.schiedeanum (v. Cham.) Tul.
   b. Anthers 1.5—2.5 mm long; ultimate divisions of the leaf subfiliform to lanceolate, up to 1 mm wide and 4—10 mm long 5
5. a. Ultimate divisions less than 0.5 mm wide, 4—10 mm long; stamens 5—8 . . . . . 3. M.haenkeanum Engl.
   b. Ultimate divisions lanceolate, 0.5—1 mm wide, up to 6 mm long; stamens 7—9 . . . . . 4. M.elegans v. Royen
6. a. Stamens 2 or 3, shifted to one side, mostly more or less united . . 7
   b. Stamens 5—40, in a complete whorl, free or united at the base only 11
7. a. Flowers fascicled; ovary with 6 winged ribs and 2 ribs on the sutures, 4—5 mm high; styles spathulate, slightly compressed, sometimes with 2 or 3 teeth at the top; 1—2 mm long. Ultimate divisions of the leaf triangular to lanceolate, up to 1 mm long . . . . . 15. M.capillaceum (Pulle) v. Royen
   b. Flowers solitary 8
8. a. Ultimate divisions of the leaf up to 15 mm long; ovary 3—4 mm high, with 6 or 8 ribs; styles more or less boat-shaped, dentate along the margin, 1—1.5 mm long . . . . . 16. M.trichophorum v. Royen
   b. Ultimate divisions of the leaf up to 5 mm long 9
9. a. Ribs of ovary and fruit distinctly winged. Ovary about 2 mm high; styles obovoid to spathulate, compressed, about 0.5 mm long; anthers 1 mm long or less. . . . . 13. M.aeruginosum v. Royen
   b. Ribs not winged 10
10. a. Ultimate divisions of the leaf up to 1.5 mm long; ovary 2—3 mm high; styles subulate, 1—1.5 mm long; petiole of the leaf usually winged . . . . . 14. M.tenue Liebmann
   b. Ultimate divisions of the leaf up to 5 mm long; ovary 2.5—3.5 mm high; styles filiform to ovoid compressed or more as less bota-shaped, 0.5—1 mm long . . . . . 17. M.striatifolium v. Royen
11. a. Stamens when fully developped reaching at the most halfway the ovary . . . . . 7. M.stenocarpum (Weddell) v. Royen
   b. Stamens when fully developed slightly shorter, as long as, or longer than the ovary 12
12. a. Leaves repeatedly forked; ultimate divisions with a distinct nerve; anthers acute, emarginate or with 2 small teeth; 1.5—2.5 mm long . . . . . 18. M.pauciflorum Tul.

b. Leaves repeatedly pinnate or pinnate with repeatedly forked pinnae 13
13. a. Pedicel of flower and fruit up to 1 cm long . 10. **M.cubanum** Wright
b. Pedicel up to 9 cm long 14
14. a. Ultimate divisions of the leaf filiform, nerveless; anthers obtuse or with 2 short teeth. 1—1.5 mm long; stamens 4—25 (30—40 in var. phellandrifolium) . . . . . 19. **M.squamosum** Weddell var. *squamosum*
b. Ultimate divisions of the leaf lanceolate, linear or spathulate . . . 15
15. a. Styles filiform, widened at the top, sometimes emarginate, cohering over a long distance, 2—3 mm long; stamens 8—10; ultimate divisions of the leaf up to 3 cm long and up to 0.3 mm wide . . 6. **M.oxycarpum** Tul.
b. Styles of different shape, cohering at the base only, up to 2 mm long; stamens 5—9: ultimate divisions of the leaf 5 mm long or less . . 16
16. a. Largest leaves shorter than 7 cm 17
b. Largest leaves up to 30 cm long 18
17. a. Leaves repeatedly pinnate, 3—6 cm long. Styles filiform, up to 1 mm long. Pollen grains 20 μ high, 11 μ diam. 11. **M.leptophyllum** v. Royen
b. Leaves repeatedly pinnate or cuneate and dissected at the top, up to 1 cm long. Styles cylindrical, about 1.5 mm long. Pollen grains 15 μ high, 14 μ diam . . . . . 12. **M.pusillum** v. Royen
18. a. Leaves at the base without an intrapetiolar stipule . . . . . **M.cheiriferum** v. Royen
b. Leaves at the base with an intrapetiolar stipule . . . . . 8. **M.minutiflorum** Engler

1. **Marathrum foeniculaceum** Humb. & Bonpl. (1808) 40—41, t. 11; Kunth, (1815) 197; Schnitzlein, (1843—'79) t. 85, f. 24; Tul. (1849) 94; idem (1852) 74—76; Walpers (1852) 43; idem (1858) 777; Warming (EP 1891) 18; idem (1901) 50—52, f. 47; Engler (1930) 40; v. Royen, (1950) 137 — *Lacis foeniculacea* Martius (1824) 6; Presl, (1830) 90; Bongard, (1835) 74; Schlechtendahl & v. Chamisso, (1835) 504.

Medium sized herb. Base irregular, 0.5—2 cm long, 1—1.5 cm wide. Leaves repeatedly forked or when young rarely repeatedly pinnate, 2.5—50 cm long; petiole compressed, 1—8 cm long, membranaceously widened at the base; with a distinct, sometimes very irregular, 2—3 mm high intrapetiolar stipule; pinnae repeatedly forked or rarely repeatedly pinnate; ultimate divisions narrow, 0.5—12 mm long, obtuse or acute, nerveless, very rarely nerved. Flowers solitary or fascicled, pedicel disc-like widened at the top, 1—3.5 cm long; mature spathella tube- to trumpetshaped, up to 1.5 cm long; tepals 5—8, triangular, acute or acuminate, about 1 mm long; stamens 5—8, from 5—5.5 mm long, filaments sometimes slightly united at the base; anthers obtuse, about 1 mm long; pollen grains 18 μ high, 15 μ diam; ovary 3—4.5 mm high, 1—1.5 mm diam, acute, compressed, with 8 ribs; styles compressed to subulate, acute or emarginate, 1—2.5 mm long. Each valve of the fruit with 5 ribs.

Type: Humboldt et Bonpland s.n., in P, duplicate in B, BM, F, NY; collected in Colombia.

Distribution: British Honduras to Colombia.

Colombia: Salto de Tequendama, Humb. et Bonpl. s.n., fl. fr. (B, BM, F, NY, P); idem, Triana 823, fl. fr. (BM); idem, Triana 824, fl. fr. (BM, K, P); idem, Triana 1833, fl. fr. March (BM); idem, Holton 241, fr. Dec. (GH, K, NY); idem, André 1481, fr. Febr. (K, NY); idem, André 1482, fl. fr. Febr. (F, GH, K, NY); idem, Cuatrecases 192, Oct. (US); Rio de la Plata and Rio Pax, Lehmann 2226, fl. fr. Oct. (B, G.-Boiss., K); Rio Quinihia, Lehmann 3243, Oct. (BM).
Panama: Without locality, Hayes 824, fl. (NY).
Honduras: Santa Inés, Rodriguez 1504, Nov. (F).
British Honduras: Mountain Pine Ridge, Bartlett 11654, Febr. (Mo, NY, US).

2. **Marathrum schiedeanum** (v. Cham.) Tul., (1849) 95; idem (1852) 77—79; Walpers (1852) 433; idem (1858) 778; Weddell (1873) 53; Warming (EP 1891) 18; J. D. Smith, (1899) 73; Warming (1901) 45—49, f. 43—45; Nash, (1905) 5; Standley, (1928) 187; Engler (1930) 40 — *Lacis schiedeanum* Chamisso, (1835) 504—505, t. 566; — *Lacis foeniculacea* Martius, Schiede (1831) 42 — *Marathrum flexuosum* Liebmann (1849) 511.

Small to medium-sized herb. Base irregular in outline, sometimes branched, up to 2 cm wide. Leaves distichous, repeatedly pinnate, in young leaves sometimes repeatedly forked, up to 40 cm long; petiole terete or slightly compressed, 0.5—13 cm long, provided at the base with an obtuse, about 1.5 mm long intrapetiolar stipule; pinnae ascending at an angle of 70—90°; ultimate divisions nearly filiform, acute or obtuse, with an indistinct nerve or nerveless, up to 2.5 mm long. Flowers solitary or fascicled, pedicel 1—9 cm long, at the top cupuliform to disciform, to 2 mm in diam; mature spathella infundibuliform, 1—1.5 cm long; tepals 5—8, lanceolate, acute, 0.5—1.5 mm long; stamens 5—8, from 4—4.5 mm long; anthers about 1 mm long, obtuse, with 1 or 2 tops, connective sometimes prolonged, base of the thecae emarginate; pollen grains 18 μ high, 12 μ diam; ovary 2—5.5 mm high, 1.5—3 mm diam, obtuse, terete or subcompressed, with 8 prominulous ribs; juvenile style cuneiform, mature one subulate, sometimes emarginate at the top, 1—2 mm long. Each valve of the fruit provided with 5 prominent ribs.

Type: Schiede & Deppe 965, in W, duplicates in B, BM, K, L, Mo; collected in Mexico.

Distribution: Mexico to Costa Rica.

Mexico: Rio de Actopeadi (or Actopan), near Actopan, Schiede & Deppe 965, fl. fr. March (B, BM, K, L, Mo, W); Tonala-river, C. & E. Seler

2016, fl. fr. Febr. (GH, K, NY, US); Escuintla-Chiapas, Matuda 600, Nov. (US), La Asleton, Liebmann s.n. fr. May (C); between Asleton and Maloapan, Liebmann s.n., fr. May (C); Guatulco, Liebmann s.n., fl. fr. May (C); Rio Magdalena, Conzatti c.s. 3133, fl. fr. April, (GH).
Guatemala: Rio Michatoya, Standley 89023, March (F); Rio Siguacan, Muenscher 12031, fr. May (F, GH); Rio Madre Vieja, Standley 62229, fr. Jan. (F); Rio Lima, Muenscher 12034, May (F), idem 12035 (F, GH); Finca Pirineos, Steyermark 33240, Dec. (F); Rio Ixtacapa, Morton 222, Dec. (F); South of Delicias, Standley 87999, Febr. (F); San José del Idolo, Merk s.n., Jan. (F, GH).
British Honduras: Rio Frio, Lundell 6703, June (F, GH, Mo, NY, US).
Costa Rica: Rio Agua Caliente, Torres 2 (F); San José, Standley 41213, Dec. (F, US); Matagalpa, Ørsted s.n., fl. fr. Jan. (C); Rio Torres, Tonduz 7997, fr. May, (BR, F, G.-Boiss., G.-Del., GH, K, P, US); Rio Escasú, Torres R 47, Jan. (US); Rio Torres, Tonduz s.n., fr. May (C); idem, Tonduz 9838, fr. Jan. (GH, K, NY, US); idem 7125, fr. Jan. (US); Rio Cañas, Valerio 1131, fl. fr. (US); near St. Anna, Windland s.n., fl. April (W); without locality, Tonduz 18051, March (G.-Boiss.).
Colombia: Tequendama-falls, Holton 241 (GH). Probably this is a false label and so this locality is rather doubtful.
Without Known Country: Hacienda de la Laguna, sine coll. 1980 (S).

Dubious specimens: Guatemala, Rio de las Esclavas, Tejada 340, Dec. (US); Mazatenango, Kellerman 5913, Febr. (US). — Honduras, Rio Yeguare, Standley 1120, Dec. (F).

3. **Marathrum haenkeanum** Engler (1927) 4; idem, (1930) 40.

Small to medium sized herb. Base branched 0.5—1 cm long. Leaves distichous, repeatedly pinnate, 3—25 cm long; petiole terete or subcompressed, widened at the base, 1—9 cm long; pinnae ascending at an angle of 30—90°; ultimate divisions narrow, nearly filiform, acute, nerveless, 4—10 mm long. Flowers solitary, pedicel 2—10 cm long, winged, disc-like up to 2.5 mm widened at the top; mature spathella infundibuliform 2—3 cm long; tepals 5—6, triangular, acute, 0.5—1 mm long; stamens 5—8, from 4—6 mm long, anthers 1—2.5 mm long, obtuse or truncate, base of the thecae obtuse or emarginate, connective slightly prolonged in the young anthers, pollen grains, 19 μ high, 14 μ diam; ovary 3—5 mm high, 1.5—2 mm diam, subacute, with 6 prominulous ribs and 2 indistinct ones; styles cuneiform to filiform, compressed, emarginate, papillate, slightly cohering at the base, 0.5—1.5 mm long. Each valve of the fruit with 3 prominulous ribs and 2 ribs in the margins; pedicel 3—10 cm long.

Type: Haenke 89, in B, duplicates in BR, Mo, NY, W; collected in Mexico.

Distribution: Mexico and Guatemala.

Mexico: Without locality, Haenke 89, fl. fr. (B, BR, Mo, NY, W); Rio San Francisco, Conzatti 4508, fl. fr. Dec. (GH, US); Rio Antigua, Galeotti s.n., fl. (W); without locality, Hoege s.n., fl. (W).

Guatemala: Near San Carlos, dept. Quezaltenango, Tonduz & Rojas 162, March (Mo, US).

Dubious specimen: Rio Ceibo, Costa Rica, Tonduz 6591, Jan. (P.)

4. **Marathrum elegans** v. Royen, nov. spec. — **P. 131 and plate 16 f. 4—5.**

Medium-sized herb. Base irregularly shaped, 0.5—2 cm in diam. Leaves distichous, repeatedly pinnate, 10—50 cm long, petiole subcompressed, 3—12 cm long, widened at the base, sometimes provided at the base with an, up to 5 mm long, intrapetiolar stipule; pinnae ascending at an angle of 30—45°; ultimate divisions spathulate, up to 6 mm long, 0.3—1 mm wide, acute, with an indistinct nerve, nerveless or the nerve not reaching the top. Flowers numerous, pedicel up to 9 cm long, widened at the top; mature spathella infundibuliform, 15—20 mm long; tepals 7—9, 0.5—1 mm long, ovate to triangular; stamens 7—9, from 4.5—7 mm long, anthers about 2.5 mm long, narrow, subacute, connective sometimes prolonged, base of the thecae acute; pollen grains 17 μ high, 15 μ diam; ovary 4.5—5 mm high, 1.5—2 mm diam, obtuse, with 8 prominulous ribs; styles spathulate, obtuse or emarginate, cohering at the base, about 1.5 mm long. Each valve of the fruit with 5 ribs; pedicel cupuliform widened at the top, margin serrulate.

Type: Hinton 11624, in GH, duplicate in F, K, NY, US; collected in Mexico.

Distribution: Mexico.

Dept. Guerrero: Vallecitos, Arroyo San Antonio, Hinton 10269, June (BM, F, G.-Del., GH, Mo, NY, US); Vallecitos, distr. Montes de Oca, Hinton 11624, fl. fr. Nov. (F, GH, NY, US).
Dept. Michoacan: Aquila, distr. Coalcaman, Hinton 15952, Aug. (US).

5. **Marathrum utile** Tul., (1849) 95; Tul. (1852) 79—81, t. 2; Walpers (1852) 434; idem (1858) 778; Weddell (1873) 55; Bentham & Hooker (1880) 110; Warming (EP 1891) 18; idem (1901) 43—45, f. 39—42; Engler (1930) 40, f. 29.

Small to medium-sized herb with shoots opposite along roots. Base irregular, about 2 cm long, sometimes provided with a short stem. Leaves 3—35 cm long, 1—5.5 cm wide, entire to pinnatipartite, cuneate to spathulate, rhombiform in the young leaves; lobes few, entire, obtuse or with 2—5 narrow lobes; at the top with many lanceolate, up to 5 mm long segments. Leaf green with pink to red spots, with many nerves. Flowers solitary or fascicled, pedicel widened at the top, 1—4 cm long, mature spathella infundi-

buliform, 20—25 mm long; tepals 5—8, squamiform, up to 0.5 mm long; stamens 5—8, from 3.5—4 mm long, anthers 1—1.5 long, acuminate, base deeply incised; pollen grains 16 μ high, 13 μ diam; ovary ellipsoidal to ovoid, 2.5—4 mm high, 1—1.5 mm. diam, acute, carpels subequal; 8-ribbed; styles 1.5—2 mm long, compressed, spathulate, 3-sided at the base, with one of the sides passing into the midrib of the carpels, slightly cohering at the base.

Type: Purdie s.n., in K, duplicates in CGE, GH, NY, P; collected in Colombia.

Distribution: Costa Rica, Colombia and Venezuela.

Vernacular names: Granuna de aqua, Algas del rio (Colombia).

Costa Rica: Rio Volcan, Tonduz 3848, fl. fr. Febr. (BR, P); idem, Pittier 7939, fl. fr. (K); Rio San Pedro, Pittier 10654, fl. fr. (BR); San Antonio, Sierra Nevada de Sta Marta, Karsten s.n. (P. W).
Columbia: Sta Martha, Rio de Mancha, Purdie s.n., fl. fr. July (CGE, GH, K, NY, P); idem, H. Smith 1336, fl. fr. Febr. (B, BM, BR, F, G.-Del., GH, K, L, NY, P, S, U, US); idem, H. Smith 5277, fl. fr. (BR); Barranca Bermeja, Magdalena Valley, Haught 1925, July (GH, US); Valle Dupar, Haught 2340, 38955, Sept. and Nov. (US) ;Rio Ariguani, Dugand & Barriga 2505, Jan. (US); Rio Zulia, Nicéforo Maria 4248, Jan. (US); Magdalena, Pueblo Bello, Apolinar Angel 747 (US).
Venezuela: Rio Bocono, Goebel s.n. (in M?).

6. **Marathrum oxycarpum** Tul., (1849) 94—95; idem Tul. (1852) 76—77; Walpers (1852) 433; idem (1858) 777—778; Weddell (1873) 54; Nash (1905) 5; Engler (1930) 40; v. Royen (1950) 129, f. 56.

Medium sized herb. Base unbranched, of irregular shape, up to 30 mm long, 2—8 mm wide. Leaves repeatedly pinnate, 3—50 cm long, pinnae ascending at an angle of 30—90°; petiole compressed, up to 12 cm long, widened at the base, with an obtuse membranaceous, 1.5—2.5 mm long intrapetiolar stipule; ultimate divisions spathulate, acute, nerveless, rarely with a distinct nerve, 0.5—3 cm long, up to 0.3 mm wide. Flowers solitary, pedicel widened at the top but not cup-like, 4—9 cm long, mature spathella infundibuliform, 8—10 mm long; tepals 8—10, triangular, acute, 0.5—1 mm long, stamens 8—10, from 5—6 mm long, anthers obtuse, 1—2 mm long; pollen grains 16 μ high, 13 μ diam; ovary 3.5—5 mm high, 1.5—2 mm diam, acute, compressed, with 8 distinct ribs; styles filiform, 2—3 mm long, widened at the top and sometimes emarginate, cohering over a long distance. Each valve of the fruit with 5 ribs.

Type: Seeman 34, in K, duplicates in GH, NY; collected in Panama.

Distribution: Nicaragua, Honduras, Panama, Columbia.

Vernacular name: Passe-carne (Panama).

Honduras: Stann Creek river, Schipp 948, fl. fr. Febr. (BM, K, NY, US); Santa Inés, Rodriguez 1501, Nov. (F).
Panama: Penonome, Williams 371, fl. fr. Febr. (NY, US); Siguatepeque, Standley 56432, Febr. (F); Rio de S. Maria, Seemann 34, fl. fr. Dec. (GH, K, NY).
Colombia: Near Valle Dupar, Haught 2341, Sept. (US); idem Haught 3894, Nov. (F, US).
Nicaragua: without locality, Tate 340, fr. Aug. (K, NY).

In this species the secondary pinnae directed towards the base are sometimes much shorter than those directed towards the top.

7. **Marathrum stenocarpum** (Wedd.) v. Royen, (1950) 127—128, f. 55 — *Marathrum schiedeanum* (v. Cham.) Tul. var. *stenocarpum* Wedd., (1873) 54.

Small to medium sized herb. Base cuneiform to more or less discoid, 1—2 cm wide, 1—3 cm high. Leaves repeatedly pinnate, 3—20 cm long, petiole compressed, dilatated at the base, stipule more or less distinct, obtuse, 1—1.5 mm long; primary pinnae ascending at an angle of about 45°; ultimate divisions spathulate, acute, mostly nerveless, rarely with an indistinct nerve, 0.5—1 mm long, up to 0.3 mm wide. Flowers few, solitary, pedicel 1—4 cm long, mature spathella infundibuliform, 3—5 mm long; tepals 9, lanceolate, nearly 1 mm long; pollen grains 17 μ high, 14 μ diam; ovary 3.5—4 mm high, 1.5—2 mm diam; styles cylindrical, about 1.5 mm long, at the base 3-edged, the narrow wings passing into the midribs of the valves, obtuse, papillate at the top. Each valve of the fruit with 5 ribs.

Type: Husnot s.n., in P; collected in Colombia.

Distribution: Panama and Colombia.

Colombia: Manzanari-river, Husnot s.n., fl. fr. (P.)
Panama: Boqueron-falls, Rio Boqueron, Steyermark & Allen 17255, Dec. (Mo); Juan Diaz-river, Killip 3390, March (US).

8. **Marathrum minutiflorum** Engler, forma **minutiflorum**, (1927) 5; idem (1930) 40.

Small herb. Base irregular, slightly branched, up to 1 cm long, 1—3 mm wide. Leaves repeatedly pinnate, 1—13 cm long, petiole 0.5—5 cm long, about 1 mm wide, terete or subterete, with a

distinct, acute, about 1 mm long stipule; pinnae ascending at an angle of 30—45°; primary pinnae with a narrow wing running down the rachis; ultimate divisions mostly spathulate, obtuse or acute, with a distinct nerve, up to 1.5 mm long, about 0.3 mm wide. Flowers few, solitary, pedicel up to 3.5 cm long; mature spathella infundibuliform, up to 12 mm long; tepals 5—8, triangular, up to 0.5 mm long; stamens 5—8, from 3.5—4.5 mm long, anthers up to 1.5 mm long, obtuse or emarginate, base of the thecae obtuse, pollen grains 18 μ high, 14 μ diam; ovary 2—3.5 mm high, 1—1.5 diam, acute, subterete, provided with 8 prominulous ribs; styles spathulate, up to 2 mm long, subcompressed, obtuse, cohering at the base. Each valve of the fruit provided with 5 ribs.

Type: Rothschuh 411 in B; collected in Nicaragua.

Distribution: Mexico to Costa Rica.

Mexico: Matagalpa-river, Liebmann s.n., fl. fr. Jan. (C).
Guatemala: Rio de Mazatenango, Bernouilli 57, fl. Nov. (BR, K, NY) (*Marathrum schiedeanum* non (v. Cham.) Tul. var. *modestum* Wedd, cited by Warming, 1901, 50); idem, Kellerman 5991, Febr. (US); Retalhulea, Kellerman 6720, fl. fr. Jan. (F).
Nicaragua: Near Muy-Muy, Rotschuh 411, fl. fr. Febr. (B); Wanks-river Schramm s.n., fl. fr. (F); Matagalpa, Rio Segovia, Liebmann s.n., fl. fr. Jan. (C).
Honduras: Siguatepeque, Standley & Chacon 6925, fr. March (F); Rio Yeguare, Standley 1119, Dec. (US).
Costa Rica: Rio Barranca, Brenez 21893, fl. fr. Jan (F).

Forma **allenii** (Woodson) v. Royen, nov. comb. — *Marathrum allenii* Woodson (1938) 827—828; v. Royen (1950) 135—136, f. 61.

Pinnae ascending at an angle of 30—45°, without a wing. Ultimate divisions up to 1.5 mm long; mature spathella 7—13 mm long; tepals 6—9, up to 0.5 mm long; anthers acute, obtuse or emarginate, 1—2.5 mm long; pollen grains 17 μ high, 14 μ diam; styles subulate, narrowly 3-sided at the base, obtuse or emarginate, up to 2 mm long.

Type: Allen 82, in Mo, duplicates in GH; collected in Panama.

Distribution: Panama to Guatemala.

Panama: El Valle, Allen 82, fl. fr. Dec. (GH, Mo); El Valle de Antón, Woodson & Schery, fl. fr. June (GH, Mo); Remedios, Pittier 5443, fl. fr. Dec. (F, US).
Guatemala: Rio Michatoya, J. D. Smith 2049, fl. fr. March (GH, K, US) (*Marathrum foeniculaceum* non HB, cited by J. D. Smith (1891) 65 and (1895) 188).

Forma **indifferens** (v. Royen) v. Royen, nov. comb. — *Marathrum indifferens* v. Royen (1950) 132—133, f. 59.

Pinnae ascending at an angle of 60—90° decurrent with a narrow wing. Ultimate divisions up to 5 mm long; mature spathella 4—12 mm long; tepals 5—8, up to 0.5 mm long; anthers acute, mucronate or emarginate, 1—2.2 mm long; pollen grains 16 μ high; styles linear, acute or emarginate, 1—2 mm long.

Type: Dodge & Allen 17399 in U, duplicates in Mo; collected in Panama.

Distribution: Mexico to Panama.

British Honduras: Sittee-river, Peck, fl. fr. April (GH).
Costa Rica: without any details, Ørsted s.n., fr. (C).
Panama: Rio Indio, Dodge & Allen 17399, fl. fr. Jan. (Mo, U); Rio Boqueron, Steyermark & Allen 17256, fl. fr. Dec. (Mo, U); Quebrada Ancha, Steyermark & Allen 17117, Dec. (Mo); San Felix, Pittier 5430, fl. fr. Dec. (NY).

Forma **intermedium** v. Royen, nov. forma — **P. 131 and plate 16 f. 10—13.**

Pinnae ascending at an angle of 60—90°, decurrent along the rachis with a wing. Ultimate divisions up to 1 mm long; mature spathella 0.5—1.5 mm long; tepals 5 or 6, up to 0.5 mm long; anthers acute to mucronate about 1 mm long; pollen grains 17 μ high, 14 μ diam; styles conical or spathulate, emarginate, narrowed at the base, about 1 mm long.

Type: Skutch 2598 in US, duplicates in K, Mo, NY; collected in Costa Rica.

Distribution: Costa Rica.

Vicinity of El General, prov. San José, Skutch 2598, fl. fr. Febr. (K, Mo, NY, S, US); Rio Tiribi, prov. San José, Tonduz 9839, fl. fr. Jan. (BR, G.-Boiss., NY, W).

Forma **diversifolium** v. Royen, nov. forma — **P. 131 and plate 16 f. 1—3.**

Pinnae ascending at an angle of 45—60°, decurrent with a wing along the rachis; ultimate divisions up to 2 mm long; mature spathella 10—15 mm long; tepals 6—8, up to 1.5 mm long; anthers acuminate, 1—1.5 mm long; pollen grains 18 μ high, 14 μ diam; styles compressed, lanceolate, obtuse, emarginate or with 2 or 3 teeth; about 1 mm long.

Type: J. D. Smith 4921 in US, duplicates in G.-Del, GH, K, NY; collected in Costa Rica.

Distribution: Costa Rica.

Rio Tiribi, Tonduz 2163, fl. fr. March (BR, P); Rio Maria Aguilar, Tonduz 2182, fl. March (BR); Rio Ceibo, Tonduz 6591, fl. fr. Jan. (BR, P); Rio Torres, Tonduz 11295, fl. fr. July (BR, U, W); Rio San Francisco, J. D. Smith 4921, fl. fr. March (G.-Del., GH, K, NY, US(*Marathrum schiedeanum* non (v. Cham) Tul. cited by J. D. Smith (1895) 131; San José, Ørsted s.n., fl. fr. Nov. (C); vicinity of Las Pavas, Standley 36078, fr. Febr. (F, US); Las Canas, Standley & Valerio 46665 (F, US); vicinity of Pejivalle, Skutch 4604, fl. fr. Jan. (F, GH, Mo, US); San Sebastian, Standley 49290, Febr. (US).

Skutch 4604 comprises sterile specimina with the following characters: Leaves 15—20 cm long, repeatedly pinnate, petiole 4—6 cm long; primary pinnae with a distinct wing decurrent; ultimate divisions 1—1.5 mm long, spathulate, acute, with a distinct nerve, about 0.5 mm wide.

9. **Marathrum cheiriferum** v. Royen (1950) 134—135, f. 60.

Small to medium-sized herb. Base irregular, up to 2 cm long, up to 8 mm wide. Leaves repeatedly pinnate, up to 20 cm long, pinnae ascending at an angle of 30—45°, petiole terete to subcompressed, up to 5 cm long, narrowly winged, ultimate divisions ovate to lanceolate, obtuse or acute, with an indistinct nerve or nerveless, up to 2 mm long, or ultimate divisions rotundate and the margin crenulate to lobed and up to 1 mm long. Flowers solitary, pedicel up to 5 cm long, mature spathella infundibuliform, 6—10 mm long; tepals 6—8, triangular, acute, up to 0.5 mm long; stamens 6—8, from 3—5.5 mm long; anthers 1—1.5 mm long, obtuse or mucronate, base of the thecae obtuse; pollen grains 15 μ high, 14 μ diam; ovary ovoid to ellipsoidal, 2.5—3.5 mm high, 1—1.5 mm diam, acute, subcompressed, with 8 ribs; styles filiform or spathulate, obtuse, emarginate, slightly papillate, 1—1.5 mm long. Each valve of the fruit provided with 5 distinct ribs.

Type: Bouché s.n., in NY; collected in Panama.

Distribution: Panama, Colombia, Costa Rica.

Costa Rica: W. of Carthago, Stork 1029, Febr. (US); Rio Torres, Pittier 2485, fl. fr. May (BR).
Panama: Rio Jesus, Bouché s.n., fl. fr. Jan. (NY); Valle Chiquita, Martin 2979, July (NY); El Valle de Anton, Alston 8835, fr. June (BM, U).
Colombia: Rio Ariguani, Dugand & Barriga 2497, Jan. (US).
Alston 8835 (BM-material) shows in one specimen 2 types of leaves, one as described above, the other closely resembling a leaf of M.schiedeanum.
Dubious specimens: *Costa Rica:* Bebedero, Alfaro 121, April (US);

Guatemala: Rio Bravo, Shannon 57, (US) (*Marathrum foeniculaceum* non HB, cited by J. D. Smith in Enum. pl. guat 4. (1895) 130); *Honduras:* San Pedro Sula. Thieme 5435, Jan. (US) (*Marathrum schiedeanum* non (v. Cham.) Tul., cited by J. D. Smith, in Enum. pl. guat. 4 (1895) 131.)

10. **Marathrum cubanum** Wright ex Sauvalle (1870) 561; idem, Sauvalle, (1873) 150—151; Nash, (1905) 4. — *Marathrum schiedeanum* Cham.?, Grisebach, (1866) 41; Warming (1901) 48.

Small to medium-sized herb. Base irregular, up to 2 cm long, 4—7 mm wide. Leaves repeatedly pinnate, up to 35 cm long, petiole 2—8 cm long, widened at the base, provided with a membranaceous, about 1 mm high stipule; pinnae ascending at an angle of 30—60°, ultimate divisions spathulate to linear, acute, with a distinct nerve, up to 10 mm long. Flowers solitary, pedicel 0.5—1 cm long, mature spathella widely infundibuliform, 2—6 mm long; tepals 5—8, triangular with 1—3 acute tops, up to 1 mm long, united at the base with the filaments; stamens 5—8, from 2—4.5 mm long; anthers up to 1.5 mm long, obtuse or mucronate, base of the thecae obtuse or emarginate; pollen grains 18 μ high, 14 μ diam; ovary 1.5—3 mm high, 1—1.5 mm diam, acute, subterete, provided with 8 ribs; style cylindrical to slightly 3-sided, emarginate, free, 1.5—2 mm long. Each valve of the fruit with 5 ribs, pedicel 0.5—1 cm long.

Type: Wright 3194, in Havana, duplicates in B, BM, GH, Gött., K, Mo, NY, P, S; collected in Cuba.

Distribution: Cuba, prov. Pinar del Rio.

San Sebastian river: Wright 3194, fl. fr. (B, BM, GH, Gött., Havanna, K, Mo, NY, P, S); Ekman 18055, Nov. (BM, F, P. S); Ekman 13798, May (G.-Del., NY, S).
Rio Portales: Britton c.s. 9763, March (F, GH, K, NY, U); Shafer 11176 (K, Mo), 11200, Dec. (K, Mo, NY); Shafer 11190, March (F, GH, Nov. NY, U); Ekman 18710a, March (GH, NY, S); Ekman 18710b, March (K, Mo, S).

Probably this species is found in the northern parts of Colombia, but as the material is sterile the decision is left to future material (See Karsten s.n. Rio Negro, in Göttingen).

11. **Marathrum leptophyllum** v. Royen, (1950) 131—132, f. 58.

Herb with small shoots arising in pairs from long, compressed roots. Base about 0.5 cm in diam. Leaves repeatedly pinnate, 3—6 cm long, pinnae ascending at an angle of 45—90°; petiole up to 1.5 cm long, membranaceous, transparent when young, at the base with a membranaceous, about 1 mm long stipule which is absent in some cases, ultimate divisions lanceolate, membranaceous, acute,

nearly filiform, up to 2 mm long. Flowers few, known young only, pedicel 1.5—2 cm long, spathella clavate, mucronate, papillate; tepals 7, lanceolate, acute, about 0.5 mm long; stamens 7, from 2.5—3 mm long, anthers 1—1.5 mm long, obtuse or emarginate; pollen grains 20 μ high, 11 μ diam; ovary 2.5—3 mm high, about 1 mm diam, acute, rounded or attenuate at the base, compressed, with 8 prominulous ribs; styles filiform, top obliquely cut off, emarginate at the inner margin, 0.5—1 mm long. Fruit similar to the ovary, each valve with 5 ribs.

Type: Woodson & Schery 805 in GH, duplicate in Mo; collected in Panama.

Distribution: Once collected.

Boquete, fl. fr. July (GH, Mo).

12. **Marathrum pusillum** v. Royen, (1950) 129—130, f. 57.

Small size. Base cuneiform, up to 10 mm long, 2—8 mm wide. Leaves repeatedly pinnate, up to 2.5 cm long, sometimes with a cuneate, about 1 cm long and at the top 2—3 mm wide petiole and than provided with 3—5 lobes, primary pinnae sometimes with a broad wing running down the rachis; at the base provided with a distinct, obtuse, about 1.5 mm long stipule, ultimate divisions lanceolate, acute, nerveless, 0.5—2 mm long. Flowers 1 to 3, solitary or fascicled, pedicel up to 2 cm long, mature spathella infundibuliform 4—5 mm long; tepals 6 or 7, squamiform, about 0.3 mm long; stamens 6 or 7, about 3.5 mm long, anthers 1—1.5 mm long, obtuse, emarginate or mucronate, base of the thecae obtuse; pollen grains 15 μ high, 14 μ diam; ovary ovoid, 2—3 mm high, about 1 mm diam., acute, strongly compressed, with 8 prominulous ribs; styles cylindrical, about 1.5 mm long, top obliquely cut off, emarginate at the inner side or styles spathulate and emarginate, slightly papillate. Each valve of the fruit with 5 ribs.

Type: Pittier 2403, in US; collected in Panama.

Distribution: Once collected.

Chagres river, fl. fr. Jan. (US).

13. **Marathrum aeruginosum** v. Royen, nov. sp. — **P. 132 and plate 8 f. 1—2.**

Small herb with opposite shoots along branched, compressed roots. Base irregular, 2—10 mm diam. Leaves repeatedly forked

or cuneate with forked lobes at the top; 1—5 cm long, copper coloured, at the base sometimes with an, up to 4 mm long, stipule; membranaceous, with many nerves radiating from the base or pinnatinerved; petiole slightly winged, ultimate divisions subfiliform, nerveless, 1—3 mm long. Flowers solitary, pedicel about 1 cm long, mature spathella infundibuliform, 4—5 mm long; tepals 3 or 4, in an incomplete whorl, 1—1.5 mm long, free or united at the base with the stamens, lanceolate, acute; stamens 2, free or united at the base, 2—3 mm long, anthers up to 1 mm long, obtuse to mucronate, base of the thecae obtuse, pollen grains 16 μ high, 13 μ diam; ovary ellipsoidal to ovoid, about 2 mm high and 1 mm diam, rounded at the base, subcompressed, provided with 6 winged and 2 prominulous ribs; styles obovoid to spathulate, about 0.5 mm long, compressed, cohering at the base, papillate. Each valve of the fruit with 3 winged ribs and 2 marginal prominulous ribs.

Type: Steyermark 58428 in F; collected in Venezuela.

Distribution: Once collected.

Santa Barbara cataracts, Orinoco-river, fl. fr. Sept. (F).

14. **Marathrum tenue** Liebmann, (1849) 511 — *Marathrum kerberi* Engler (1927) 5; idem, (1930) 40 — *Neolacis myriophylla* Weddell, (1873) 63—64 — *Apinagia myriophylla* (Wedd.) Engler, (1930) 38 — *Blandowia myriophylla* (Wedd.) Nash, (1905) 5. Nash, (1905) 5.

Small herb. Base branched or nubranched, up to 1.5 cm high. Leaves repeatedly pinnate, up to 15 cm long, along the margin of the base or distichous, petiole terete to subterete, up to 3.5 cm long, 1.5—3.5 mm diam, widened and sheathed at the base, sheathes sometimes irregular, but never with a stipule; pinnae ascending at an angle of 60—90°, ultimate divisions nearly filiform, nerveless, up to 1.5 mm long. Flowers solitary or fascicled, pedicel up to 2.5 cm long, mature spathella infundibuliform to tubuliform, 3—10 mm long; tepals 2—4, in an incomplete whorl, lanceolate to filiform, acute, about 1 mm long; stamens 2 or 3, from 3—4.5 mm long, anthers 1—1.5 mm long, obtuse, base of the thecae obtuse to acute, pollen grains 16 μ high, 12 μ diam; ovary 2—3 mm high, 1—2 mm diam, acute, subcompressed, with 8 prominent ribs; styles subulate, 1—1.5 mm long, acute, pyramidal when young, free or slightly cohering, subpapillate. Each valve of the fruit with 3 distinct and 2 indistinct ribs; pedicel up to 3 cm long.

Type: Liebmann s.n. in C; collected in Mexico.

Distribution: Mexico to Costa Rica.

Vernacular name: Muzgo (Guatemala), aserri (Mexico).

Mexico: Huitamalco, Liebmann s.n., fl. fr. May (C) (*Marathrum schiedeanum* non (v. Cham.) Tul., cited by Warming in (1901) 49); Cordoba, Greenman 123, fl. fr. Jan. (F, GH, NY); Arroyo del Ladion, Conzatti 4338, Nov. (US); Barranca of Texolo, Pringle 7805, April (GH, US); La Luz, Kerber 83, fl. fr. Oct. (B, BM, BR, C, G.-Boiss, G.-Del, Gött, K, P, US). *Guatemala:* Finca Pirineos, (S. Maria de Jésus & Calahuaché), Steyermark 35193, Jan. (F); Finca Pirineos & F. Soledad, Steyermark 33577, fl. fr. Jan. (F); Carro Brujo, Steyermark 30940, fl. Nov. (F); Finca El Porvenir, Steyermark 37130, March (F).
Costa Rica: Rio Orosi, Torres 1, fl. fr. (F); La Hondura, Standley & Valerio 51920, fl. fr. March (F, US); La Verbena, Standley 32312, fl. fr. Jan. (F, US); Dulce Numbre, Standley 35801, fl. fr. Febr. (F, US); Sta Maria de Dota, Standley & Valerio 44154, 44155 (F); El General, Skutch 2489, fl. fr. (K, Mo, NY, S); Rio Virillo, Hoffman 271, fl. fr. (B, C); Rio Parida, Pittier & Tonduz 7951, fl. March (BR); Rio del Volcan, Pittier 3846 (BR) (*Marathrum schiedeanum* non v. Cham.) Tul. var. *modestum* cited by Warming (1901) 50, f. 46, B, K); Rio Ceibo, Pittier 393 (BR); Piedra Blanca, Pittier & Tonduz 1260, fl. Aug. (BR); Rio Parrita, Tonduz 7951, fl. March BR); near Tres Rios, Pittier 98, fl. March (BR); without locality, Pittier & Tonduz s.n. (BR).

15. **Marathrum capillaceum** (Pulle) v. Royen, nov. comb. — *Lophogyne capillacea* Pulle, (1906) 194, t. 8; Went (1919) 47—50, t. 12 f. 1—11, t. 13 f. 115—122; Engler (1930) 44 — *Marathrum nervosum* Engler, (1927) 5; idem (1930) 40.

Small to medium sized herb. Base thalloid, fleshy, slightly branched, about 3.5 cm in diam and up to 1.5 cm thick. Leaves along the margin of the base, 3—15 cm long, but sometimes, mostly in the fertile plants, distichous along a terete, 1—1.5 cm high stem. Leaves repeatedly pinnate, petiolate, petiole compressed, 1.5—2.5 cm long, 3—8 mm diam, primary pinnae slightly winged, ultimate divisions triangular to lanceolate, acute, 0.5—1 mm long. Flowers fascicled, pedicel 3—5 cm long, narrowly winged, mature spathella infundibuliform, 2—3 cm long; tepals 3—5, free or united at the base with the filaments, lanceolate, acute, 0.5—1.5 mm long; stamens 3 or 4, in a complete or incomplete whorl, 3—5 mm long, anthers 1—1.5 mm long, obtuse; pollen grains 19 μ high, 16 μ diam; ovary 4—5 mm high, 1—2 mm diam, obtuse, slightly compressed, with prominent winged ribs and 2 indistinct, prominulous ribs on the sutures which are sometimes absent; styles spathulate, 1—2 mm long, slightly compressed, sometimes with 2 or 3 short dents at the top, free. Fruit similar to the ovary, each valve with 3 winged ribs and 2 indistinct marginal ribs; base strongly attenuate, prolonged up to 1 mm, pedicel 2.5—5 cm long.

Type: Versteeg 814, in U, duplicate in BM; collected in Suriname.

Distribution: Suriname and Venezuela.

Suriname: Kortoefoetoe-falls, Upper Tapanahony-river, Versteeg 814, fl. fr. (BM, U); Waremapan-soela, Upper Tapanahony-river, Geyskes 2 & 4 & s.n., fl. fr. July (U).
Venezuela: Cachoeira Piñal, Passarge & Selwyn 736, fl. fr. Jan. (B).

16. **Marathrum trichophorum** v. Royen, nov. sp. — **P. 132 and plate 16 f. 6—9.**

Medium sized herb. Base incompletely known, up to 1 cm in diam. Leaves 5—40 cm long, repeatedly pinnate, pinnae ascending at an angle of 30—45°, petiole compressed, 3—14 cm long, about 1 mm diam, widened at the base, with a stipule, ultimate divisions lanceolate, acute, with a distinct nerve, 4—15 mm long, up to 0.3 mm wide. Flowers fascicled, sometimes solitary, pedicel up to 7 cm long, mature spathella infundibuliform, 1—3 cm long; tepals 3, one-sided, 1—2 mm long, lanceolate, acute, united with the stamens, but sometimes the tepals between the stamens absent; stamens 2, from 5—6.5 mm long, anthers about 1 mm long, obtuse, mucronate or emarginate, base of the thecae obtuse; pollen grains 17 μ high, 14 μ diam; ovary 3—4 mm high, about 2 mm diam, acute, subcompressed, provided with 6 or 8 strongly prominent ribs; styles slightly boat-shaped, 1—1.5 mm long, acute, cohering at the base, slightly dentate along the margins, papillate inside. Each valve with 3 strongly prominent ribs; pedicel 1.5—6.5 cm long.

Type: Langlassé 613, in GH, duplicates in G.-Del., US; collected in Mexico.

Disribution: Mexico.

Sierra Madre, Langlassé 613, fl. fr. Aug. (G.-Del., GH, US); North of Acapulco, Frye & Frye 2573, May (Mo, NY).

17. **Marathrum striatifolium** v. Royen, nov. sp. — **P. 132 and plate 7 f. 29—34.**

Of small size. Leaves distichous, up to 6 cm long, a few times forked or pinnate or cuneate and a few times divided lobes at the top, petiole cuneate, up to 2 cm long and wide, membranaceous, rhombiform in transverse section, widened at the base, with prominulous nerves; ultimate divisions spathulate to linear, nerveless, up to 5 mm long, very narrow. Flowers solitary, pedicel 1—3 cm long, mature spathella infundibuliform, 4—7 mm long;

tepals 3 or 4, one-sided, triangular to lanceolate, acute, always 1 on either side of the 2 united stamens and 2 on very different places, 0.5—1.5 mm long; stamens 2, united to very different levels, about 3 mm long; anthers about 1.5 mm long, obtuse or emarginate, base of the thecae acute; pollen grains subglobose 15 μ high, 14 μ diam; ovary ovoid or ellipsoidal, 2.5—3.5 mm high, 1.5—2 mm diam, acute, rounded or attenuate at the base, strongly compressed, carpels equal or unequal, with the sutures sometimes excentric; provided with 8 ribs; styles filiform or spoonlike to ovate, 0.5—1 mm long, compressed or slightly boat-shaped, slightly cohering at the base, papillate, distinctly nerved. Fruit similar to the ovary, each valve with 3 distinct and 2 indistinct ribs in the margins; sometimes obliquely inserted on the pedicel.

Type: Weberbauer 6426 in GH, duplicate in US; collected in Peru.

Distribution: Once collected.

Western slopes of the Andes below Frias, prov. Ayavaca, fl. fr. May (GH, US) (*Apinagia peruviana* non (Wedd.) Engler cited by Mac Bride (1938) 1007).

18. **Marathrum pauciflorum,** Tul. var. **pauciflorum,** (1849) 94; idem (1852) 72—74, t. 1 f. 6; Walpers (1852) 433; idem (1858) 777; Weddell (1873) 55; Engler (1930) 40.

Small herb with a 2—4 mm long terete stem. Leaves distichous, repeatedly forked, 5—6 cm long, petiole up to 3 cm long, widened at the base, with 2 distinctly pointed stipules; ultimate divisions filiform, with a distinct nerve, up to 15 mm long (or longer?). Flowers few, pink, solitary, pedicel slightly winged, sometimes with 2 or 3 flowers on one pedicel, 3—6 cm long, mature spathella tubuliform-infundibuliform, up to 2.5 cm long; tepals about 8, lanceolate, acute, up to 1 mm long; stamens 11—18, white, 4.5—8 mm long, sometimes 2 or 3 filaments united to different levels; anthers 1.5—2.5 mm long, acute or emarginate or with 2 small dents, base of the thecae obtuse; pollen grains unknown in a good state; ovary 2.5—5 mm high, 1.5 —2 mm diam; obtuse, with 8 distinct ribs; styles filiform, 2—2.5 mm long, cohering about halfway or less, slightly thickened at the top. Fruit similar to the ovary, each valve with 5 ribs, but 2 of them sometimes very indistinct, pedicel 3—6 cm long.

Type: Schomburgk 556, in P, duplicates in BM, CGE, F, G.-Del., GH, K, L, W; collected in British Guyana.

Distribution: British Guyana.

Vernacular name: Paku weed.

Without locality, Schomburgk 550, fl. fr. (B); idem, Schomburgk 556, fl. fr. (BM, CGE, F, G.-Del., GH, K, L, P, W); idem, Schomburgk s.n. (G.-Boiss.); Puruni-river, Thomas-falls, Jenman 7609, fl. fr. Oct. (K); Cuyuni-river, Tinamu-falls, Aitkers 2001, fl. fr. March (K).

Var. **heterophyllum** v. Royen, nov. var. — **P. 133 and plate 16 f. 20.**

Small herb. Base as in the var. pauciflorum. Leaves as in var. pauciflorum, but up to 3 cm long. Besides this form the second type of leaf is flabelliform, has wider lobes and is up to 3 cm long and up to 4 cm wide; ultimate divisions, in both types of leaves, linear-lanceolate, up to 6 mm long; petiole of the leaf with 1 or 2, up to 3 mm high and 1.5 mm wide, membranaceous, intra-petiolar stipules, but these are present in the leaves of the first type only. Flowers solitary, pedicel up to 2 cm long; mature spathella tubuliform, up to 2 cm long; tepals 8—13, lanceolate, acute, 0.8—1.5 mm long; stamens 12—18, up to 4 mm long, sometimes 2 or 3 united up to different levels, anthers greenish pink, about 1 mm long, acute, emarginate or with 2 small dents, base of the thecae obtuse, pollen grains 17 μ high and 14 μ diam; ovary up to 2.5 mm high and 1.5 mm diam, terete, obtuse, markedly attenuate at the base, provided with 8 ribs; styles cylindrical, about 1 mm long, slightly compressed at the top, emarginate, cohering over a long distance. Fruit known in an incomplete state only.

Type: Sandwith 694, in K, duplicate in BM; from British Guyana.

Distribution: Once collected.

Cuyuni-river, Akaio falls, fl. Nov. (BM, K).

19. **Marathrum squamosum** Weddell var. **squamosum**, (1873) 54; Warming (1901) 41, f. 37; Engler (1930) 40 — *Marathrum squamosum* Wedd. var *spruceanum* Wedd., (1873) 54.

Of small to medium size. Base up to 0.5 cm high, up to 1 cm wide. Leaves 2.5—40 cm long, repeatedly pinnate or pinnate and pinnae repeatedly forked, petiole compressed, up to 8 cm long, about 1 mm wide, at the base 2 stipulae which are sometimes distinctly pointed, primary pinnae ascending at an angle of 45—60°, the other pinnae at an angle of less than 30°; ultimate divisions filiform, acute, nerveless or with an indistinct nerve, 2—18 mm long (or

longer?). Flowers solitary or fascicled, pedicel pink, up to 8 cm long; mature spathella infundibuliform, 10—25 mm long; tepals 8—12, triangular, acute, up to 1 mm long; stamens 4—25, in a complete or incomplete whorl, sometimes in 2 whorls 3.5—5.5 mm long; anthers green. 1—1.5 mm long, obtuse or with 2 short dents, base of the thecae obtuse; pollen grains 16 μ high, 14 μ diam; ovary 2—3 mm high, 1—1.5 mm diam, subterete, with 8 distinct ribs, but sometimes 2 very indistinct or absent; styles subulate, 1—2.5 mm long, cohering to a half or somewhat less, papillate at the top. Fruit with two 5-ribbed valves; pedicel 2.5—8 cm long.

Type: Spruce 3102, in P, duplicates in B, BM, BR, C, G.-Boiss., G.-Del, K, NY, S, W; collected in Brazil.

Distribution: Upper Amazone-region Brazil.

Rio Negro, near San Carlos, Spruce 3102, fl. fr. April (B, BM, BR, C, G.-Boiss., G.-Del., Gött., K, NY, P, S, W); Rio Uaupès near Panure, Spruce 2579, fl. fr. Oct. (BM, BR, C, CGE, F, G.-Bois., G.-Del., GH, Gött., K, NY, P, S. W); Rio Negro near San Gabriel, Spruce 1580, fl. Oct. (P).

Var. **phellandrifolium** (Engler) v. Royen, nov. comb. — *Oenone phellandrifolium* Engler (1927) 2—3; idem (1930) 38.

Differs from the var. squamosum in more stamens (30—40), in the wider ultimate divisions, in the much larger ovary and fruit (4—6 mm high, 2—3 mm diam.), in the longer pedicel of the fruit (10—15 cm) and in the larger and wider pollen grains, 18 μ high, 16 μ diam.

Type: Koch-Grünberg 140 in B; collected in the borderland of Venezuela and Brazil.

Distribution: Borderland of Venezuela and Brazil.

Vernacular names: Caruru, Uanana, Ndapopexka.

Venezuela: Matapy-falls and others in the Rio Caiary, Koch-Grünberg 140, fl. fr. (B).
Brazil: Rio Uaupès, Arara-cachoeira, v. Luetzelburg 23245, 23246, 23252, fl. fr. Nov. (M).

DUBIOUS SPECIES.

1. **Marathrum** nov. sp.?

Of medium size. Base cuneiform, 2.5—4.5 cm long, 1.5—3 cm high. Leaves 1.5—20 cm long, repeatedly pinnate, petiole terete to slightly compressed, sheated at the base, up to 5.5 cm long, up to

1.5 mm wide, primary pinnae ascending at an angle of 30—60°, up to 5 cm long; ultimate divisions very numerous, triangular, acute, nerveless, about 0.3 mm long. Secondary and tertiary pinnae slightly winged.

Collection: Tate 1243, in NY, collected in Venezuela.

Mount Auyan Tepui, Dec. (NY).

The leaves closely resemble those of Rhyncholacis dentata, especially in the triangular ultimate divisions. The presence of the distinctly pointed stipulae at the base of the leaf points to the genus Marathrum. This species is highly characteristic in the numerous, fascicled leaves.

2. **Marathrum** nov. sp.?

Of medium size, Base irregularly rounded, 5—10 mm long, 2—5 mm wide. Leaves 3—30 cm long, repeatedly pinnate, petiole up to 6 cm long, compressed, widened at the top but the rachis then tapering towards the top of the leaf; distinctly nerved; primary pinnae up to 5 cm long, distinctly nerved; ultimate divisions narrow, slender, obovate, acute, 0.5—0.8 mm long, 0.3 mm wide or less, nerveless.

Collection: H. H. Smith s.n., in NY, collected in Colombia.

Distribution: Sta Martha, Columbia.

Santa Martha, above Onaca, H. H. Smith s.n. Aug. (NY); idem, Rio Negro, Karsten s.n. (W).

Closely resembles M.cheiriferum but differs in the wider and distinctly nerved rachis and petiole of the leaf, in the longer secondary pinnae, wider rachis of primary and secondary pinnae, and in the less wider, nerveless ultimate divisions which are much more numerous than in M.cheiriferum.

3. RHYNCHOLACIS Tul.

Stemless herbs of small to medium size. Base various, branched or unbranched. Leaves distichous, repeatedly forked or pinnate with the lobes sometimes repeatedly forked, or simple and then always cuneate and palmatilobed to partite with the lobes strongly dissected at the top; petiole terete to subterete, sometimes slightly winged, often with 2 sheathes at the base. Fertile individuals sometimes smaller and more slender than the sterile one. Flowers either solitary or fascicled; pedicels sometimes cohering, sometimes with a cup-like widening at the top; juvenile spathella clavate,

mostly narrow, mature one tubuliform or infundibuliform; tepals 3—20, in a complete or incomplete whorl or shifted to one side of the flower; sometimes of unequal length; anthers mostly very narrow, often with 2 or 3 short teeth at the top; pollen grains ellipsoidal, 3-sulcate; ovary ellipsoidal to ovoid, attenuate or rounded at the base, compressed, consisting of 2 equal carpels and provided with 6, rarely with 8 ribs; midrib of each carpel more or less winged, the other ribs sometimes absent or indistinct; ribs grooved inside and prominent outside; styles 2, often rigid, subulate or clavate, sometimes membranaceous at the top, 3-sided to terete at the base, with one of the edges passing into the midrib of the carpel. Fruit similar to the ovary, but always larger.

Type: Rhyncholacis hydrocichorium Tul.

Distribution: About 25 species in Venezuela, Colombia, Brazil.

The genus *Rhyncholacis* belongs to the easily recognisable genera. It was founded by Tulasne (1849, 1852) with the description of *Rh.hydrocichorium* and *Rh.macrocarpa*, the latter based on fruits only. Weddell (1873) added *Rh.crassipes*, *Rh.varians*, *Rh.linearis* and *Rh.oligandra*. The latter can be recognised by its small size and by the 2—6 stamens. *Rh.linearis* and *Rh.crassipes* closely resemble each other; in fact they differ mainly in the size of the stamens and ovary. Yet, because of some additional minor differences, e.g. the longer ultimate divisions of the leaf, the longer tepals and the wider midrib of the carpel in *Rh.linearis* it seems advisable to keep the two species apart. However when more material becomes available, these differences may prove illusory. In the species named above and in some others too it is noteworthy that the lateral ribs of the fruit and ovary are mere folds and are not, or but slightly reinforced by vascular bundles. In all other genera where the fruit and ovary are provided with ribs, the latter nearly always are reinforced by vascular bundles.

Goebel (1893) described *Rh.applanata* from Venezuela and British Guyana. This and the species of Weddell constitute a group with repeatedly forked pinnae. In contrast to this group stands the one typified by *Rh.hydrocichorium*. The leaves of the species belonging to this group are cuneate and dissected at the top. More or less intermediate are *Rh.varians* and *Rh.oligandra*. In the first group Matthiessen (1908) described *Rh.divaricata* and *Rh.penicillata*. He was the first to point out that the anthers often have 2 or 3 teeth at the top and that this provides a good character for the genus. Engler in 1927 described *Rh.jenmanii*.

Taxonomy.

Rh.brassicifolia is a new species belonging to the group typified by *Rh.hydrocichorium*. It differs from the latter in the less distinctly winged midrib of the carpel, the wider and prominent ribs and the widened top of the pedicel; the ultimate divisions of the leaf are wider and coarser. To the group of intermediate species *Rh.coronata*, *Rh.palmettifolia* with the variety *rosea* and *Rh.unguifera* are added. *Rh.coronata* can be recognized by the rather large projecting part of the connective. This part is absent in some species and consists in other species of 2 or 3 short teeth. *Rh.palmettifolia* has delicate leaves, which resemble those of *Rh.hydrocichorium*. The styles are long in proportion to the ovary. The narrowness of the latter and the 3-topped anthers provide good points of difference with *Rh.hydrocichorium*. The variety *rosea* differs from the type in the more numerous stamens, the longer tepals, the 2-topped anthers and the shorter styles, which are membranaceous at the top. This is a character found in *Rh.nitelloides* only. *Rh.unguifera* closely resembles *Rh.varians*, but differs in the wider and in the more numerous ultimate divisions.

In the group characterized by repeatedly pinnate leaves or pinnate leaves with repeatedly pinnae 7 new species and 4 new varieties and forms have been described, viz. *Rh.guyanensis*, *Rh.dentata*, *Rh.flagellifolia*, *Rh.brevistamina*, *Rh.carinata*, *Rh.cristata*, *Rh.nobilis* and *Rh.oligandra* var. *tenella*, *Rh.applanata* var. *laxipinnata*, *Rh.jenmanii* forma *laciniata* and *Rh.jenmanii* forma *dolichophylla*.

Rh.brevistamina can be distinguished by the very short stamens, which reach halfway the ovary or but slightly higher.

Rh.guyanensis, *Rh.dentata*, *Rh.nobilis* and *Rh.applanata* var. *laxipinnata* differ from the other species in the very short ultimate divisions of the leaf. *Rh.dentata* especially is easily recognisable as the ultimate divisions are reduced to short, triangular teeth. *Rh.nobilis* resembles *Rh.unguifera*, but has repeatedly pinnate leaves, shorter ultimate divisions and narrower midribs in ovary and fruit. The other new species have leaves with filiform ultimate divisions and are difficult to separate. *Rh.jenmanii* Engler forma *laciniata* has narrower styles and a narrower membranaceous petiole than the type; that of the type is terete and fleshy. *Rh.macrocarpa* is a name that has been applied to several different species, e.g. by Tulasne, Goebel, Warming, Went and Engler. This confusion has arisen because Tulasne described the fruits only, and each of the later authors thought he had found the leaves belonging to these fruits. Yet it is better to regard his species as a

dubious one, as fruits similar to those described by Tulasne are found in several species. On the whole these fruit characters seems to be of little importance. The fruits of *Rh.flagellifolia, Rh.crassipes, Rh.guyanensis* and others resemble each other so closely that a division based on the latter seems impossible. The species of Warming, Went and Engler are here identified respectively as *Rh.carinata, Rh.cristata* and *Rh.jenmanii* forma *dolichophylla.* The specimen regarded by Goebel as *Rh.macrocarpa* is a large form of *Rh.applanata. Rh.carinata* and *Rh.cristata* are distinguishable from the other species by the keel at the dorsal side of the petiole, which is particularly distinct at the latter's base. They differ from each other because *Rh.cristata* has wider and shorter ultimate divisions in the leaf, which are provided with a distinct nerve.

Neolacis nitelloides Weddel must be regarded as a *Rhyncholacis* species, although the midribs of the carpels are but slightly developed. This species closely resembles *Rh.oligandra,* but the top of the style is membranaceous. The variety *tenella* also lacks the winged midribs, but the styles run down with a narrow wing into the midrib of the valve. This character is typical for the genus *Rhyncholacis.*

A striking character of *Rh.apiculata* are the connivent sheathes of the various leaves, which are united into a cone. *Rh.minor* is a very small species with leaves up to 3 cm long, which resemble those of *Rh.palmettifolia;* the ultimate divisions, however, are much shorter. In its ovary it closely resembles *Rh.oligandra* and *Rh.nitelloides,* but the midribs are wider. The styles are longer than in these 2 species.

Geography (See plate 1, map 1b).

The species of this genus have on the whole a very restricted distribution and Goebel's statement that the species of the *Podostemaceae* are often restricted to a single cataract or river, is well applicable to this genus. *Rh.flagellifolia* seems to be the only species which is more widely distributed.

Not a single species has been found south of the Amazone-river.

Key to the species:

1. a. Stamens 2 to 6; leaves 4—9 cm long 2
   b. Stamens 6 to 30; leaves 3—80 cm long 4
2. a. Ultimate divisions of the leaf up to 2 mm long; stamens and tepals 2—5, shifted to one side of the flower; stamens up to 4.5 mm long; ovary 3—4 mm high . . . . . 13. **Rh.oligandra** Weddell . . . . . *var. tenella* v. Royen
   b. Ultimate divisions 3—8 mm long; stamens and tepals in a complete or

incomplete whorl or shifted to one side of the flower, 2—6, 3—7 mm long; ovary 2—3 mm high 3

3. a. Stamens 5 or 6, 2—3 mm long; ovary 2—2.5 mm high; pollen grains 19 μ high, 15 μ diam; ultimate divisions of the leaf 3—5 mm long . . . . . 13. **Rh.oligandra** Weddell . . . . . *var. oligandra*

b. Stamens 2—6, 5—7 mm long; ovary 2—3 mm high; pollen grains 17 μ high, 12 μ diam; ultimate divisions of the leaf 4—8 mm long . . . . . 13. **Rh.nitelloides** (Wedd.) v. Royen

4. a. Stamens 25 or more; leafbase on either side with a 1—5 mm long lobe which tapers in an obtuse tip . . . . . 21. **Rh.apiculata** v. Royen

b. Stamens 25 or less; leafbases not provided with lobes 5

5. a. Leafbase distinctly keeled at the back 6

b. Leafbase without a keel at the back 7

6. a. Ultimate divisions filiform, 0.5—1.5 mm long; ovary ellipsoidal, up to 5.5 mm high . . . . . 15. **Rh.carinata** v. Royen

b. Ultimate divisions of the leaf lanceolate to linear, 0.2—0.5 mm wide, up to 3 mm long; ovary ovoid, up to 10 mm high 14. **Rh.cristata** v. Royen

7. a. Ultimate divisions numerous, filiform or nearly so, always less than 0.5 mm wide 9

b. Ultimate divisions few, 0.5—2 mm wide 8

8. a. Stamens 3—4 mm long; ovary 2—2.5 mm high; ultimate divisions of the leaf 1—7 mm long, provided with a distinct nerve 22. **Rh.crassipes** Wedd.

b. Stamens 4.5—9.5 mm long; ovary 3.5—6 mm high; ultimate divisions of the leaf 5—15 mm long, not provided with a distinct nerve . . . . . 23. **Rh.linearis** Tul.

9. a. Ultimate divisions filiform 10

b. Ultimate divisions lanceolate, linear or spathulate 13

10. a. Leaves repeatedly forked . . . . . 1. **Rh.hydrocichorium** Tul.

b. Leaves repeatedly pinnate 11

11. a. Primary pinnae decurrent with a wing . . 19. **Rh.divaricata** Matth.

b. Primary pinnae not decurrent with a wing 12

12. a. Midrib of the ovary distinctly winged, the four other ribs just visible; rachis of the leaf subfiliform, abruptly widened at the base; primary pinnae up to 12 cm long; pedicel of the fruit 5—6 cm long . . . . . 18. **Rh.flagellifolia** v. Royen

b. Midrib of the ovary narrowly winged, the four other ones clearly visible; rachis terete, towards the top subfiliform, gradually widening towards the basis; primary pinnae up to 25 cm long; pedicel of the fruit 8—15 cm long . . . . . 17. **Rh.penicillata** Matth.

13. a. Ultimate divisions triangular, shorter than 0.5 mm 14

b. Ultimate divisions not triangular, 1 mm long or more 15

14. a. Styles 4—6 mm long; ovary 4—6.5 mm long; stamens 11—14; ultimate divisions of the leaves nerveless . . . . 8. **Rh.guyanensis** v. Royen

b. Styles 1—2 mm long; ovary up to 4 mm high; stamens 7—12; ultimate divisions of the leaves with a distinct nerve . 10. **Rh.dentata** v. Royen

15. a. Largest leaf up to 3 cm long . . . . . 9. **Rh.minor** v. Royen

b. Largest leaf up to 50 cm long 16

16. a. Leaves repeatedly forked 17

b. Leaves repeatedly pinnate or pinnate with repeatedly forked pinnae 22

17. a. Anthers crowned by an acute, about 0.3 mm long excrescence of the connective . . . . . 3. **Rh.coronata** v. Royen

b. Anthers crowned by 1 to 3 acute or obtuse teeth 18

18. a. Styles 4—10 mm long . . . . . 5. **Rh.palmettifolia** v. Royen

b. Styles up to 3 mm long (See also Rh.palmettifolia var. rosea) . . 19

19. a. Ultimate divisions of the leaf lanceolate, 2—7 at the end of each pinna . . . . . 6. **Rh.unguifera** v. Royen

b. Ultimate divisions of the leaf linear to subfiliform, numerous . . 20

20. a. Anthers 1.5—2.5 mm long; base of the leaf 5—25 mm wide . . . 21

b. Anthers 1—1.5 mm long; midrib of the ovary distinctly winged; the

lateral ribs indistinct; base of the leaf 1—6 mm wide 4. **Rh.varians** Wedd.

21. a. Anthers 1.5—2 mm long; midrib of the ovary winged; lateral ribs distinct but narrow; base of the leaf up to 25 mm wide 1. **Rh.hydrocichorium** Tul.
    b. Anthers about 2.5 mm long; midrib of the ovary narrowly winged; lateral ribs distinct and wide; base of the leaf 5—10 mm wide . . . . . 2. **Rh.brassicifolia** v. Royen
22. a. Ultimate divisions of the leaf always shorter than 1 mm 23
    b. Ultimate divisions of the leaf always longer than 1 mm, up to 5 mm long 25
23. a. Anthers 4—5 mm long, crowned by an excrescence of the connective . . . . . 3. **Rh.coronata** v. Royen
    b. Anthers with 1 to 3 acute or obtuse teeth 24
24. a. Midrib of the ovary winged at the top only; styles about 1.5 mm long; anthers 3.5—5 mm long . . . . . 11. **Rh.applanata** Goebel
    b. Midrib of the ovary narrowly winged over its whole length; styles 1.5—4 mm long; anthers 1.5—3 mm long . . 7. **Rh.nobilis** v. Royen
25. a. Styles 5—6 mm long . . . . . 16. **Rh.brevistamina** v. Royen
    b. Styles up to 3 mm long 26
26. a. Ultimate divisions of the leaf few, 3—5 mm long 6. **Rh.unguifera** v. Royen
    b. Ultimate divisions of the leaf numerous 27
27. a. Anthers obtuse, 1—1.5 mm long; styles 1.5—2 mm long; pedicel of the fruit up to 5 cm long . . . . . 4.**Rh.varians** Wedd.
    b. Anthers with 2 teeth at the top; 2—5 mm long; styles 2.5—3 mm long, pedicel of the fruit up to 15 cm . . . . 20. **Rh.jenmanii** Engler

1. **Rhyncholacis hydrocichorium** Tul. (1849) 95; idem Tul. (1852) 82—83, t. 3 f. 2; Walpers (1852) 434; idem (1858) 779; Weddell (1873) 56; Warming (EP 1891) 19; Engler (1930) 41.

Small sized herb, either stemless or with a compressed stem, branched, up to 5 cm long, 2—4 mm diam. Leaves cuneate to elliptic, 2.5—20 cm, repeatedly forked, membranaceous, plurinerved, pinnae up to 25 mm wide, ultimate divisions numerous, filiform, nerveless, 0.5—2 mm long; petiole widened at the base. Flowers fascicled, pedicel terete, with 2 narrow wings, 2—11 cm long, mature spathella up to 2.5 cm long; tepals 7—14, about 0.5 mm long, triangular, acute; stamens 7—14, light pinkish mauve, 5—7 mm long, anthers 1.5—2 mm long, greenish, narrow, obtuse, base of the thecae acute, pollen grains 16 μ high, 14 μ diam; ovary ellipsoidal, 4—8 mm high, 1.5—3 mm diam, subattenuate at the base, compressed, with 2 distinct midribs and 4 indistinct ribs; styles 1—3 mm long, light pinkish mauve, subulate at the top, compressed and slightly cohering at the base. Midrib of the fruit winged, lateral ribs distinct, marginal ribs inconspicuous pedicel 6—16 cm long.

Type: Schomburgk 435 in P, duplicates in BM, C, CGE, G.-Del., GH, K, L, W; collected in British Guyana.

Distribution: British Guyana.

Berbice, Schomburgk 435, fl. fr. (BM, C, CGE, G.-Del., GH, K, L, P, W); without loccality, Schomburgk 550, fl. fr. (B); Mazaruni-river, Jenman 716, fl. fr. Sept. (Gött., K); Essequibo-river, First falls, Sandwith 228, fl. fr. Sept. (K).

2. **Rhyncholacis brassicifolia** v. Royen, nov. sp. — **P. 133 and plate 13 f. 1—10.**

Small to medium-sized herb. Base cuneiform, about 1.5 cm wide and 2.5 cm high. Leaves repeatedly forked, 5—10 cm long, membranaceous, distinctly nerved, incisions obtuse, base cuneiform, 5—10 mm wide, ultimate divisions lanceolate, 0.5—1.5 mm long, acute, nearly filiform, nerveless. Flowers few, pedicel cupuliform at the top, 2—10 cm long, juvenile spathella unknown, mature one tubuliform, 1—1.5 cm long; tepals 7—10, lanceolate to ovate-acuminate, about 1 mm long; stamens 7—10, from 5—5.5 mm long, anthers about 2.5 mm long, acute, slightly emarginate or with 2 short, acute teeth, base of the thecae obtuse, pollen grains 19μ high, 17 μ diam; ovary and fruit ellipsoidal to ovoid, 3.5—4.5 mm high, 2—3 mm diam, obtuse, rounded or attenuate at the base, midrib narrowly winged, the 4 other ribs wide and raised; styles at first subulate, afterwards membranaceously flattened, 2—3 mm long, at the base 3-sided and cohering, at the top obtuse, papillate.

Type: J. Cuatrecasas 6986, in US; collected in Colombia.

Distribution: Once collected.

Rio Uaupès, Yurupari-falls near Mitu, fl. fr. Sept. (US).

3. **Rhyncholacis coronata** v. Royen, nov. sp. — **P. 133 and plate 9 f. 8—9.**

Medium-sized herb. Base irregular, about 3 cm high, 1—2 cm wide. Leaves repeatedly pinnate or forked when young, 10—20 cm long, incisions obtuse, petiole 5—9 cm long, 3.5—12 mm wide, compressed, widened at the base, with distinct nerves, primary pinnae up to 10 cm long, ascending at an angle of 30—60°, ultimate divisions numerous, triangular, lanceolate or, seldom, spathulate, acute, or obtuse, nerveless, 0.2—1 mm long. Flowers fascicled, pedicel 1—3 cm long, juvenile spathella unknown, mature one tubuliform, up to 1.5 cm long; tepals 8—10, about 1 mm long, lanceolate, with 1 or 2 acute tops; stamens 8—18, from 5—7 mm long, anthers 4—5 mm long, obtuse, crowned by an acute, about 0.3 mm long, excrescence of the connective, base of the thecae obtuse to mucronate, pollen 20 μ high, 15 μ diam; ovary 3.5—4 mm high, about 2 mm diam, subcompressed, obtuse, rounded at the base, only the distinctly winged midribs visible, the other ribs either all absent or the marginal ribs sometimes present but indistinct; styles cylindrical, 3-sided at the base and slightly cohering, obtuse, 1.5—2 mm long. Fruit unknown.

Type: Cardona 2171a in US; collected in Venezuela.

Distribution: Once collected.

Rio Icabarú, Yumarabi-falls, fl. fr. Sept. (US).

4. **Rhyncholacis varians** Weddell var. **varians**, Wedd. (1873) 56—57; Engler (1930) 41.

Medium-sized herb. Base cuneiform, 0.3—2 cm high, 0.4—1.5 cm wide. Leaves repeatedly forked or sometimes irregularly pinnate, 6—20 cm long, pinnae up to 6 mm wide, ascending at an angle of 30—45°, plurinerved, nerves slightly prominent, incisions obtuse, ultimate divisions numerous, nearly filiform, 1—5 mm long. Flowers fascicled, pedicel 1—1.5 cm long, widened at the top, juvenile spathella obtuse, mature one 8—20 mm long; tepals 7—10, ovate, acute, 1—1.5 mm long; stamens 8—10, from 5.5—6.5 mm long, anthers 1—1.5 mm long, narrow, obtuse, base of the thecae obtuse, pollen grains 20 μ high, 16 μ diam; ovary 4—5.5 mm high, about 2.5 mm diam, subcompressed, acute, attenuate at the base, 8-ribbed, but 2 of the ribs indistinct, midribs distinctly winged, the others indistinct; styles subulate at the top, obtuse, 3-sided at the base and slightly cohering, 1.5—2 mm long. Each valve of the fruit with 5 ribs, marginal ribs indistinct, pedicel up to 5 cm long.

Type: Spruce 2488 in P, duplicates in BM, BR, C, CGE, F, G.-Boiss., G.-Del., GH, Gött., K, NY, P, S; collected in Northern Brazil.

Distribution: North-western Brazil.

Rio Uaupès, near Panure, Spruce 2488, fl. fr. Oct. (BM, BR, C, CGE, F, G.-Boiss., G.-Del., GH, Gött., K, NY, P, S); Rio Negro, near San Carlos, Spruce 3102, fl. April (S, W); idem, near San Gabriel, Spruce 2583, fl. fr. (W); idem, without locality, Spruce 2272, fl. Jan. (W).

Var. **tricholoba** Weddell, (1873) 57.

Differs from the type in the shorter (up to 15 cm long) leaves and the greater number of forks, in the pinnae which are narrower (up to 3 mm wide) and more widely apart. The ribs in the fruit moreover are indistinct, except the midrib and the filaments are shorter (up to 4.5 mm long), pedicel up to 2.5 cm long.

Type: Spruce 2749 in P, duplicates in B, BM, BR, CGE, G.-Boiss., G.-Del., GH, K, NY, S, W; collected in NW Brazil.

Distribution: Once collected.

Rio Uaupès, Gauaraté, cachoeira, fl. fr. Nov.
On the labels in NY and GH the locality is near Panuré, Rio Uaupès.

5. **Rhyncholacis palmettifolia** v. Royen, nov. sp., var. **palmettifolia — P. 133 and plate 12 f. 1—8.**

Small to medium-sized herb. Base irregular, up to 3 cm long, up to 2 cm wide. Leaves repeatedly forked, 2.5—18 cm long, forks ascending at an angle of 30—60°, petiole 0.5—1 cm long, 1—18 mm wide, membranaceous, widened at the base, incisions obtuse, ultimate divisions numerous, subfiliform, 1—3.5 mm long. Flowers fascicled, pedicel 2—10 cm long, provided with 2 wings, mature spathella infundibuliform, 1—4 cm long; tepals 8—12, ovate to lanceolate, with 1—3 acute tops, 0.5—1 mm long, membranaceous; stamens 8—12, from 4—7.5 mm long, anthers green or light brown, 1.5—4.5 mm long, narrow, with 2 acute tops and sometimes a third membranaceous one between these 2 or rarely with a simple top, base of the thecae acute or mucronate, pollen grains 19 μ high, 15 μ diam; ovary ovoid to ellipsoidal, 5—7 mm high, 2—2.5 mm diam, compressed, mostly acute, base rounded or attenuate, midribs distinct, narrowly winged, the other ribs but slightly raised; styles subulate, 4—10 mm long, acute, narrowly 3-edged at the base, cohering at the base, sometimes for 2/3 of their length. Fruit 6—8 mm high, ribs more distinct but still slightly raised; pedicel up to 15 cm long.

Type: Linder 59, in GH; collected in British Guyana.

Distribution: British Guyana.

Potaro-river, Tumatumari-rapids, Linder 59, fl. fr. Sept. (GH); idem, Jenman 7492, fl. fr. Sept. (B, K); Cuyuni-river, Crab-falls, Tutin 17a, 18, 19, fl. fr. April (BM); idem, Tinumu-falls, Jenman (Bartlett) 8371, fl. fr. Oct. (K); Mazaruni-river, Crab-falls, Gibson 29, fl. fr. Jan. (K); idem, Jenman 7195, fl. fr. Dec. (K).

Var. **rosea** v. Royen — **P. 134 and plate 12 f. 11—26.**

Medium-sized herb. Base cuneate, branched or unbranched, 0.5—4 cm high, 1—4 cm wide. Leaves repeatedly forked, 5—20 cm long, petiole cuneate, membranaceous, 2—7 cm long, 3—8 mm wide, nerved, incisions obtuse, ultimate divisions subfiliform to filiform, 0.5—5 mm long, acute, nerveless. Flowers numerous, pink, pedicel terete, with 2 or 4 wings, 5—10 cm long; tepals 12—15, squamiform to lanceolate with 1 or 2 acute tops, about 0.5 mm long; stamens 12—15, from 5—9 mm long, anthers 2—3.5 mm long, narrow, with 2 short, obtuse teeth at the top, base of the thecae obtuse, pollen grains 21 μ high, 15 μ diam; ovary 4—7.5 mm high, 2—3 mm

diam, obtuse, attenuate at the base, subcompressed, midrib winged, the other ribs indistinct, prominulous; styles 3—5.5 mm long, subulate or flattened and membranaceous at the top, obtuse, 3-sided at the base and cohering. Fruit 6.5—10 mm high, about 3 mm diam, attenuate at the base, lateral ribs reaching the sutures before the top, the apical part of the style deciduous, pedicel cupuliform at the top, 5—15 cm long.

Type: A. C. Smith 2101, collected in British Guyana, in Mo, duplicates in F, G.-Del, NY, S, U, US.

Distribution: British Guyana.

Head falls, Essequibo-river, A. C. Smith 2101, fl. fr. Sept. (F, G.-Del, Mo, NY, S, U, US); idem, A. C. Smith 2103 fl. fr. Sept. (F, G.-Del, Mo, NY, S, U, US).

6. **Rhyncholacis unguifera** v. Royen, nov. sp. — **P. 134 and plate 9 f. 1.**

Medium-sized herb. Base thalloid, 1—2 cm diam. Leaves repeatedly forked or sometimes repeatedly pinnate, 8—20 cm long, pinnae 2—10 mm wide, ultimate divisions very narrow, acute, claw-like, 3—5 mm long. Flowers fascicled, pedicel terete, with a disc-like expansion and sometimes with 2 narrow wings at the top, 1—5.5 cm long, juvenile spathella unknown, mature one tubuliform, 1—2 cm long; tepals 8—11, ovate to triangular, attenuate at the base, midrib distinct, the 4 other ribs distinct; long, anthers 1.5—2.5 mm long, narrow, obtuse, base of the thecae obtuse or emarginate, pollen grains 20 μ high, 15 μ diam; ovary 4.5—5 mm high, 2—3 mm diam, compressed, subacute, attenuate at the base, midrib distinctly winged, the 4 other ribs distinct; styles compressed, 2—2.5 mm long, obtuse, slightly cohering, papillate. Each valve of the fruit with 3 ribs, pedicel 4—6 cm long.

Type: Stradelli 4344 in C, duplicate in P; collected in Brazil.

Distribution: Once collected.

Rio Uaupès, fl. fr. (C, P).

7. **Rhyncholacis nobilis** v. Royen, nov. sp. — **P. 134 and plate 10 f. 1—6.**

Medium-sized herb. Base branched, cuneiform, sometimes slightly elongate, up to 5 cm long and 3 cm wide, Leaves repeatedly pinnate, up to 20 cm long, pinnae ascending at an angle of 30—45°, petiole

strongly compressed, up to 5 cm long and 8 mm wide, primary pinnae up to 8 cm long, ultimate divisions linear to lanceolate, nerveless, 0.8 mm long or less. Flowers fascicled, pedicel pink, up to 7 cm long, mature spathella up to 3 cm long; tepals 7—10, ovate, acute, about 1 mm long; stamens 7—10, white, 4.5—6 mm long, anthers 1.5—3 mm long, narrow, top emarginate, base of the thecae obtuse to mucronate, pollen grains 18 μ high, 19 μ diam; ovary ovoid, up to 5 mm high and 2.5 mm diam, obtuse, attenuate at the base, compressed, midrib narrow, the 4 other ribs wide but only prominulous; styles subulate at the top or sometimes compressed, 3-sided at the base, papillate, 1.5—4 mm long. Valves of the fruit with a narrow midrib, the other ribs distinct, top of the styles deciduous, pedicel up to 12 cm long, provided with a cupuliform top.

Type: Allen 3215 in Mo; collected in Colombia.

Distribution: Rio Uaupès, Colombia.

Allen 3215, fl. Nov. (Mo); Gutierrez & Schultes 925, fl. fr. March (Medel).

8. **Rhyncholacis guyanensis** v. Royen, nov. sp. — **P. 134 and plate 11 f. 7—9.**

Medium-sized herb. Base cuneiform, about 3 cm wide, and 1 cm high. Leaves repeatedly pinnate, 10—40 cm long, pinnae ascending at an angle of 30—45° (—60°), petiole 2—8 cm long, 1.5—9 mm wide, ultimate divisions numerous, triangular, always shorter and narrower than 0.5 mm, acute, nerveless. Flowers fascicled, pedicel 5—15 cm long, mature spathella narrowly tubuliform, up to 4 cm long; tepals 11—14, squamiform or lanceolate, acuminate or acute, 0.5—1 mm long; stamens 11—14, from 5—6 mm long, anthers about 3 mm long, narrow, obtuse, base of the thecae obtuse, pollen grains ellipsoidal 19 μ high, 16 μ diam; ovary 4—6.5 mm high, 1.5—2.5 mm diam, obtuse, compressed, attenuate at the base, midrib winged, the 4 other ribs very indistinct, near to the sutures; styles subulate, 4—6 mm long, at the base narrowly 3-sided, cohering. Fruit similar to the ovary, midrib winged, the other ribs prominulous, approaching the margin of the valves, pedicel 5—15 cm long.

Type: Jenman 7605 in NY, duplicates in BM, K; collected in British Guyana.

Distribution: Once collected.

Puruni-river, Big-falls, fl. fr. Oct. (BM, K, NY).

9. **Rhyncholacis minor** v. Royen, nov. sp. — **P. 135 and plate 10 f. 7—8.**

Small stemless species. Base irregular, about 1 cm in diam. Leaves repeatedly forked or pinnate, up to 3 cm long, nerved, sheath-like at the base, ultimate divisions lanceolate, up to 1.5 mm, acute, petiole up to 5 mm wide, broadly cuneiform. Flowers few, fascicled, pedicel up to 3 cm long, juvenile spathella clavate, mucronate, mature one up to 12 mm long, infundibuliform; tepals about 0.4 mm long, triangular to lanceolate, acute; stamens 6—11, from 3.5—4 mm long. anthers 1—1.5 mm long, truncate to obtuse, base of the thecae obtuse, pollen grains 19 μ high, 15 μ diam, ovary ovoid to ellipsoidal, 3—3.5 mm high, up to 1.5 mm diam, obtuse, midrib narrowly winged, the other ribs absent; styles 1—1.5 mm long, subulate, 3-sided at the base. Fruit with 2 narrow midribs and 4 more or less distinct ribs.

Type: Huber s. n., in C, duplicate in U; collected in Brazil.

Distribution: Once collected.

Rio Capim, prov. Para, fl. fr. July (C, U).

10. **Rhyncholacis dentata** v. Royen, nov. sp. — **P. 135 and plate 11 f. 1—6.**

Medium-sized herb. Base branched or unbranched, 2—5 cm long, 2—8 mm wide. Leaves repeatedly pinnate, 3—45 cm long, petiole terete or slightly compressed, membranaceous at the base, 1—16 cm long, 1—4 mm wide, primary pinnae ascending at an angle of 45—60° (30° in sterile specimina), ultimate divisions triangular, 0.2 mm long or shorter, acute, with a distinct nerve, in sterile specimina coarser and wider. Flowers fascicled, pedicel 3—5.5 cm long, juvenile spathella clavate, acute, mature one infundibuliform, 1—2.5 cm long; tepals 7—10, spathulate to lanceolate, 0.5—1 mm long, acute, sometimes with 2 or 3 teethes; stamens 7—12, from 5—6 mm long, anthers about 3 mm long, narrow, obtuse, entire, emarginate or with 2 short teeth, base of the thecae obtuse, pollen grains 18 μ high, 14 μ diam; ovary ovoid, up to 4 mm high, obtuse, base rounded or attenuate, midrib at least at the top distinctly winged, the other ribs best visible at the base; styles about 1 mm long, subulate, acute or obtuse and emarginate, cohering at the base. Fruit 5—8 mm high, acute, shortly stipitate, midrib distinct, the others indistinct and approaching the sutures, pedicel 5—15 cm long, slightly tubuliform at the top.

Type: Geyskes 1016, in U; collected in Suriname.

Distribution: Suriname.

Coppename-river, Tonckens-falls, Geyskes 1016, fl. fr. Nov. (U); Upper Gran Rio, Stahel 236, fl. fr. March (U).

11. **Rhyncholacis applanata** Goebel, var. **applanata,** (1893) 377—378, t. 29, f. 1—2; Engler (1930) 41; Matthiesen (1908) 50.

Medium-sized herb. Base branched or unbranched, 1—5 cm high. Leaves repeatedly pinnate, 3—17 mm wide, primary pinnae 1.5—15 cm long, ultimate divisions lanceolate to linear, obtuse, always shorter than 1 mm long. Flowers fascicled, known in a young state only, pedicel 4—8 cm long, juvenile spathella incompletely known, about 8 mm long, mature spathella unknown; tepals 8—20, lanceolate, acute, about 0.5 mm long; stamens 8—20, from 6—8 mm long, anthers 3.5—5 mm long, narrow, with 1 or 2 acute teeth, base of the thecae subacute, pollen grains 19 μ high, 15 μ diam; ovary known from buds only, 2.5—3 mm high, about 0.5 mm diam, obovoid, obtuse, strongly compressed, midrib only at the top distinctly winged, the 4 other ribs indistinct; styles subulate, about 1.5 mm long, obtuse, 3-sided at the base, cohering. Fruit ovoid, 5.5—6.5 mm high, about 2.5 mm diam, strongly compressed, midrib distinctly winged, the other ribs prominent at the base only; styles marcescent, about 1.5 mm long.

Type: Goebel 54, in M, duplicate in K, collected in British Guyana.

Distribution: British Guyana.

Mazaruni-river, Goebel 54, fl. fr. Nov. (K, M); idem, Caburi-falls, Jenman 7737, fl. fr. Oct. (BM); idem Goebel 55, 56, fl. fr. Nov. (M) (Rhyncholacis macrocarpa non Tul. cited by Goebel in Pfl. biol. Sch. 2 (1893) 343—347, 378—379, t. 27 f. 1—10, t. 28 f. 1—2; and Matthiesen in Bibl. Bot. 68 (1908) 20, t. 8 f. 61).
Dubious specimens: Puruni-river, Caburi-falls, Jenman 7614, 7617, fr. (K).

Var. **laxipinnata** v. Royen, nov. var. — **P. 135 and plate 9 f. 10—11.**

Medium-sized herb. Base cuneiform (?), about 3 cm wide, branched or unbranched. Leaves repeatedly pinnate, 10—40 cm long, pinnae ascending at an angle of 30—45°, petiole compressed, 4—7 cm long, 4—12 mm wide, primary pinnae 10—25 cm long, ultimate divisions lanceolate to subfiliform, acute, nerveless, 0.5—1 mm long. Flowers numerous, fascicled, pedicel 6—20 cm

long, mature spathella about 5 cm long; tepals 12—18, squamiform, ovate or lanceolate, with 1 or 2 acute tops, about 0.5 mm long; stamens 12—18, from 3.5—8 mm long, anthers narrow, 2—3 mm long, top emarginate, with 2 acute tips, base of the thecae acute, pollen grains 17 μ high, 15 μ diam; ovary ovoid to ellipsoidal, 5.5—9 mm high, 1.5—3 mm diam, compressed, obtuse, attenuate at the base, midrib narrowly winged, the 4 other ribs indistinct and prominulous, approaching the sutures; styles clavate, compressed at the top, narrowly 3-sided at the base and slightly cohering, 2.5—3 mm long. Fruit similar to the ovary but the ribs more distinct, midribs winged, the marginal ribs sometimes distinct.

Type: Jenman 7612 in U, duplicates in BM, F, K, NY; collected in British Guyana.

Distribution: Once collected.

Mazaruni-river, Waramboo-falls, fl. fr. Oct. (BM, F, K, NY, U).

12. **Rhyncholacis oligandra** Weddell var. **oligandra**, Wedd. (1873) 57; Engler (1930) 41.

Small and delicate herb. Base irregular, about 0.5 cm in diam. Leaves repeatedly pinnate or forked, 1—6 cm long, petiole terete, compressed, slightly winged, 0.5—2.5 cm long, about 1 mm wide, widened at the base, primary pinnae up to 3 cm long, ultimate divisions filiform, 3—5 mm long. Flowers solitary or fascicled, pedicel 0.5—2.5 cm long, mature spathella infundibuliform, up to 1 cm long; tepals 5 or 6, lanceolate, up to 1 mm long; stamens 5 or 6, from 2—3 mm long, anthers about 0.5 mm long, emarginate, base of the thecae obtuse, pollen grains 19 μ high, 15 μ diam; ovary 2—2.5 mm high, about 1 mm diam, subcompressed, subacute, attenuate at the base, midrib slightly winged, 2 of the 6 other ribs very indistinct; styles about 0.8 mm long, subulate at the top, obtuse, 3-sided at the base. Fruit with 2 equal valves, each with 5 ribs but the marginal ones indistinct.

Type: Spruce 2489, in P, duplicates in B, BM, BR, C, CGE, G.-Boiss, K, NY; collected in Northern Brazil.

Distribution: Once collected.

Rio Casiquari, Vasiva and Pacimoni, fl. fr. Oct. (B, BM, BR, C, CGE, G.-Boiss, K, NY, P).

In Copenhagen this species is found under Spruce 3102 (2489), fl. April, together with Marathrum squamosum, but a sheet in New York with the same number carries M.squamosum only, the locality given here as San Carlos, fl. April.

Var. tenella v. Royen, nov. var. — **P. 135 and plate 16 f. 21—22.**

Differs from var. oligandra in the shorter ultimate divisions (up to 2 mm long), less tepals (3—5) and stamens (2—4) which are moreover longer (up to 4.5 mm long). Tepals and stamens both are inserted in an incomplete whorl. The ovary is higher and wider (3—4 mm high, 1—1.5 mm wide) and has an indistinctly winged midrib. The styles are longer and run down into the midrib of the carpel with a distinct wing which is a characteristic of the genus Rhyncholacis. Styles subulate, flaccid, up to 1 mm long.

Type: Sandwith 1263, in K, duplicate in U; collected in British Guyana.

Distribution: Once collected.

Potaro-river, Waratuk-falls, fl. fr. Aug., (K, U).

13. **Rhyncholacis nitelloides** (Wedd.) v. Royen, nov. comb. — *Neolacis nitelloides* Wedd., (1873) 63. — *Apinagia nitelloides* (Wedd.) Engler, (1930) 39.

Small herb. Base irregular, about 0.5 cm long. Leaves 2—9 cm long, pinnate with the pinnae repeatedly forked, petiole 1—2 cm long, widened at the base, primary pinnae 0.5—5 cm long, ascending at an angle of less than 30°, ultimate divisions narrow, acute, with an indistinct nerve, 4—8 mm long. Flowers few, solitary or fascicled, pedicel 0.5—1.5 cm long, mature spathella tubuliform to infundibuliform, about 5 mm long; tepals 6, subulate to lanceolate, acute, about 0.5 mm long; stamens 2—6, from 4.5—7 mm long, in a complete or incomplete whorl, anthers 1—1.5 mm long, obtuse to mucronate, base of the thecae mucronate or obtuse, pollen grains 17 μ high, 12 μ diam, ovary 2—3 mm high, about 1 mm diam, subcompressed, acute, attenuate at the base, midrib slightly winged, the other ribs prominulous; styles subulate, sometimes flattened and transparent at the top, obtuse, with a narrow wing running down along the midrib, cohering over a long distance, about 1 mm long. Each valve of the fruit with 5 ribs, midrib winged, the marginal ribs indistinct, the other ribs prominulous, distinct; pedicel 1—3 cm long.

Type: Spruce 2583, in P, duplicates in B, BM, C, CGE, F, G.-Boiss, G.-Del, GH, Gött, K, NY, S, W; collected in Brazil.

Distribution: Once collected.

Rio Negro, San Gabriel de Cachoeira, fl. fr. Jan.

Massalonga in Bull. soc. bot. ital. 3 (1918) 42 gives a figure of Rh.nitelloides but it is doubtful whether this really represents a Rhyncholacis. It closely resembles a species of Jenmaniella but as the material was not avaible the decisions had to be left open.

14. **Rhyncholacis cristata** v. Royen, nov. sp. — **P. 135 and plate 9 f. 5—7.**

Medium-sized herb. Base cuneiform, fleshy, up to 5 cm high. Leaves repeatedly pinnate, up to 30 cm long, petiole 3-sided, distinctly crested at the back, up to 8 cm long, about 1 cm wide, pinnae ascending at an angle of 30—45°, ultimate divisions numerous, lanceolate-linear, acute, with a distinct nerve, up to 3 mm long, 0.2—0.5 mm wide. Flowers many, fascicled, pedicel up to 6 cm long, widened at the top, mature spathella infundibuliform, up to 3 cm long; tepals 10—14, triangular to squamiform, 1 mm long or less; stamens 10—14, from 3—7 mm long, anthers up to 6 mm long, narrow, with 2 short, acute teeth at the top, base of the thecae subacute, pollen grains unknown; ovary ovoid, up to 10 mm high and 3 mm diam, subacute, rounded at the base, midribs narrow, the 4 other ribs narrow but distinct, near to the sutures; styles subulate, obtuse, up to 1.5 mm long. Fruit up to 14 mm long, pedicel up to 18 cm long.

Type: Hulk s.n., in U, duplicate in BM; collected in Suriname.

Distribution: Once collected.

Upper Gran Rio, fl. fr. Sept. (BM, U) (Rhyncholacis macrocarpa non Tul., cited by Went (1912) 7—9, t. 1 f. 1—4).

15. **Rhyncholacis carinata** v. Royen, nov. sp. — **See p. 138.**

Medium-sized herb. Base branched or unbranched, 1—4 cm high. Leaves repeatedly pinnate, 18—25 cm long, petiole when present fleshy, compressed, at the back with a distinct crest, up to 6.5 cm long; primary pinnae up to 8 cm long, ascending at an angle of 45—60°; ultimate divisions filiform, 0.5—1.5 mm long. Flowers numerous, fascicled, pedicel slightly widened at the top, 1—9 cm long, mature spathella narrowly tubuliform, up to 3.5 cm long; tepals 8—10, lanceolate, acute, 1—1.5 mm long; stamens 7—10, from 4—6 mm long, anthers 3—4 mm long, obtuse or emarginate, base of the thecae obtuse, pollen grains 17 μ high, 16 μ diam; ovary 4—5.5 mm high, obtuse, subattenuate at the base, compressed, with distinctly winged midribs, the 4 other ribs indistinct or absent; styles spathulate to clavate, obtuse or emarginate, 1—1.5 mm long. Fruit 10—12 mm high, 4—5 mm

diam, with 3 distinct ribs on each valve; top of the styles deciduous; pedicel 10—22 cm long.

Type: Goeldi s.n., in C; collected in Eastern Brazil.

Distribution: Once collected.

Rio Counany, fl. fr. Oct. (C) (Rhyncholacis macrocarpa non Tul., cited by Warming (1899) 120—126, f. 13—22; Engler (1930) f. 30.)

16. **Rhyncholacis brevistamina** v. Royen, nov. sp. — **P. 136 and plate 12 f. 9—10.**

Medium-sized herb. Base imperfectly known. Leaves up to 50 cm long, repeatedly pinnate; pinnae ascending at an angle of 30°; petiole up to 12 cm long, 3—7 mm wide; ultimate divisions lanceolate, 1—3 mm long, nerveless. Flowers numerous, fascicled; mature spathella narrowly tubuliform; pedicel 5—7 cm long; tepals 10—12, squamiform, about 0.5 mm long; stamens 10—12, from 5.5—8.5 mm long; anthers 2.5—4 mm long, at the top with 2 teeth; pollen grains 20 μ high, 17 μ diam; ovary 7—8 mm high, 3—3.5 mm diam, acute, attenuate at the base, with distinctly winged midribs, the 4 other ribs indistinct, near the sutures; styles 5—6 mm long, acute, 3-sided. Fruit 7—10 mm high, 4—5 mm diam; pedicel 10—15 cm long.

Type: Jenman 4152 in K, duplicate in US; collected in British Guyana.

Distribution: British Guyana.

Upper Demerara, Jenman 4152, fl. fr. Sept. (K, US); idem, Great Falls, Jenman 6722, fr. May (K); Barima-river, Arakaka-falls, Jenman 6960, fr. May (K).

17. **Rhyncholacis penicillata** Matthiesen, (1908) 16—19, 48—49. t. 3, t. 7 f. 44—54, t. 8 f. 55, 59a; Engler (1930) 41.

Medium-sized herb. Base irregular, up to 6 cm long. Leaves repeatedly pinnate, 15—50 cm long, petiole 2—20 cm long, terete, widened at the base, sometimes with a distinct membranaceous sheath, pinnae ascending at an angle of 30—45°, primary pinnae 2—25 cm long, ultimate divisions numerous, filiform, 0.5—3.5 mm long. Flowers fascicled, (± 20), pedicel slightly widened at the top, 3.5—10 cm long, mature spathella unknown; tepals 7—10, ovate, acute or obtuse, about 0.5 mm long; stamens 7—10, from 6—8 mm long, anthers about 4 mm long, top with 2 teeth, base of the thecae obtuse, pollen grains known young only; ovary

5—7 mm high, 3—4 mm diam, obtuse, subcompressed, attenuate at the base, midrib narrowly winged, the 4 other ribs distinct; styles imperfectly preserved. Each valve of the fruit with 3 distinct ribs, 9—10 mm long; pedicel 8—15 cm long.

Type: Othmer s.n., in B, duplicates in C, U; collected in Venezuela.

Distribution: Once collected.

Caroni-river, fl. fr. Jan. (B, C, U).

18. **Rhyncholacis flagellifolia** v. Royen, nov. sp. — **P. 136 and plate 9 f. 12—16.**

Small to medium-sized herb. Base cuneiform, compressed, branched, 0.5—5 cm wide. Leaves either distichous or inserted along the margin of the base, repeatedly pinnate, 5—35 cm long, pinnae ascending at an angle of about 45°; petiole flaccid, abruptly widened at the base, 2—15 cm long, primary pinnae 2—12 cm long, ultimate divisions numerous, filiform, acute, 0.5—3 mm long. Flowers white to pink, pedicel 1—3 cm long, mature spathella 6—10 mm long; tepals 6—9, triangular, acute or obtuse, up to 0.5 mm long; stamens 7—9, from 3.5—6 mm long, anthers 1.5—3.5 mm long, at the top with 2 distinct but short, equal or unequal teeth, base of the thecae acuminate, pollen grains 19 μ high, 17 μ diam; ovary 3—5.5 mm high, 1—2.5 mm diam, obtuse, subcompressed, midribs distinctly winged, the 4 other ribs visible as 4 indistinct lines only; styles subulate at the top, narrowly 3-sided at the base, with 2 narrow wings, not or shortly cohering, 2.5—5 mm long. Fruit similar to the ovary, midrib distinctly winged, the 4 other ribs prominulous, reaching the sutures below the apex; pedicel 5—6 cm long.

Type: Ule 7965 in L, duplicates in G.-Del, K, US; collected in Northern Brazil.

Distribution: Northern Brazil.

Rio Surumu, Ule 7965, fl. fr. Jan. (G.-Del, K, L, US) (Rhyncholacis macrocarpa non Tul., cited by Engler (1927) 6); Rio Oyapock, Salto Araribó, v. Luetzelburg 21938, fl. fr. July (M); Rio Uaupès, v. Luetzelburg 23282, 23285, 23286, fl. fr. Sept.—Nov. (M).

19. **Rhyncholacis divaricata** Matthiesen, (1908) 19—20, 49, t. 8 f. 56—60; Engler (1930) 41.

Small sized herb. Base of irregular shape, unbranched, about 1 cm long. Leaves repeatedly pinnate, 10—15 cm long, petiole

terete to subcompressed, up to 3 cm long, up to 1.5 mm wide, membranaceously widened at the base, primary pinnae ascending at an angle of about 45°, up to 4 cm long, decurrent with a narrow, short wing, ultimate divisions numerous, filiform, up to 2.5 mm long. Flowers fascicled (2—4) or solitary, pedicel up to 2.5 cm long, mature spathella narrowly tubuliform, mucronate, papillate at the top, up to 2 cm long; tepals 6—9, triangular to lanceolate, obtuse or acute, 0,5 mm long or less; stamens 6—9, up to 6.5 mm long, anthers up to 2 mm long, narrow, with 1 or 2 teeth at the top, base of the thecae obtuse to acute, pollen grains 17 μ high, 15 μ diam; ovary ovoid, up to 3.5 mm high and 1.5 mm diam, subcompressed, obtuse, attenuate at the base, midribs narrowly winged, the 4 other ribs near the sutures, more or less prominent; stules subulate, 3-sided at the base, shortly cohering, up to 2 mm long. Fruit similar to the ovary, midrib distinct but narrowly winged, the 4 other ribs prominent; pedicel up to 4 cm long.

Type: Othmer s.n., in B; collected in Venezuela.

Distribution: Once collected.

Caroni-river, Curapacay-rapids, fl. fr. (B).

20. **Rhyncholacis jenmanii** Engler, forma **jenmanii**, Engler (1927)) 6—7 — **Plate 14 f. 1—3.**

Medium-sized herb. Base irregularly rounded, branched or unbranched, 4—20 mm long. Leaves repeatedly pinnate, 10—30 cm long, pinnae ascending at an angle of about 30°, petiole 2.5—4 cm long, 2—10 mm wide, primary pinnae 3—12 cm long, ultimate divisions subfiliform, 1—3 mm long. Flowers fascicled, pedicel up to 8 cm long, mature spathella up to 2.5 cm long; tepals 8—11, lanceolate, with 1 or 2 acute tops, 0.5—1.5 mm long; stamens 8—11, from 5—6.5 mm long, anthers 2—3.3 mm long, with 2 teeth at the top, base of the thecae obtuse, pollen grains 19 μ high, 16 μ diam; ovary ovoid to ellipsoidal, 4—7 mm high, 1—2 diam, acute, subattenuate at the base, terete, midribs narrowly winged, the 4 other ribs near the sutures, wide, prominent; styles subulate, obtuse, 3-sided at the base, 2.5—3 mm long. Fruit 5—8 mm high, 2—3 mm diam, the lateral ribs reaching the sutures below the top; pedicel up to 15 cm long.

Type: Jenman 7420 in B, dupicates in K; collected in British Guyana.

Distribution: British Guyana.

Potaro-river, Pakatuk-falls, Jenman 7415, fr. Oct. (BM, K, NY, U); idem, Cobanatuk-falls, Jenman 7418, Oct. (K); idem, Jenman 7420, fl. fr. Oct. (B, K); idem Jenman 7425, fl. fr. Oct. (B, BM, K); idem, without locality, Jenman 7494, fl. fr. Sept. (B, K); Mazaruni-river, Teboco-falls, Jenman 7608, fl. fr. Oct. (BM, K, NY, U); Conawarook-river, Temple Bar falls, Jenman (Bartlett) 8248, fl. fr. Sept. (K) (Rhyncholacis macrocarpa non Tul. cited by Engler (1927) 6.

Forma **laciniata** v. Royen, nov. forma — **P. 136 and plate 9 f. 2—4.**

Small to medium-sized herb. Base cuneiform, branched or unbranched, 1.5—3 cm high. Leaves repeatedly pinnate, 20—35 cm long, petiole terete to subcompressed, 1—11 cm long, widened at the base, primary pinnae ascending at an angle of 30—60°, repeatedly pinnate or sometimes repeatedly forked, 3—10 cm long, ultimate divisions nearly filiform, acute, nerveless, 1—3 mm long. Flowers fascicled, pedicel 2.5—6 cm long, provided with an infundibuliform top, mature spathella 2.5—3 cm long; tepals 5—9, in a complete or incomplete whorl, lanceolate, acute, 1—1.5 mm long; stamens 6—9, from 6—8 mm long, filaments united at the base, sometimes a few united to the top, anthers 2—2.5 mm long, with 1 or 2 acute tops, base of the thecae obtuse to acute, pollen grains 19 μ high, 17 μ diam; ovary ovoid, 4.5—5.5 mm high, 2—3 mm diam, obtuse to acute, rounded or attenuate at the base, midribs absent or indistinct, the 4 other ribs flat, prominulous; styles subulate, obtuse, free, about 1.5 mm long. Fruit 4.5—6.5 mm high, each valve with 3 prominent and 2 indistinct ribs; pedicel up to 10 cm long, with a cupuliform top.

Type: Tutin 648 in U, duplicates in BM, K, US; collected in British Guyana.

Distribution: British Guyana.

Potaro-river, Kaieteur-falls, Tutin 648, fl. fr. Aug. (BM, K, U, US); idem Maguire & Fanshawe 23219, 23220, May (F, NY, U, US) (Marathrum spec. by Maguire in Bull. Torr. Bot. Cl. 75, 4 (1948) 383); Mazaruni-river. Matope-falls, Graham 349, July (NY); Potaro-river, Amatuk-falls, Jenman 7422, fr. Oct. (BM, K, NY, U); Mazaruni-river, Teboco-falls, Jenman 7608, fr. Oct. (K).

Dubious specimen: Potaro-river, Cobanatuk-falls, fr., Jenman 7425 (K).

Forma **dolichophylla** v. Royen, nov. forma — **See p. 136.**

Medium-sized herb. Base irregularly cuneiform, about 3 cm wide and high. Leaves repeatedly pinnate or pinnate with repeatedly forked pinnae, up to 60 cm long, petiole up to 15 cm

long, up to 5 mm wide, at the base with a sheath, pinnae ascending at an angle of 30—45°, primary pinnae up to 7 cm long, ultimate divisions lanceolate, nerveless, subfiliform, up to 3 mm long. Flowers fascicled, pedicel up to 8 cm long, up to 1 mm wide at the top, mature spathella up to 3.5 cm long; tepals 7—10, lanceolate to squamiform, acute or mucronate, 1 mm long or less; stamens 7—10, from 7—7.5 mm long, anthers 4—5 mm long, narrow, obtuse, mucronate or with 2 teeth, base of the thecae obtuse, pollen grains 19 μ high, 16 μ diam; ovary ovoid, 4—6 mm high and about 2.5 mm diam, obtuse, rounded to markedly attenuate at the the base, 6-ribbed. midrib narrowly winged; styles cylindrical, 1—2 mm long. Fruit up to 7 mm high.

Type: Jenman 7419 in B, duplicates in BM, K, U; collected in British Guyana.

Distribution: Potaro-river, Kaieteur-falls.

Jenman 7419, fl. Oct. (B, BM, K, U); Jenman 933, fl. fr. Sept. (K); Jenman 1010, fl. fr. Sept. (K).

21. **Rhyncholacis apiculata** v. Royen, nov. sp. — **P. 136 and plate 13 f. 11—17.**

Medium-sized herb. Base variable in shape, branched or unbranched, 3—7 cm long. Leaves repeatedly pinnate, 4—35 cm long, pinnae ascending at an angle of about 30°, petiole terete, widened at the base, 1—15 cm long, 1—20 mm wide, on each side of the base with a 1—5 mm long lobe tapering in an obtuse tip, primary pinnae 4—15 cm long, ultimate divisions numerous, subfiliform, acute, 0.5—3 mm long. Flowers fascicled, pedicel 10—20 cm long, mature spathella with a long, narrow, acute apex, mature one narrowly tubuliform, 2—10 cm long; tepals about 18, lanceolate, with 1 or 2 acute tops, about 1 mm long; stamens 25—35, about 6 mm long, anthers narrow, about 4 mm long, with 1 or 2 acute teeth at the top, base of the thecae acuminate or obtuse, pollen grains 18 μ high, 15 μ diam; ovary about 5 mm high, 1.5—2.5 mm diam, compressed, rounded or attenuate at the base, midribs distinctly winged, the 4 other ribs prominent, not reaching the top; styles subulate, 4—5 mm long, flattened at the top, emarginate, narrowly 3-sided at the base. Fruit 6—10 mm long, 4—4.5 mm diam; pedicel up to 15 cm long.

Type: Jenman 7615, in U, duplicates in BM, K; collected in British Guyana.

Distribution: British Guyana.

Vernacular name: Paku weed (Br. Guyana).

Puruni-river, Caburi-falls, Jenman 7615, fl. fr. Oct. (BM, K, U); Guyuni-river, Matope-fall, Tutin 22, fl. fr. April (BM, US); Potaro-river, Curiebrong-falls, Jenman 7413, fl. fr. Oct. (K).

22. **Rhyncholacis crassipes** Weddell. (1873) 56; Engler (1930) 41.

Medium-sized herb. Base irregularly cuneiform, 2—3,5 cm long, 1—2 cm high. Leaves pinnate, 4—40 cm long, pinnae repeatedly forked, 2—15 cm long, ultimate divisions narrow, spathulate, acute to obtuse, with a distinct nerve, 2—15 cm long, petiole terete 5—10 cm long, up to 20 mm wide, sheathing at the base. Flowers fascicled, pedicel 1—6 cm long, with a discoid top, mature spathella 5—8 mm long; tepals 8—10, triangular and acute or ovate and acuminate, about 0.5 mm long; stamens 8—10, from 3—4 mm long, anthers 1.5—2 mm long, obtuse, base of the thecae obtuse, pollen grains 21 μ high, 16 μ diam, ovary 2—4 mm high, about 1.5 mm diam, obtuse, subattenuate at the base subcompressed, midribs narrow, the 4 other ribs and especially the sutural ribs indistinct; styles subulate at the top, 3-sided at the base, slightly cohering, up to 1.5 mm long. Fruit similar to the ovary, each valve with 3 distinct ribs and 2 indistinct marginal ribs.

Type: Spruce 2720, in P, duplicates in BM, BR, C, CGE, G.-Boiss, K, NY, collected in Western Brazil.

Distribution: Western Brazil.

Rio Uaupès, Spruce 2720, fl. fr. Nov. (BM, BR, C, CGE, G.-Boiss., K, NY, P); Rio Paapurès, Spruce 2720, fl. fr. Nov. (K, P).

23. **Rhyncholacis linearis** Tul., (1863) 211—212, t—74 f. 5; Engler (1930) 41, f. 31 — *Rhyncholacis tenuifolia* Weddell, (1873) 57.

Small to medium-sized herb. Base irregularly shaped, sometimes cuneiform, 2—4 cm long, about 1.5 cm high. Leaves pinnate, 2.5—40 cm long, pinnae repeatedly forked, up to 12 cm long, ascending at an angle of 30—60°, decurrent, ultimate divisions lanceolate, acute, with an indistinct nerve, 5—15 mm long; petiole terete, 1.5—9 cm long, 2—4 mm wide. Flowers solitary or fascicled, white to pale lilac, pedicel widened at the top, 2—10 cm long, mature spathella 1.5—6 cm long; tepals 6—12, lanceolate, with 1 or 2 acute tops, about 1 mm long; stamens 6—12, from 4.5—9.5 mm long, anthers 2—4 mm long, narrow, with 1 or 2 acute tops, base of the thecae obtuse or subemarginate, pollen grains 22 μ high, 18 μ diam; ovary 3.5—6 mm high, 2—3 mm

diam, subcompressed, subacute, attenuate at the base, midrib winged, the 4 other ribs distinct, prominulous; styles subulate at the top, 3-sided at the base, acute or obtuse, 2—4 mm long. Fruit 6—8 mm high, 3—4 mm diam, each valve with 5 ribs, midribs winged, marginal ribs indistinct, the 2 others distinct and fairly wide; pedicel 6—16 cm long.

Type: Spruce 2272 in P, duplicates in BM, BR, C, G.-Boiss, K, NY; collected in Northern Brazil.

Distribution: Rio Negro and Rio Uaupès, Brazil.

Rio Negro: Near Sao Gabriel, Spruce 2272, fl. fr. Aug. (BM, BR, C, G.-Boiss, K, NY, P); idem, v. Luetzelburg 24013, fl. fr. Sept. (M); at Camanaos, v. Luetzelburg 22139, 22150, 22827, fl. fr. Sept. (M); idem, Tate 126, fl. fr. Sept., (K, NY, US) (Rhyncholacis macrocarpa non Tul, cited by A. C. Smith in Bull. Torr. Bot. Cl. 58 (1931) 369).
Rio Uaupès: Jauaraté-cachoeira, Spruce 2749, fl. fr. Nov. (P); near Panuré Spruce 2488, fl. Oct. (W).

DUBIOUS SPECIES.

1. **Rhyncholacis macrocarpa** Tul. (1849) 95; Tul. (1852) 84, t. 3 f. 1; Walpers (1852) 434, idem (1858) 779; Weddell (1873) 56; Engler (1930) 41, f. 30.

Of this species only imperfect fruits are known.

Type: Parker s.n. in K, duplicates in C, P; collected in British Guyana.

Distribution: Essequibo-river.

2. **Rhyncholacis** nov. sp.?

Medium-sized stemless herb. Base circular, 2—6 cm diam, about 1 cm high. Leaves distichous, repeatedly pinnate, 15—80 cm (or longer?), pedicel terete and fleshy at the base, 0.5—1.5 cm wide, provided at the base with 2 distinct sheathes, petiole 10—25 cm long, primary pinnae ascending at an angle of 30—45°, 5—20 cm long, ultimate divisions lanceolate, acute, nerveless, about 0.5 mm long. Flowers unknown, pedicel 4.5—12 cm long, widened at the top, fascicled. Fruit with 2 equal valves, each with 3 prominent ribs and 2 indistinct marginal ribs; 5.5—6 mm long, 2—2.5 mm wide.

Collection: Jenman 7210 in U, duplicates in C, K, NY, collected in British Guyana.

Distribution: Venezuela to British Guyana.

British Guyana: Upper Mazaruni-river, Jenman 7210, fr. Dec. (C, K, NY, U). *Venezuela:* Rio Chama, without collector (L).
This species is easily recognisable by its long leaves and its very short, triangular, ultimate divisions.

4. WETTSTEINIOLA Süssenguth

Medium-sized herbs, shoots with a thalloid base. Leaves either bipinnate, with the secondary pinnae repeatedly forked or leaves repeatedly pinnate, ultimate divisions numerous, filiform; at the bases of the leaf and of the pinnae provided with a one-sided stipel. Flowers in bundles; tepals 3—6, in an incomplete whorl; stamens 1—4, in an incomplete whorl, anthers introrse; ovary ellipsoidal to ovoid, consisting of 2 equal carpels, terete, provided with 12 ribs, borne by a short gynophore; styles linear. Fruit similar to the ovary.

Type: *Wettsteiniola pinnata* Süssenguth.

Distribution: 2 species in Southern Brazil. (See map 1.b, plate 1).

1. a. Tepals 3—5, half the size of the anthers 1. W.pinnata Süssenguth.
   b. Tepals 5—6, much longer than the anthers . . . . . 2. W.accorsii (Toledo) v. Royen.

1. **Wettsteiniola pinnata** Süssenguth (1936) 18—20. — *Apinagia warmingiana* Wettstein, (1904) 55, t. 62 (nomen nudum); idem in Handb. syst. Bot. ed. 2 (1911) 650; idem ed. 4 (1935) t. 505.

Base irregularly peltiform, up to 5 mm in diam. Leaves bipinnate, 8—10 cm long, petiole terete, 4—5 cm long, 3—5 mm diam; rachis compressed, sometimes flexuose, primary pinnae up to 1.5 cm long, secondary pinnae repeatedly forked, ultimate divisions numerous, filiform, 2—4 mm long; stipels up to 3 mm large. Flowers with an up to 2.5 cm long pedicel; juvenile and mature spathella unknown; tepals 3—5, up to 0.5 mm long; stamens 1—4, up to 3 mm long, anthers up to 1 mm long; ovary up to 3 mm high and 2 mm diam; styles acute.

Type: v. Wettstein s.n. in M; collected in Southern Brazil.

Distribution: Once collected.

Salto Grande, Paranapanema, fl. fr., v. Wettstein s.n. (M). The type is a specimen preserved in alcohol, which under the present circumstances could not be obtained from the München herbarium.

2. **Wettsteiniola accorsii** (Toledo) v. Royen, nov. comb. — **Plate 16 f. 24—26.** — *Apinagia accorsii* Toledo ex Accorsi, (1944) 59—93, f. 1—12; (1946) 400—424, f. 1—27.

Base hepatic-like, branched, up to 10 cm wide, branches about 1 cm wide, of irregular shape. Leaves along the margin of the base, repeatedly pinnate, up to 30 cm long, petiole up to 8 cm long, terete, widened at the base and provided with 1 or 2 obtuse sheaths, which are up to 7 mm long; primary pinnae up to 10 cm long; ultimate segments in bundles, about 1 mm long; stipels reniform to squamiform, membranaceous, up to 1.5 mm in diam. Flowers borne by an up to 3.5 cm long pedicel; juvenile spathella nippelshaped, mature one trumpet-shaped, up to 10 mm long; tepals 5 or 6, linear-lanceolate, acute, 2.5—3.5 mm long; stamens 3 or 4, from 3—6 mm long, filaments sometimes bifurcate, anthers 1.5—2.5 mm long, obtuse, base of the thecae subobtuse; pollen grains ellipsoidal, 3-sulcate, 20 μ high, 12 μ diam; ovary ellipsoidal to ovoid, 2.5—3 mm high, 1.5—2 mm diam, obtuse, with 2 subequal or equal carpels; styles up to 2 mm long, shortly cohering at the base, emarginate or obtuse at the top.

Type: Accorsi s.n. in SP, duplicate in U; collected in Brazil.

Distribution: Once collected.

Salto de Piracicaba, Piracicaba-river, prov. Sao Paulo, Accorsi s.n., fl. fr. Sept. (SP, U).

5. LOPHOGYNE Tul.

Small thalloid herbs, shoots opposite or subopposite along thin branched roots. Leaves not distinctly separated from the base, at the top finely dissected or repeatedly forked. Flowers solitary, juvenile spathella clavate, mucronate, mature one infundibuliform to tubuliform; tepals 2—5, in a complete or incomplete whorl, lanceolate or linear, acute; stamens 2—4, in a complete or subcomplete whorl, filaments lanceolate, anthers introrsely dehiscing, when dry sometimes spirally coiled, base slightly incised; pollen grains ovoidal to ellipsoidal, 3-sulcate, lobes tapering towards one of the poles; ovary 2-celled, ellipsoidal or ovoid, obtuse, attenuate at the base, 6-sided in transverse section, consisting of 2 equal or subequal carpels; 6-ribbed; subobliquely inserted on the pedicel; styles 2, cock's comb-like, compressed, margin serrate, free or slightly cohering at the base, marcescent.

Type: *Lophogyne helicandra* Tul.

Distribution: 2 species in eastern Central Brazil (See map 1b, plate 1).

This genus which is immediately to recognise by its comb-like styles, has been founded by Tulasne in 1852 with *L.helicandra* and *L.arculifera*, the latter described by Tulasne and Weddell. Pulle (1906) described a 3rd species, *L.capillacea* but this species has no comb-like styles. The 6 winged ribs of the fruit form the main difference with the genus *Lophogyne*. In addition the base of *L.capillacea* is strongly enlarged and thalloid, a characteristic which is not found in *Lophogyne*. The flowers are fascicled and in *Lophogyne* solitary. The leaves are different too and the presence of a distinct intrapetiolar stipule at the base of the leaves point rather to *Marathrum* than to *Lophogyne*. Therefore *L.capillacea* has been placed in *Marathrum*. (See also p. 71).

1, a. Anthers at the dorsal side with a distinct groove: leaves up to 3 cm long. . . . . 2. L.arculifera Tul. & Wedd.
b. Anthers at the dorsal side smooth; leaves up to 2 cm long . . . . . 1. L.helicandra Tul.

1. **Lophogyne helicandra** Tul., (1849) 99; idem (1852) 110—111, t. 8 f. 3; Walpers (1852) 436; idem (1858) 782; Tul. (1863) 249—250, t. 73 f. 4; Weddell (1873) 65; Warming (EP 1891) 19; Engler (1930) 44, f. 35 A—D; Tobler, (1933) 297—298, f. 14—15 *Marathrum lacunosum* Gardner, (1847) 169; idem (1850) 34.

Herbs up to 1 cm high, with a sometimes fairly deeply incised base. Leaves flabelliform to elliptical pinnatilobed to pinnatipartite, 1—2 cm long, lobes lanceolate, at the top divided into repeatedly forked segments; ultimate divisions filiform, in large leaves with distinct nerves. Flowers borne by an up to 1 cm long pedicel, juvenile spathella 3—5 mm long, mature one tubuliform to widely infundibuliform, up to 7 mm long; tepals 2—5, linear, 2—2.5 mm long; stamens 2—4, from 4—5 mm long, anthers 2—2.5 mm long, obtuse, spirally coiled after flowering; pollen grains 21 μ high, 18 μ diam; ovary ovoid, 3—4.5 mm high, 1—1.5 mm diam; styles up to 1 mm long and 1.5 mm wide, marcescent.

Type: Gardner 5860, in P; duplicates in BM, CGE, G.-Boiss., G.-Del., K, W; collected in Eastern Brazil.

Distribution: Eastern Central Brazil.

Prov. Rio de Janeiro: Rio Paquequa-grande, Gardner 5860, fl. fr. March/April (BM, CGE, G.-Boiss., G.-Del., K, P, W); idem, Gardner 5866, fl. March (W); Rio Guandú, near Baixo Guandú, Tobler s.n., Sept. (BM).
Prov. Minas Ceraes: Tombos de Garangalo, Schwacke 6293, fl. June (P).
Without locality: Gardner 5840 (W); idem, dos Neves Armond s.n. (C).

2. **Lophogyne arculifera** Tul. & Wedd., Tul. (1849) 100; idem (1852) 111—113, t. 8 f. 2; Walpers (1852) 436; idem (1858) 782; Tul. (1863) 250—251; Weddell (1873) 65; Warming (1888) 493—503, t. 26 f. 1—6, t. 27 f. 1—23; idem (EP 1891) 19, f. 15; Engler (1930) 44, f. 19 E, f. E—J; Tobler, (1933) 295—297, f. 11—13; Wettstein (1935) t. 504 f. 9.

Base up to 5 cm long. Leaves distichous, ovate, attenuate in the basal part, up to 5 cm long, top 3—4 times forked, ultimate divisions up to 1.5 cm long. Flowers borne by an up to 2 cm long pedicel, mature spathella up to 7 mm long, widely infundibuliform to bilabiate; tepals 3, lanceolate, up to 2.5 mm long, coiled when old; stamens 2, up to 4 mm long, anthers acute, at the back with a groove reaching nearly to the top; up to 1.5 mm long; pollen grains known in a young state only; ovary up to 3.5 mm high, and up to 1.5 mm diam; styles up to 1 mm long, marcescent.

Type: Weddell s.n. in P, duplicate in C; collected in Eastern Brazil.

Distribution: Eastern Central Brazil.

Piabanha-river, Weddell s.n., fl. Nov. (C, P); Rio Quitandinha, Glaziou 12195, May (B, C, K, P); Rio Bengala, Glaziou 12196, Oct. (C, P), idem, Glaziou 16313, Nov. (P), idem, Glaziou 17226, Dec. (C, F, K, P); idem, Glaziou 13147, July (F, G.-Del, K, P, US); idem, Glaziou 15441, Aug. (P, US); Rio Negro, Ronca Cao-falls, Glaziou s.n., fl. June (C), idem, Glaziou 13142, fl. fr. June (C, K, P); Rio Macahé, Glaziou 17776, Jan. (C, F, K, P); Rio Grande, Glaziou s.n., Sept. (P); Rio Guama, Huber 1815, Dec. (G.-Boiss.). — Rio Parahyba, Glaziou 13143, fl. July (B, C, K, P) cited as *Apinagia parahybensis* by Glaziou, Bull. soc. bot. Fr., mém. 3, 58 (1911) 575, nomen nudum.

6. MONOSTYLIS Tul.

Small stemless, thalloid herbs with radical leaves which have a distinct petiole, limb repeatedly forked, ultimate divisions filiform. Flowers solitary, juvenile spathella clavate, sessile, mature one tubuliform to trumpet-shaped; tepals 2, one-sided, one on either side of the stamen; stamen 1, filaments filiform, anthers sagittate, top and base deeply incised; introrse; pollen grains globose to ellipsoidal, contents constricted in the middle to one side; with a ring around the middle; ovary ellipsoidal, acute, stipitate, consisting of 2 equal carpels, with 14 ribs; styles filiform to subcompressed, free; placenta strongly compressed, with few ovules on long funiculi; septae solid. Fruit similar to the ovary; tepals and styles marcescent.

Type: *Monostylis capillacea* Tul.

Distribution: One species from the Amazone-region, Brazil (See map 1. b., plate 1.)

This monotypical genus is founded by Tulasne in 1852, but Weddell in 1873 considered it to be a species of the genus *Neolacis* (=*Apinagia*) in the section *Chamaelacis*. This seems to me incorrect because the genus *Neolacis* is to recognise by the 6 or 8 ribs in the ovary and fruit. One could insert the species in the section *Hymenolacis* of *Apinagia*, as this section has species provided with 10—14 ribs in the ovary. But as well as in *M.capillacea* as in the species of the section *Hymenolacis* the ovary is borne on a short gynophore, which is otherwise nowhere the case in *Apinagia*. The anther is deeply incised at the top and the base but the main difference is found in the pollen grains. In *Apinagia* these are 3-sulcate, but in *Monostylis* they have a intine which is constricted to one side while a ring with large warts, which is sometimes cast off, around the middle of the pollen grain is present. This difference is sufficient to maintain *Monostylis*.

1. **Monostylis capillacea** Tul. (1852) 201—203; Walpers (1858) 784; Tul. (1863) 251—252 — *Neolacis capillacea* (Tul.) Weddell (1873) 63. — *Apinagia capillacea* (Tul.) Engler (1930) 39 — **Plate 16 f. 23.**

Base 3—4 mm long, 2—5 mm diam. Leaves united at the base, distichous, 1—2.5 cm long, petiole 0.5—1.5 cm long, terete to compressed, at the base with 2 sheathes. Flowers few, pedicel 0.5—1 cm long, juvenile spathe 1 mm long or less, obtuse, mature one sometimes slightly S-shaped, 2—4 mm long; tepals lanceolate to subulate, acute, about 1 mm long; stamens 1, from 3—4 mm long; anthers about 1 mm long, thecae at both sides acute, dehiscing lateraly; pollen grains 24 μ high, 19 μ diam; ovary 2—3 mm high, about 1 mm diam, subcompressed, borne by a 1 mm long gynophore; styles subpapillate, 0.5—1 mm long. Fruit with 2 thin and fragile valves.

Type: Spruce 1038, in P, duplicates in B, BM, C, CGE, G.-Boiss, G.-Del, GH, Gött, K, NY, S, US, W; collected in the Amazone-region of Brazil.

Distribution: Once collected.

Near Santarem, Amazone-river, prov. Para, fl. Aug.

7. JENMANIELLA Engler.

Very small to small stemless herbs or provided with a short stem; shoots subopposite or opposite arising from the sides of filiform branched roots; base of different shapes in the stemless, thalloid species and branched or unbranched. Leaves distichous, sometimes at the base not distinctly marked from the thalloid base of the plants, of different shapes, mostly a few times forked or pinnate with forked pinnae, petiole sometimes with 2 sheathes at the base, with or without an intrapetiolar stipule, which is sometimes markedly shifted towards one of the margins of the petiole or is sometimes present in the fertile plants only. Flowers few, solitary, juvenile spathella clavate, stalked, mature one infundibuliform; tepals 2—7, in a complete or incomplete whorl; stamens 1—7, in a complete or incomplete whorl, free or sometimes 2 stamens borne by an andropodium; sometimes all differing in size in one flower; anthers dehiscing introrsely or extrorsely; pollen grains ellipsoidal, 3-sulcate; ovary ellipsoidal, terete to subterete, consisting of 2 equal carpels; 6-ribbed but the ribs on the sutures sometimes distinctly marked as twin-ribs; thin-walled; borne on a short gynophore; styles mostly subulate, free. Fruit provided with 2 equal valves, each valve with 3 or 5 ribs; borne on a short gynophore.

Type: *Jenmaniella varians* Engler.

Distribution: Guyana and Northern Brazil.

Studying the *Podostemaceae* Engler in 1927 discovered in Berlin this new genus and described 4 species and one variety. The genus is characterised among others in the ovary which is borne by a short gynophore. Often also an intrapetiolar stipule is present. Remarkably Engler in his diagnosis of the genus claimed that the anthers are introrsely dehiscing, but in the pictures present in the herbarium of Berlin the anthers are depicted as dehiscing extrorsely in some species, for example in *J.ceratophylla*. In the description of the genus in Engler's Naturliche Pflanzenfamilie 18a (1930) he too claimed the anthers as dehiscing introrsely only. Remarkable is why Engler did not consider *Marathrum jenmanii* as a *Jenmaniella* species.. This species has 6 ribs in ovary and fruit and these are borne by a short gynophore, but the intrapetiolar stipule is absent. But these are also missing in a few species described by Engler. Therefore it is better to transfer *Marathrum jenmanii* towards *Jenmaniella* though in this way the certainly ugly name of *Jenmanniella jenmanii* is formed.

In the genus 2 new species and one variety are described, i.e., *J.ceratophylla* var. *parva*, *J.isoetifolia*, both with extrorsely dehiscing anthers and *J.fimbriata* with introrsely dehiscing anthers. The first resembles *J.ceratophylla* but differs in the numerous filiform and shorter ultimate divisions. The second closely resembles *J.varians* but has longer leaves and extrorse anthers. The third species resembles *J.guianensis* but has much longer leaves, longer ultimate divisions, a rhombiform petiole and 3 stamens. *J.ceratophylla* var. *parva* and *J.isoetifolia* certainly belong to *Jenmaniella* but together with *J.ceratophylla* they differ in the extrorsely dehiscing anthers. This forced the author to disinguish 2 sections in *Jenmaniella*, i.e., *Introsae* with species typified by introrse anthers and the section *Extrorsae* typified in extrorse anthers.

That not 2 genera have been distinguished, as is the case with the genera *Oserya* and *Apinagia* in which the former has extrorsely dehiscing anthers and the latter mainly introrsely, is due to the fact that for the rest not a single character is found which might give a reason to establish 2 genera.

The genus is distributed from Venezuela towards Suriname. One species has been found in NE Brazil, thus extending the area of the genus. It is well possible that in the intervening areas more species will be found. (See plate 1, map 1b.)

Key to the sections:

1. a. Anthers introrsely dehiscing [1] . . . . . Sect. I **Introrsae** v. Royen
   b. Anthers extrorsely dehiscing [2] . . . Sect. II **Extrorsae** v. Royen

Section: INTRORSAE v. Royen.

1. a. Ultimate divisions 1—4 mm wide . . . 1. **J.tridactylitifolia** Engl.
   b. Ultimate divisions les than 0.5 mm wide 2
2. a. Ultimate divisions 0.5—2.5 mm long, about 0.3 mm wide; stamens 7; leaves repeatedly forked, flabelliform, 1—2 cm long . . . . . 2. **J.jenmanii** (Engl.) v. Royen.
   b. Ultimate divisions nearly filiform; stamens 1—6 3
3. a. Ultimate divisions 2—4 mm long; stamens 1—6, from 2—5 mm long, anthers 1—2.5 mm long; base of the leaf with a sheath and sometimes with a distinct crest; tepals 0.3—0.8 mm long 4
   b. Ultimate divisions about 1 mm long; stamen 1, about 4 mm long, anthers about 1 mm long, base of the leaf slightly sheathed; tepals about 1 mm long . . . . . 3. **J.guianensis** Engler.
4. a. Gynophore shorter than 0.5 mm long; stamens 3, anthers mucronate; styles without a wing running down into the midrib of the carpels, 1—1.5 mm long; ovary and fruit distinctly ribbed; pollen grains 23 μ high, 19 μ diam . . . . . 4. **J.fimbriata** v. Royen.
   b. Gynophore 0.5—1 mm long; stamens 1—6, anthers truncate and mucronate or obtuse and emarginate; styles with a distinct wing running down into the midrib of the carpel, about 1 mm long; ovary and fruit indistinctly ribbed; pollen grains 17 μ high, 13 μ diam . . 5. **J.varians** Engler

[1] Antheris dehiscentibus introrsis.
[2] Antheris dehiscentibus extrorsis.

1. **Jenmaniella tridactylitifolia** Engler (1927) 8, t. 8 f. R—W; idem (1930) 44, f. 34 R—W. — **Plate 14 f. 7.**

Herb with branched or unbranched shoots, stem terete, about 1 cm long, 1—3 mm diam. Leaves 2—4 times forked, 1.5—2.5 cm long, petiole 4—10 mm long, 1—2 mm wide, subcompressed but widened at the base, with a membranaceous sometimes asymmetric, about 1 mm high intrapetiolar stipule, which is often shifted to one margin of the petiole; ultimate segments triangular, 2—8 mm long, 1—3 mm wide, acute or obtuse, with a distinct nerve. Flowers borne by an 0.5—2 cm long pedicel, juvenile spathella acute, mature one about 8 mm long; tepals 5 or 6, in a complete or incomplete whorl, lanceolate, acute, about 0.5 mm long; stamens 4—6, from 0.5—3.5 mm long, anthers known young only, about 0.5 mm long or less, truncate, emarginate, base of the thecae obtuse or mucronate; pollen grains 17 μ high, 13 μ diam; ovary 1.5—2.5 mm high, about 1 mm diam, acute, attenuate at the base, nearly stipitate, terete, styles lanceolate, 1.5—2 mm long, acute, papillate. Fruit unknown, pedicel 2—3 mm long.

Type: Jenman 7189, in herb. B, duplicate in K; collected in British Guyana.

Distribution: British Guyana.

Waramboo-falls, Mazaruni-river, fl. Oct. Jenman 7189 (B, K); Crab-falls, Mazaruni-river, Gibson 28, fl. fr. Jan. (K); Caburi-falls, Puruni-river, Jenman 7616, fl. Oct. (K, U).

2. **Jenmaniella jenmanii** (Engl.) v. Royen, nov. comb. — *Marathrum jenmanii* Engler (1927) 5—6.

Base branched, with the branches united at the base and passing into the leaves. Leaves repeatedly forked, flabelliform, 1—2 cm long; petiole compressed 2—5 mm long, about 1 mm wide, nerved, with 1 or 2 intrapetiolar stipules at the base; ultimate divisions lanceolate, 0.5—2.5 mm long, 0.3 mm wide or less, obtuse or apiculate, with a distinct nerve. Flowers borne by an 1.5—2.5 cm long pedicel, juvenile spathella unknown, mature one widely infundibuliform, up to 12 mm long, papillate at the top; tepals 7, subulate, about 0.5 mm long; stamens 7, about 2 mm long; anthers about 1 mm long, greenish pink, emarginate or mucronate, base of the thecae obtuse; pollen grains 17 μ high, 14 μ diam; ovary dark reddish-violet, about 1.5 mm high and 1 mm diam, borne by an about 1 mm long terete gynophore, ribs distinct, but not raised;

styles subulate, dark reddish-violet, about 0.8 mm long, obtuse, papillate, free or slightly cohering. Valves of the fruit 5-ribbed.

Type: Jenman 7418, in herb. B, collected in British Gyuana.

Distribution: British Guyana.

Potaro-river, Cobanatuk-falls, fl. fr. Oct., Jenman 7418 (B); Cuyuni-river, Akaio-falls, fl. fr. Nov., Sandwith 694 (BM,K).

3. **Jenmaniella guianensis** Engler (1927) 8, t. 8 G—K; idem (1930) 44, f. 34 G—K.

Small up to 1 cm high herb. Leaves a few times pinnate or forked, 0.4—1 cm long, petiole terete, widened at the base, ultimate divisions nearly, filiform about 1 mm long. Flowers borne by an 0.6—1 cm long pedicel, juvenile spathella about 2 mm long, mature one 2—2.5 mm long; tepals 2, subulate, about 1 mm long; stamen 1, about 4 mm long, anther about 1 mm long, obtuse, base of the thecae obtuse, pollen grains unknown; ovary about 1 mm high and 0.5 mm diam, obtuse, terete, borne by an about 0.5 mm long gynophore. Valves of the fruit with 3 ribs.

Type: Jenman 7416, in herb. B, duplicate in BM, K; collected in British Guyana.

Distribution: Potaro-river, British Guyana.

Fl. fr. Oct. Jenman 7416 (B, BM, K); Kaieteur-falls, fr. Oct., Jenman 7401 (B); idem, fl Sept., Jenman 7500 (K).

4. **Jenmaniella fimbriata** v. Royen, nov. sp. — **P. 137 and plate 16 f. 16—19.**

Base thalloid, circular or branched, up to 2 cm in diam. Leaves repeatedly forked or pinnate, 1—3 cm long, ultimate divisions nearly filiform, 2—4 mm long, acute, nerveless; petiole rhombiform in transverse section, up to 10 mm long and up to 2.5 mm wide, widened at the base, one margin of the sheath sometimes forming a crest at the upper side of the petiole. Flowers borne by an up to 2 cm long pedicel, juvenile spathella narrowly clavate, acuminate, obtuse, papillate, mature one campanulate, up to 5 mm long; tepals 4, lanceolate to linear, 0.3—0.8 mm long, obtuse; stamens 3, up to 2.5 mm long (or longer?); anthers 1—2 mm long, mucronate, base of the thecae mucronate; pollen grains 23 μ high, 19 μ diam; ovary 1.5—2.5 mm high, 0.5—1.5 mm diam, subacute, attenuate at the base, borne by an about 0.5 mm long gynophore; styles subulate, slightly compressed, 1—1.5 mm long,

papillate, sometimes widened and emarginate at the top. Each valve of the fruit with 3 ribs, marginal ribs indistinct.

Type: Huber 1816, in G.-Boiss., collected in Brazil.

Distribution: Once collected.

Cachoeira do Rio Guama, fl. fr. Dec., Huber 1816 (G.-Boiss.).

5. **Jenmaniella varians** Engler (1927) 7, t. 8 f. L—Q; idem (1930) 44 f. 34 L—Q.

Small herb with a very short, 1—3 mm long stem, branched or unbranched. Leaves 4—6 times forked or leaves pinnate with 3—5 times forked pinnae; 1—4 cm long, petiole 0.5—1 cm long, 0.5—2 mm wide, membranaceous, carrying a sheath shifted to one margin, sometimes only visible as a narrow membrane, ultimate divisions very narrow, lanceolate, acute, nerveless, 2—4 mm long. Flowers borne by an 5—12 mm long pedicel, juvenile spathella unknown, mature one 5—7 mm long, papillate; tepals 2—6, in a complete or incomplete whorl, lanceolate, acute, 0.3—0.8 mm long; stamens 1—6, from 2—6 mm long, if only 1 stamen then from 5—8 mm long; anthers about 1.5 mm long, truncate and mucronate or obtuse and emarginate, base of the thecae obtuse; if only 1 stamen present the anther 1.5—2.5 mm long; sometimes 2 stamens borne by a 1.5—2.5 mm long andropodium, with 1.5—2 mm long filaments; pollen grains 17 μ high, 13 μ diam; ovary 1.5—2 mm high, about 1 mm diam, top and base acute, ribs indistinct, carpels thin, gynophore 0.5—1 mm long; styles subulate, sometimes subcompressed, acute or obtuse, papillate, about 1 mm long. Valves of the fruit with 3 distinct, prominulous ribs, pedicel 2—3 mm long.

Type: Jenman (Bartlett) 8249, in B, duplicates in K; collected in British Guyana.

Distribution: British Guyana.

Conawarook-river, Temple Bar falls, Jenman (Bartlett) 8249 (B, K); Mazaruni-river, Warambo-falls, Jenman 7613, fl. fr. Oct. (BM, K, U); Puruni-river, Caburi-falls, Jenman 7616, fl. fr. Oct. (BM); Essequibo-river, First falls, Sandwith 446, fl. fr. Oct. (K).

Section: **EXTRORSAE** v. Royen.

1. a. Leaves 5—7 cm long, at the top with a few once or twice forked pinnae; anthers about 2 mm long . . . . . 6. **J.isoetifolia** v. Royen
   b. Leaves shorter than 3 cm; anthers 1.5 mm long or less . . . . . 7. **J.ceratophylla** Engler.

6. **Jenmaniella isoetifolia** v. Royen, nov. sp. — **P. 137 and plate 14 f. 8—16.**

Small and thalloid herb. Base irregular, branched, subcompressed, 4—7 mm long, 2—5 mm diam. Leaves filiform, 5—7 cm long, at the top with a few once or twice forked pinnae, widened and sulcate at the base. Flowers borne by a 1—2 cm long pedicel, juvenile spathella obtuse, papillate, mature one strongly lepidote, 6—9 mm long; tepals 2 or 3 from 0.8—1.5 mm long, the 3d at the back of the stamen or absent, filiform; stamen 1, from 2—3 mm long; anther about 2 mm long, acute, base of the thecae acute; pollen grains 17 μ high, 14 μ in diam; ovary 1—1.5 mm high, about 1 mm in diam, obtuse, subcompressed, borne by a 0.5 mm long, terete, gynophore, ribs indistinct; styles subulate, obtuse, less than 1 mm long. Fruit 2.5—3 mm long, each valve with 5 ribs, but 2 of them indistinct; borne by a 1 mm long, terete gynophore; pedicel 2—3 cm long.

Type: Jenman 7417, in U, duplicates in B, K; collected in British Guyana.

Distribution: Once collected.

Top of Kaieteur-falls, Potaro-river, fl. fr. Oct. (B, K, U).

7. **Jenmaniella ceratophylla** Engler var. **ceratophylla** (1927) 7—8, t. 8 f. A—F; idem (1930) 44, f. 34.

Herb with small branched or unbranched thalloid shoots; base cuneate, about 2 mm wide. Leaves a few times forked, 0.5—1.5 cm long, petiole cuneate, membranaceous 1—5 mm long, about 1.5 mm wide, but widened at the base, with distinct nerves; at the base with a short triangular, acute stipule (in the fertile plants only), ultimate divisions very narrow, lanceolate, acute, with a distinct nerve, 1—4 mm long. Flowers borne by an about 1 cm long pedicel, juvenile spathella obtuse, papillate, mature one narrowly infundibuliform, about 3 mm long; tepals 2, very narrow, acute, about 1 mm long; stamen 1, about 4 mm long, anther about 1 mm long, obtuse; pollen grains known in a young state only; ovary about 1.5 mm high, about 0.5 mm diam, acute at top and base, with 8 distinct ribs, 2 of them double; borne by a terete, about 0.5 mm long gynophore; styles subulate, acute, 0.5—1 mm long. Each valve of the fruit with 5 ribs.

Type: Jenman 7496, in B, duplicate in BM, K; collected in British Guyana.

Distribution: Potaro-river, British Guyana.

Tumatumari falls, Jenman 7496, fl. fr. Sept. (B, BM, K); Kaieteur-falls, Jenman 7498, fl. fr. Oct. (BM, K).

Var. **hexandra** Engler (1927) 8.

Similar to var. ceratophylla but flowers with 6 tepals and as many stamens. Fruit 1.5 mm high, gynophore 1.5 mm long, pedicel 2 cm long.

Type: Jenman 7497, in B, collected in British Guyana.

Distribution: Potaro-river.

Jenman 7497, fl. fr. Oct. (B); Amatuk-falls, Jenman 7421, fl. fr. Oct. (K); Kaieteur-falls, Jenman 7498, fl. fr. Oct. (K).

Var. **parva** v. Royen, nov. var. — **Plate 16 f. 14—15.**

Differs from var. ceratophylla in the subacute anthers and in the terete rachis of the leaf, which is membranaceous at the base only, while in the var. ceratophylla the whole leaf is membranaceous. Stamens 1 or 2.

Type: Othmer s.n., in B, duplicate in C; collected in Venezuela.

Distribution: Once collected.

Caroni-river at the mouth of the Curapacay, Othmer s.n., fl. (B, C); (*Apinagia pusilla* non Tul., cited by Matthiesen in Bibl. Bot. 68 (1908) 15—16 t. 7 f. 41—43, t. 9 f. 90b.)

8. MACARENIA v. Royen nov. gen.

Small stemless herbs with repeatedly pinnate leaves which are provided at the base with an intrapetiolar stipule. Flowers to the number of 10—20 enclosed in a common coriaceous clavate spathella; spathellas in fascicles or solitary, each spathella enclosed at the base in 2 membranaceous stipules. Tepals 3—5 in an incomplete or more or less complete whorl; stamens 2—4, shortly united at the base, inserted at one side of the flower; anthers sagittate, introrse; pollen grains ellipsoidal, 3-sulcate; ovary 2-celled consisting of 2 equal carpels, each provided with 3 ribs; styles 2, subulate. Fruit with 2 equal valves, each valve with 5 ribs.

Type-species: *Macarenia clavigera* v. Royen.

Distribution: 1 species in rivers north and west of the Macarena-mountains, Colombia.

Though this mono-specific genus closely resembles some of the *Marathrum* and *Rhyncholacis* species e.g. *M.cubanum* and *Rh.jenmanii*, it can not be included in either of these genera for it differs from them in the absence of the spathella which encloses the young flower. The fact that the presence of this spathella has so far been regarded as a general character of the *Podostemaceae* seems to emphasize the isolated position of this genus. The large clavate spathella of the new genus might be interpreted as a homologon of the one-flowered spathella found in the other *Podostemaceae* but it is also possible that it represents a different leaf that does not occur in the rest of the *Podostemaceae* and that the spathella themselves are suppressed. The similarity between the spathellas in the new genus and the groups of spathellas observed in the genera *Marathrum* and *Rhyncholacis* makes it probable that the first interpretation is the correct one.

The flower itself shows a close resemblance to that of *Mourera, Apinagia* and *Rhyncholacis*. The presence of an intrapetiolar stipule is a character that the new genus shares with the genus *Marathrum*. The styles show some resemblance to those of *Marathrum aeruginosum* and *M.trichophorum* but they are never provided with teeth along the margin. The stamens are inserted at one side of the flower and in this respect the new species resembles *Marathrum tenue, M.trichophorum, M.capillaceum, M.aeruginosum* and several *Apinagia* species.

The differences between this new species and its allies seem to be of sufficient importance to justify its reference to a new genus. The best place is near *Marathrum* and *Rhyncholacis*.

1. Macarenia clavigera v. Royen — P. 138 and plate 15 f. 1—14.

Base variable in shape, up to 7 mm wide. Leaves repeatedly pinnate, up to 30 cm long; petiole terete, up to 10 cm long, provided at the base with an up to 3 mm high, obtuse, membranaceous intrapetiolar stipule; primary pinnae up to 10 cm long; ultimate segments linear, acute, with a distinct nerve, up to 15 mm long. Flowers to the number of 10—20 in a common club-shaped spathella. Spathella solitary or in fascicle of 2 or 3; juvenile 0.5—4 cm long; mature 6 to 12 cm long; peduncle terete, slightly winged, up to 3 cm long and about 1 mm in diam, rather tough, nippelshaped at the top, smooth, enveloped at the base by 2 membranaceous stipules. Flowers without spathella. Tepals 3—5, lanceolate, about 0.8 mm long, with 1 or 2 teeth; stamens 2—4, up to 4 mm long; anthers 1.5—2 mm long, truncate or with 2

obtuse lobes, base of the thecae obtuse; pollen grains 19 μ high, 16 μ diam; ovary ellipsoidal to obovoidal, 1.5—4 mm high, 1—1.5 mm in diam, with 6 ribs; styles subulate, obtuse, 1—1.5 mm long, papillate. Fruit similar to the ovary, with 6 ribs, pedicel up to 2 cm long.

Type: Philipson c.s., 1724 in BM, duplicate in U; collected in Colombia.

Distribution: In rivers North and West of the Macarena-mountains, Colombia.

El Mico Airstrip, fl. fr. Dec., Philipson, Idrobo and Fernandez 1724 (BM, U); idem, Philipson 2275, fl. fr. Jan. (BM, U).

4. APPENDIX.

Latin descriptions of the new genus and of the new species.

Apinagia digitata. — cf. p. 42—43.

Caule ex internodiis compressis, alatis, composite, usque ad 20 cm alta. Folia plerumque rhombiformia, casa quo interdum asymmetrica, interdum angustiora vel latiora, pinnatipartita vel -secta, petiolo cuneato instructa; lobis triangularibus vel lanceolatis, apice in lacinias angustus infrequenter, dissectis, laciniis ultimis lanceolatis, enerviis; nervi plures ex basi radianti, infra prominente, lamina supra fasciculis paucis filorum lanceolatorum, acutorum sparsa. Flores solitarii; tepala 9—12, stamina 8—14, ovarium complete circumdantia, antheris acutis; ovarium ellipsoideum, medio utriusque carpelli linea clariore notatum, styli compressi, lanceolati, basi cohaerentes, interdum emarginati. Fructus e valvis 2 aequalibus medio dorso linea alba et costa brevissima basi tantum conspicua notatis compositus.

Typus: *Sagot 1112, in fluvio Maroni, cataracta prima, Guyana gallica, in herb. U.*

Ad Apinagiam imthurnii et A.richardianam accederi videtus differt autem ab utraque specie nervis pluribus e basi in laminam radiantibus, apicibus loborum tenue dissectis, et praesertim staminibus 8—14, ovarium complete circumdantibus dispositio.

Apinagia arminensis. — cf. p. 48—49.

Basis multi-lobatus, lobis saepe irregulariter furcatis, crassis, sensim in folia transgredientibus. Caulis internodiis indistinctis. Folia pinnati-partita vel pinnati-secta, nervis principalibus 2—4 instructa, supra fasciculis pilosum applanatorum sparsa; lobis triangularibus vel lanceolatis, laciniis ultimis linearibus, acutis, apice in fila aliquoties furcata exeuntibus. Flores solitarii. Tepala 7—10, stamina tanta quanta tepala, ovarium serie completa circumdantia, antheris acuta, truncatis vel emarginatis; ovarium ellipsoideum, carpellis aequalibus, dorso-linea mediana albida longiore et duabus lineis lateralibus brevioribus notatis; styli nunc cylindrici, nunc subcompressi et spatulati, basi connati. Fructus maturus nondum notus.

Typus: *Lanjouw 536, in U, lectum in cataracta fluminis Marowynensis Armina dicta, Surinamia.*

Affinis Apinagiae marowynensis, sed ab ea foliis minus profundi divisis, pilis fasciculatis in facie superiore limbi brevioribus et angustioribus, rache minus distincte evoluta, staminibus pluribus, longioribus, ovarium serie completa circumdantibus distinguenda.

Apinagia fluitans. — cf. p. 51.

Caulis distincte evolutus apice ramosas, internodiis irregulariter angularibus, interdum subulatis compositus. Folia frequentes pinnata vel bifurcata, laciniis ultimis filiformibus, acutis, distincte nervatis, valde compressis vel membranaceis; basi limbi vaginata, subamplexicauli. Flores solitarii; tepala 3, ovarium incomplete circumdantia; stamina 2, haud opposita, antheris obtusis vel mucronatis, ovarium ellipsoideum, costis 6 distinctis et 2 valde indistinctis instructum; styles taeniiformes vel gracile triquetra, acuti, liberi. Fructus valvis duabus aequaliter compositus, utraque valva costis 5 longis et interdum insuper 2 brevioribus.

Typus: *Baldwin 2996, in flumine Abuná, dicta, Bolivia, in herbario US.*

Hac species cognosanda est foliis angustissimis, frequentis divisis, longis laxis, fluitantibus et insuper tepalis longissimis. Foliis longissimis revocat indolem Ruppieae vel Zannichelliae. Hac species Apinagiae ruppioidi identica esse potest sed cum tantum exempla pessima species illius nota sunt et stamina cuis ex descriptione Kunthii insupis in andropodio inserta sunt specime a Baldwin collectum sub nomine novo describere rectum videtus.

Apinagia minor. — cf. p. 52.

Herba pusilla, paulum ramosa, flexuosa. Folia cuneata irregulariter pinnatipartita, sessilia, basi in caule decurrentia, lobis triangularibus, obtusis vel acutis, apice raro in lacinias paucas divisis, nervis 2 vel 3 basi radiantibus, supra fasciculis filorum lanceolatorum, munitis. Tepala 4, linearia, acuta, stamina 3; antheris obtusis; ovarium ellipsoideum, obtusum; stylis filiformibus, papillatis. Fructus ovario similior, utraque valva costa singula haud conspicua munita.

Typus: *Spruce 555, in fluvio Aripecuru, prov. Para, Brasilia septentrionalis, in herb. P.*

Affinis est A.pygmaea atque differt tepalis brevioribus, antheris longioribus, atque ovario et fructu ecostatis.

Apinagia crispa. — cf. p. 57.

Herba acaulis. Folia rhombiformia vel oblique rectangularia, basi cuneata, margine pinnatilobata vel pinnatipartita, lobis triangularibus vel lanceolatis, apice in lacinias furcatas, angustissimas aliquas exeuntibus, plurinervata, nerviis flabelliforme e basi radiantibus, supra fasciculis filorum spathulatorum, acutorum instructa. Tepala 5—8, ovarium totum circumdantia, lanceolata; stamina 5—8; antheris acutis; ovarium ellipsoideum, carpellis 2 aequalibus compositum; stylis filiformibus, basi connati. Fructus ignotus.

Typus: *Lanjouw et Lindeman 2010, in fluvii Marowynensis, cataracte Armina dicto, in herb. U.*

Affinis Apinagiae imthurnii et latifoliae. Differt ab A.imthurnii stylis bis ad ter longioribus, foliis latioribus, pedicellia brevioribus, absentia lineae albidae quae in speciebus his dorsam carpellorum ornat speciminibus florentibus humilioribus necnon filia quibus folia supra muniti sunt, acutis cum obtusi sunt in A.imthurnii. Differt A.latifoli et A.leptophylla lobis foliorum apice dissectis, cum integra sunt in speciebus his.

Apinagia platystigma. — cf. p. 60.

Herba parva acaulis vel brevicaulis. Folia forma variabilia, pinnatilobata vel -partita, membranacea, nervis primariis 2—5, in foliis veterioribus subtus basi tantum prominentibus, instructa; supra paucis fasciculis filorum lanceolatorum munita; lobis triangularibus vel lanceolatis vel irregulariter rhombiformibus, integris, basi cuneatis, interdum distincte petiolulatis, pinnatinerviis. Tepala 7—10, ovarium complete circumdantia; stamina 7—19; antheris obtusis, connectivo interdum apice producto; ovarium ellipsoideum vel ovoideum, medio carpellorum linea singula indistincta notatum; stylis cylindricis, interdum apice compressis vel applanatis, emarginatis, medio vel minus cohaerentibus, saepe recurvatis deflectis. Fructus media valva costa singula distincta ad margines valvarum costii, basi tantum prominentibus, instructus.

Typus: *v. Luetzelburg 20224, in fluvio Oyapock, Cachoeira Grand Massará, Brasilia septentrionali, in herb. M.*

Nervis radiantibus Apinagiae latifoliae et A.richardianae similior, differt ab A.richarianae stylis cohaerentibus apice applanatis; ab A.latifolia habitu tantum cum specimina plura aderust, differentia haec forsitan vana apparebit, sed hoc tempore speciem novam accipere cautius videtur.

Apinagia rangiferina. — cf. p. 61.

Herba pusilla, acaulis. Folia aliquotiis pinnata, laciniis ultimis lanceolatis, angustissimis, enerviis; petiolo paulo compresso, basi in vaginam angustam ampliato instructo. Antheris obtusis vel apiculatis; ovarium ellipsoideum vel ovoideum, costis 6 plus minusve distinctis instructum; styli subulati, parte superiore tamen dilatati et compressi, basi paulo coherente. Fructus ovario similior, utraque valva costis 3 distinctis instructa.

Types: *Glaziou 22001, Rio Bacalhao, prov. Goyaz, Brasilia, in herb. C.*

Apinagiae divertenti Went valde affinis sed foliis longioribus, petiolo plus-minusve tereti evidenti, basi distincte evoluta, tepalis longioribus, staminibus 2, antheris obtusis vel apiculatis, gynophoro nullo, fructu erecto ab ea recedens.

Apinagia fimbrifolia. — cf. p. 62.

Herba acaulis. Folia aliquoties-pinnata, interdum semel pinnata casu quo pinnis aliquoties furcatis; petiolo compresso; laciniis ultimia filiformibus. Tepala 2—7, ovarium complete vel incomplete circumdantia, quorum 1 vel 2 saepe cum staminibus 2 vel 3 in altitudine diversa connata et cum illis alternantia; stamina 2 vel 3, connata, antheris obtusis; ovarium ellipsoideum, interdum pedicello suboblique insertum, carpellis 2 aequalibus constans, distincte 6-costatum; styli 2, spathulati, compressi, obtusi vel emarginati, cohaerente. Fructus valvis 2 aequalibus instructus, utraque valva costis 3 distinctis et marginalibus 2 indistinctis.

Typus: *Glaziou 21982, in fluvio Paranaúa, provincia Goyaz, Brasilia orientalis, in herb. P.*

Differt staminibus connatis a specibus Apinagiae aliis; foliorum characteris cum A.glaziovii et A.riedelii congruit; habitu speciebus generis Marathri e.g. M.squamoso simillima, sed ovario et fructu 6-costatis a genere illo faciliter distinguenda.

Apinagia boliviana. — cf. p. 63.

Herba parva. Folia pinnata, sessilia, sensim in basem transeuntia, pinnatis, laciniis ultimis angustissimis, lanceolatis, enerviis. Tepala 2 vel 3, si stamen singulum adest in utroque latere staminis inserta, si stamina dua adsunt tepalum tertium furca filamentorum duorum insertum, alliis brevius; stamina 1 vel 2, basi cum tepalis 2 vel 3 connata; antheris obtusis vel mucronatis; ovarium ellipsoideum, pedicello suboblique insertum, e carpellis aequalibus vel inaequalibus compositum; costis 6 distinctis instructum; styli primum valde applanati, emarginati vel lobati, postea cuneiforme, emarginati, applanati. Fructus pedicello 0.5—1.5 cm longo elatus, ovario similior, utraque valva 5-costata.

Typus: *Williams 1570, Apolo, Bolivia, in herb. NY.*

Species haec ab Apinagia peruviana differt foliis pinnati-partitis, laciniis ultimis numerosioribus, angustioribus, tepalis longioribus, stylis applanatis emarginatis, antheris brevioribus.

Apinagia parvifolia. — cf. p. 64.

Herba pusilla. Folia aliquotiis-pinnata, laciniis ultimis filiformibus, enerviis; rache folii anguste alata, alis hic inde appendicibus parvis forma irregularibus instructis. Tepala 2—5, cum filamentis connecta et cum eis alternantia; stamina 2—4, connata, antheris obtusis; ovarium ellipsoideum, 6-costatum; styli obovoidei, compressi, mucronati, basi attenuati, liberi. Fructus ovario similior, utraque valva 3-costata.

Typus: *Glaziou 21992, e Brasilia in herb. U.*

Speciebus Apinagiae aliis differt staminibus connatis, charactero illo ad Apinagiam fimbrifoliam, peruvianam, bolivianam accedit. Differt a speciebus illis foliis ad apicem filamentorum connatis; differt ab A.boliviana et Marathrum striatifolium foliis minutis aliquoties-pinnatis et laciniis ultimis filiformbus.

Apinagia batrachifolia (Mildbraed) v. Royen var. **longistyla.** — cf. p. 57.

Herba acaulis. Folia aliquoties-pinnata vel furcata; laciniis ultimis filiformibus, multis. Tepala 7—15; stamina 7—22, antheris acutis, obtusis vel emarginatis; ovarium ovoideum vel ellipsoideum, indistincte 6-costatum; styli cylindrici, capitati, medio vel minus connati. Fructus e valvis duabus aequalibus composita, utraque valva costis 3 indistinctis instructa.

Typus: v. *Luetzelburg 20301, in cataracta Salto Manoa in fluvio Oyapock, Brasilia, in herbario monacense.*

Differt ab Apinagia batrachifolia var. batrachifolia laciniis ultimis pluribus et angustioribus, petiolo latiore, stylis longioribus, staminibus paucioribus, floribus albis. Conjunctura esset cum var. batrachifolia nisi area sua magno intervallo (1400 km) ab area eius separate.

Marathrum elegans. — cf. p. 77.

Herba mediocris. Folia disticha ter pinnata, laciniis ultimis spathulatis, paulo nervatis, enervatis vel nervo apicem non attingente instructis. Tepala 7—9; stamina 7—9, antheris angustis, acutis, connectivo interdum oblongato; ovarium ellipsoideum, costis 8 distinctis, paulo prominentibus; styli cylindrici, obtusi, emarginati, basi connati. Fructus e valvis 2 aequalibus compositus, utraque valva 5-costata, pedicello apice cupuliformi margine serrato, elatus.

Typus: *Hinton 11624, Vallecitos, departemento Michoacan, Mexico, in herb. GH.*

Hac species apice pedicelli dilatato Marathro schiedeano et haenkeano similis est sed differt ab utraque specie laciniis ultimis multo latoribus.

Marathrum minutiflorum Engler, forma **intermedium.** — cf. p. 81.

Statura mediocris. Basi ambitu irregulariter rotundatus, 1—1.5 cm diam. Folia petiolata et stipulata, petiolus usque ad 6 cm longus, basi dilatatus, stipula membranacea obtusa, saepe ad marginem mota, lamina aliquoties pinnata, 5—25 cm longa, rache flexuosa, angulo 60—90° ascendentibus, pinnis primariis 0.3—4 cm longis ala angusta in rache decurrentibus, laciniis ultimis spathulatis vel lanceolatis, 0.5—1 mm longis, acutis enerviis. Flores solitarii, pedicello 1—3 cm longo elati. Spathella ante anthesin clavata et acuta, ad anthesin anguste infundibuliformis, 0.5—1.5 cm longa. Tepala 5 vel 6, squamiformia, usque ad 0.5 mm longa, acuta; stamina tanta quanta tepala, 3—3.5 mm longa, antheris acutis vel mucronatis, basi emarginatis, thecis circ. 1 mm longis, thecis basi obtusis vel emarginatis; granula pollinis longe-ellipsoidea, 17 μ alta et 14 μ diam; ovarium ellipsoideum, 3—3.5 mm altum, 1—1.5 mm diam; apice acutum, basi attenuatum, subcompressum, costis 8 prominulis notatum; styli 2, conici, interdum paulum applanati casu quo apice emarginati, circ. 1 mm longi, basi contracti, tertia parte connati, dense papillati. Fructus 2-valvatus, costis 8 prominulis notatus valvis aequalibus.

Typus: *Skutch 2598, in herb. US, lectum in vicinitate loci El General dicti in provincia San José, Costa Rica.*

Plusminusve intermedia inter M.minutiflorum Engl. var. diversifolium et M.minutiflorum Engler var. indifferens, a M.minutiflorum Engler, var. diversifolio laciniis ultimis multo brevioribus et a M.minutiflorum Engler, var indifferente laciniis ultimis enerviis recedens; ab utraque specie antheris et stigmatibus brevioribus diversa.

Marathrum minutiflorum Engler, forma **diversifolium.** — cf. p. 81.

Herba parva vel mediocris; basi irregulariter elliptica, 2—8 cm in diam; foliis et floribus in margine insertis. Folia petiolo membranaceo, basi saepe stipula obtusa vel acuta instructa, ter vel quater pinnata, 3—25 cm longa, pinnis angulo 45° ascendentibus, pinnis primariis 0.5—4 cm longis, ala hyalina ad rachem decurrente instructis; laciniis ultimis lanceolatis 0.5—2 mm longis, circ. 0.3 mm latis, nervatis. Flores multi, pedicello 1—4 cm longo, instructa,

spathella matura infundibuliformi, 10—15 mm longa. Tepala 6—8, ovata, 0.5—1.5 mm longa; stamina 6—8; 4.5—5 mm longa, antheris acuminatis 1—1.5 mm longis, thecis basi obtusis vel emarginatis; granula pollinis ellipsoidea, 18 μ alta, 14 μ diam; ovarium ellipsoideum, 3—4 mm altum et 1.5—2 mm diam, obtusum vel acutum, basi paulo attenuatum, toros vel subcompressum, costis 8 prominulis ornatum; styli juveniles cilindricis, maturi compressi, circ, 1 mm longi, obtusi, emarginati vel dentibus 2 vel 3 instructi, valde papillati, basi connati. Fructus ovario similior, costis 8 prominulis notatus.

Typus: *J. S. Smith 4921, in flumine San Francisco dicto, provincio San José, Costa Rica, in herb. GH.*

Rache alata similis est Marathro minutifloro Engler, var. indifferenti sed differt tepalis longioribus, stylis brevioribus, laciniis ultimis nervatis, costis ovarii et fructus minus prominentibus. In Skutch 4604 e plantis sterilis compositi characteres hi invemiuntur: folia 15—20 cm longa, ter vel quater pinnata; pinnis primariis ala distincta ad rachem decurrente instructis; laciniis ultimis spathulatis, acutis, nervatis. Folia eorum igitur differunt a foliis plantarum fertilium laciniis ultimis tantum brevioribus et lateribus.

Marathrum aeruginosum. — cf. p. 84.

Herba pusilla. Folia aliquoties furcata vel subsimplicia apice solum in lobos furcatos divisa, pluri-nervata, nunc nervis a basi radiantibus instructa, nunc pinnatinervia, laciniis ultimis numerosis subfiliformibus, enerviis. Tepala 3 vel 4, ovarium incomplete circumdantia, libera vel basi cum staminibus 2 conjuncta, antheris obtusis vel mucronatis; ovarium ellipsoideum vel ovoideum, costis 6 alatis, 2 prominulis ad suturas; styli obovoidei, compressi, basi cohaerentes. Fructus ovario similior, utraque valva dorso costis 3 alatis, margine 2 prominulis instructa.

Typus: *Steyermark 58428, in cataractis fluvii Orinoco, Santa Barbara dicta Venezuela, in herb. F.*

Hac species revocat Lophogynem arculiferam et Marathrum squamosum. Distinctio facilis est ob stamina 2 connata, costas alatas et stylos obovoideos. Characteris illis haec species accedit ad Marathrum trichophorum et M.capillaceum. In specie nostra tepala interdum non omnia inter stamine et ad margines staminum inserta sunt. Forma foliorum M.pusillo et M.striatifolio similior.

Marathrum trichophorum. — cf. p. 87.

Herba mediocris. Folia aliquoties pinnata, laciniis ultimis lanceolatis, nervatis. Tepala 3, unilateralia; stamina connata, tepala inter-staminalia interdum absentia; stamina 2; antheris obtusis vel emarginatis; ovarium ellipsoideum, 6 distinctis et valde prominentibus instructum; styli subcymbiformes, acuti, basi connati, margine subdentati. Fructus ovario similior, utraque valva 3 costis valde prominentibus ornata.

Typus: *Langlassé 613, Sierra Madre, Mexico, in herb. GH.*

Accedit videtus ad Marathrum oxycarpum sed differt ab aliis speciebus Marathri ovario 6-costato, staminibus connatis stylis cymbiformibus.

Marathrum striatifolium. — cf. p. 87.

Herba parva, acaulis. Folia nunc infrequenter furcata vel pinnata nunc simplicia casu que basi late-cuneata lobis infrequenter divisis, pinnis aliquoties furcatis, laciniis ultimis spathulatis vel linearibus, angustissimis, enerviis. Tepala 3 vel 4, triangularia vel lanceolata, dua ad latera filamentorum 2 connatorum inserta alia hic inde e basi ovarii orientia; stamina 2, ad altitudinem diversam, antheris, obtusis vel emarginatis; ovarium e carpellis aequalibus vel inaequalibus compositum, suturis interdum a centro remotis; costis 8 distinctis notatum; styli filiformes spathulati vel ovoidei, applanati vel subcymbiformes, basi paulo cohaerentes, distincte nervati. Fructus ovario similior, interdum pedicello oblique insertus, utraque valva costis 3 distinctis et margine in supes nervis 2 indistinctis instructa.

Typus: *Weberbauer 6426, prov. Ayavaca, in herb. GH.*

Haec species differt ab Marathro peruviano foliis conspicue nervatis, tepalis dorso filamentorum 2 connatorum, non inter filaments insertis.

Marathrum pauciflorum Tul., var. **heterophyllum** v. Royen. — cf. p. 89.

Statura parva. Basis ut in var. paucifloro. Folia nunc eis var. pauciflori similiora, minora tamen, nunc flabellifolia et estipulata, et lobis latioribus munita. Tepala 8—13; stamina 12—18, interdum aliquae e basi usque ad altitudines diversas inpares vel triades connata, antheris acutis, emarginatis vel in denticula 2 exeuntibus; ovarium ellipsoideum, 8-costatum; styli cylindrici, apice subcompressi, emarginati, basi alte connati. Fructus maturus nondum notus.

Typus: *Sandwith 694 in K, dupl. typi BM; e Guiana brittanica, in cataractis Akaio fluminis Cuyuni dicti.*

Varietas haec characteris principalibus cum typo congruit sed partibus omnibus minoribus et foliis dimorphis ab eo recedit. Folia anomala eis Jenmaniella jenmanii (Engler) v. R. similiora sunt.

Rhyncholacis brassicifolia. — cf. p. 97.

Statura parva vel mediocris. Folia repetito furcata; incisionibus obtusis, laciniis ultimis fasciculatis. Tepalis 7—10; staminibus 7—10; antheris acutis, aliquando emarginatis vel dentibus 2 brevibus, acutis instructis; ovario ovoideo vel ellipsoideo, 6-costato, costa mediana anguste alata, aliis latis et distincte prominentibus; stylis juvenilibus subulatis, maturis membranaceo-applanatis, basi triangularibus et ibi coherentibus, obtusis, apice papillatis. Fructus ovario similior.

Typus: *J.Cuatrecasas 6986, in cataractis Yurupari, in flumine Uaupès in vicinitate Mitu, Columbia, in herb. US.*

Haec species differt a Rhyncholace hydrocichoria ovarii costa mediana minus distincte alata, costis omnibus latis et distincte prominentibus, ovario minus distincte compresso et pedicello apice dilatato. Folia eis Rh-hydrocichoriae similiora sunt latiora tamen et laciniis ultimis distinctius fasciculatis, asperioribus et latioribus.

Rhyncholacis coronata. — cf. p. 97.

Statura mediocris. Folia multipinnata vel juvenilia multi- furcata, incisionibus obtusis; laciniis ultimis numerosis, triangularibus, lanceolatis vel raro spathulatis, acutis vel obtusis, enerviis. Flores fasciculati; tepalis 8—10, lanceolatis, apicibus 1—2 acutis; staminibus 8—18; antheris obtusis, connectivo in lobum acutum producto; ovario ellipsoideo, costis medianis distincte alatis, aliis absentibus, costis marginalibus nonnunquam praesentibus sed vix distinctis; stylis cylindricis, basi trigonalibus et ibi aliquando cohaerentibus, obtusis. Fructus ignotus.

Types: *Cardona 2171, in cataractis Yumaraba, in flumine Icabarú, Venezuela, in herb. US.*

Cognitio facilis est connectivo producto, acuto. Folia similia sunt illis Rhyncholacis jenmanii, Rh.laxipinnatae et illis species a Warming depictae sunt nomine R.macrocarpa (Fam. Pod. 5).

Rhyncholacis palmettifolia v. Royen, var. **palmettifolia.** — cf. p. 99.

Statura parva. Folia repetito furcata; laciniis ultimis subfiliformibus. Flores fasciculati. Tepalis 10—12, staminibus 10—12; antheris apice acutis vel 2- vel 3-dentatis; ovario ovoideo vel ellipsoideo, compresso, 6-costato, costa mediana distincte sed anguste alata, costis aliis prominulis; stylis subulatis, acutis, basi anguste trigonalibus, interdum majore parte connatis. Fructus ovario similior, utraque valva 3-costata, costis prominulis distinctioribus tamen quam in ovario.

Typus: *Linder 59, in cataractis Tumatumari dictis, in flumine Potaro, Guyana brittanica, in herb. GH.*

Differt a Rhyncholace hydrocichoria spatha longiore, antheris longioribus et interdum 3-dentatis, stylis longioribus, foliorum furcis saepius numerosioribus, laciniis ultimis pluribus sed brevioribus.

Rhyncholacis palmettifolia v. Royen, var. **rosea.** — cf. p. 99.

Statura mediocris. Folia petiolo cuneato, lamina repetito furcata; laciniis ultimis angustissimis vel filiformibus, acutis, enerviis. Tepalis 12—15; staminibus 12—15; antheris lobulos 2 brevissimos, obtusos instructis; ovario ellipsoideo, 6-costato, costa mediana praesertim apice alata, costis aliis 4 indistinctis; stylis subulatis vel applanatis, apice membranaceis, obtusis, basi 3-gonalibus, cohaerentibus. Fructus ovario similior sed magis attenuatus, basi substipitatus, costa mediana sicut in ovario, costis aliis distinctis apicem versus suturas attingentibus, parte apicali styli decidua; pedicelli apice subcupuliformi.

Typus: *A. C. Smith 2101, in cataractis principalibus, in fluvio Essequibo, Guyana brittanica, in herb. Mo.*

Affinis Rh.brassicifolia sed differt apice antherorum et lobis thecarum basi obtusis, antheris et stylis brevioribus. Differt a typo staminibus numerosioribus, tepalis longioribus, antheris 2-lobulatis, lobis thecarum basi obtusis, stylis brevioribus.

Rhyncholacis unguifera. — cf. p. 100.

Statura mediocris. Folia pluri-furcata, interdum pinnata, pinnis apicem versus attenuatis, lobis ultimis in lacinias angustissimas, acutas, unguiformes divisis. Pedicello apice in discum dilatato, interdum apicem versus alis 2 angustis instructo; tepalis 8—11; staminibus 8—11; antheris obtusis; ovario ellipsoideo, subcostato, costa mediana distincte alata; stylis compressis, obtusis, paulo cohaerentibus, papillatis. Fructus valvis aequalibus, utraque valva 3-costata; stylis filamentis et tepalis marcescentibus.

Typus: *Stradelli 4344, in flumine Uaupès, Brasilia in herb. C.*

Haec species affinis est Rhyncholaci varianti, sed differt pedicello longiore, antheris et stylis brevioribus, laciniis ultimis minoribus et latioribus.

Rhyncholacis nobilis. — cf. p. 100.

Statura mediocris, basi ramosa, cuneiformi, interdum plus minusve elongata. Flores fasciculati; tepalis 7—10; basi cum filamentis connatis; staminibus 7—10; antheris apice emarginatis; ovario ovoideo, 6-costato, costa mediana angusta, costis aliis latis sed paulo prominentibus; stylis apice subulatis, interdum compressis, basi 3-gonalibus. Fructus ovario similior, costa mediana angusta, costa aliis prominentibus, apice stylorum deciduo, pedicello apice cupuliformi.

Typus: *Allen 3215, in cataractis Yuruparu, in fluvio Uaupès, Colombia, in herb. Mo.*

Rh.brassicifolia, Rh.dentata, Rh.palmettifolia, Rh.unguifera similior sed a Rh.brassicifolia, Rh.palmettifolia, Rh.unguifera foliis pluripinnatis non pluri-furcatis et a Rh.dentata divisionibus foliorum ultimis lanceolatis, tepalis plerumque brevioribus, ovario altiore, stylis longioribus recedens. A. Rh.unguifera ad quam maxime accedit insupes divisionibus foliorum ultimis multo brevioribus, costis angustiore distinguenda.

Rhyncholacis guyanensis. — cf. p. 101.

Statura mediocris. Folia pluri-pinnata; laciniis ultimis numerosis, triangularibus, acutis, enerviis. Floribus fasciculatis; tepalis 11—14; staminibus 11—14; antheris obtusis; ovario ellipsoideo, 6-costato, costa mediana alata, costis aliis indistinctis ad suturas approximatis; stylis subulatis, basi anguste 3-gonalibus, rigidis, basi cohaerentibus. Fructus ovario similior, costa mediana distincte alata, costis aliis prominulis ad suturas approximatis.

Typus: *Jenman 7605, in cataractis Big Falls dictis, in fluvio Puruni, Guyana brittanica, in herb. NY.*

Rh.jenmanii simillima sed divisionibus foliorum ultimis plerumque brevioriter ovaria et fructu insuper indistincte costatis, antheris apice obtusis non bidentatis, styli multi longioribus, staminibus numerosioribus ab ea distinguenda.

Rhyncholacis minor. — cf. p. 102.

Statura parva. Folia identidem furcata vel pinnata; segmenta ultima lanceolata, acuta. Flores fasciculati; tepala 6—11; stamina 6—11; antherae, truncatae vel obtusae; ovarium ovoideum ad ellipsoideum, costa mediana angustissime alata, costis alliis suppressis; styli subulati, basi trigonales, liberi. Fructus ovario similior.

Typus: *Huber s.n., e Brasilia in herb. C, dupl, in U.*

Rh.brassicifoliae similior sed ab ea dimensionibus minoribus partium omnium, ovario non costato, pedicello apice non dilatato recedens.

Rhyncholacis dentata. — cf. p. 102.

Statura mediocris. Folia multipinnata; laciniis ultimis triangularibus, acutis, nervatis, brevissimis, in speciminibus sterilibus asperioribus et latioribus. Tepalis 7—10; staminibus 7—12; antheris obtusis, integris, emarginatis vel 2-denticulatis; ovario ovoideo, 6-costato, costa mediana saepe apice tantum distincte alata, costis aliis basi distinctis; stylis subulatis, acutis vel obtusis et sub emarginatis, basi cohaerentibus. Fructus ellipsoideus, acutus, breviter stipitatus, costa mediana distinctissima, costis aliis indistinctis et ad suturam approximatis; stylis marcescentibus coronatus; pedicello apice subtubuliformi.

Typus: *Geyskes 1016, in cataractis Tonckens dictis, in flumine Coppename, Suriname, in herb. U.*

Hac species differt a congeneribus foliorum laciniis ultimis triangularibus, brevissimis, dentiformibus.

Rhyncholacis applanata Goebel, var **laxipinnata.** — cf. p. 103.

Statura mediocris. Folia pluri-pinnata; laciniis ultimis lanceolatis, subfiliformibus, enerviis. Flores fasciculati; tepalis 12—18, squamiformibus, ovatis vel lanceolatis, interdum 2 vel 3 connatis, acutis, apicibus 1 vel 2; staminibus 12—18 antheris, apice bidentatis; ovario ovoideo vel ellipsoideo, 6-costato, costa mediana angustissime alata, costis aliis 4 vix prominulis, ad suturas approximatis; stylis clavatis, apice applanatis, basi anguste 3-gonalibus et ibi paulo cohaerentibus. Fructus ovario similior, sed costis distinctioribus, costa mediana distincte alata, utraque valva 3-costata, costis marginalibus interdum distinctis.

Typus: *Jenman 7612, in cataractis Waramboo dictis, in fluvio Mazaruni, Guyana brittanica, in herb. U.*

Rhyncholacis oligandra Weddell, var. **tenella.** — cf. p. 105.

Recedit a typo laciniis ultimis brevioribus (longitudine 2 mm haud excedentibus), tepalis (2—5) staminibusque (2—4) paucioribus, staminibus insuper longioribus (usque ad 4.5 mm longis), tepalis staminibusque verticillo incompleto dispositis, ovario altiore et latiore (3—4 mm alto et 1—1.5 mm diam.) carpelli costa mediana valde inconspicua, stylis longioribus, subulatis, flaccidis (usque ad 1 mm longis) et ala distincta quae pro genere Rhyncholaci characteristica in carpelli costam medianam decurrentibus.

Typus: *Sandwith 1263, in cataractis Waratuk dictis fluminis Potaro, Guyana brittanica, in herb. K.*

Rhyncholacis cristata. — cf. p. 106.

Statura mediocris. Folia basi distincte cristato, lamina pluripinnata, laciniis ultimis numerosis, lanceolatis, nervatis. Flores fasciculati, pedicello apice

dilatato; tepalis 10—14; staminibus 10—14; antheris apice 2-dentatis; ovario ovoideo, costa mediana angustissima, costis 4 aliis angustis sed distinctis, ad suturas approximatis; stylis subulatis, obtusis. Fructus ovario similior.

Typus: *Hulk s.n., Upper Gran Rio, Suriname, in herbario U.*

A congeneribus omnibus Rh.carinata sola excepta petiolis dorso conspicue cristatis diversa, a Rh.carinata laciniis foliorum ultimis haud filiformibus sed lineari-lanceolatis (0.2—0.5 mm latis) distinguenda.

Rhyncholacis brevistamina. — cf. p. 107.

Statura mediocris. Folia identidem pinnata; segmenta ultima lanceolata, enervia. Flores fasciculati; tepala 10—12; stamina 10—12; antherae apice bidentatae; ovarium ellipsoideum, costa mediana distincte alata, costis 4 aliis vix conspicuis, ad suturas approximatis; styli, acuti, 3-gonales. Fructus ovario similior.

Typus: *Jenman 4152 in K, in Guiana brittanica lectum in flumine Demerara superiore.*

Species haec longitudine staminum quae ovario aequilonga vel eo breviora sunt, facile distinguenda est.

Rhyncholacis flagellifolia. — cf. p. 108.

Statura parva vel mediocris. Folia pluripinnata; laciniis ultimis filiformibus, acutis. Tepalis 7—9; staminibus 7—9; antheris apice dentibus 2 distinctis sed brevibus, aequalibus vel, inaequalibus; ovario ellipsoideo, 6-costato, costis medianis distincte alatis, aliis ad lineas 4 vix distinctas redactis; stylis apice subulatis basi anguste 3-gonalibus, alis 2 angustissimis instructis, non vel paulo cohaerentibus. Fructus ovario similior, valvis 2 aequalibus, utraque valva costas 3 instructa, costis medianis distincte alatis, aliis prominulis apicem versus suturas attingentibus, pedicello apice paulo incrassato.

Typus: *Ule 7965, in flumine Surumu dicto, Amazonia Brasilia septentrionalis, in herb. L.*

Rh.guyanensis et ad Rh.jenmanii similior sed divisionibus foliorum ultimis filiformibus et longioribus ab eis recedens. A.Rh.apiculata numero minore staminum et absentia loborum attenuatorum in specie hac utroque latere petioli insertorum diversa. Folia rache anguistissima flexuosa et divisionibus foliorum ultimis numerosioribus et fasciculatis faciliter cognoscenda.

Rhyncholacis jenmanii Engler, forma **laciniata** v. Royen. — cf. p. 110.

Var. jenmanii similior sed carpelli costa mediana vix conspicue alata, costis aliis dilatatis, prominulis ab ea faciliter distinguenda; styli insuper breviores, tepala staminaque basi connata.

Typus: *Tutin 648, in cataractis Kaieteur dictis, in flumine Potaro, Guyana brittanica, in herb. U.*

Rhyncholacis jenmanii Engler, forma **dolichophylla** v. R. — cf. p. 110.

Forma antheras duplo longiores quam forma laciniata possedet.

Typus: *Jenman 7419, Guyana brittanica, summa cataracta Kaieteur dicta, in flumine Potaro, in herb. B.*

Rhyncholacis apiculata. — cf. p. 111.

Statura mediocris. Folia multipinnata; basi dilatata et utroque latere in lobam apicem versus attenuatum obtusum producta, laciniis ultimis plurimis angustissimis, acutis. Flores fasciculati; tepalis circ. 18; staminibus 25—30, antheris 1 vel 2 acuti-dentatis; ovario ovoideo vel ellipsoideo, compresso, 6-costato, costis medianis distincte alatis, praecipue apice, costis aliis prominentibus apicem non attingentibus; stylis juvenilibus deflectis, subulatis, apice applanatis, emarginatis, basi anguste triangularibus. Fructus ovario similior, valvis 2

aequalibus, utraque distincte 3 costata, costa mediana alata, costis aliis angustis, prominentibus.

Typus: *Jenman 7615, in cataractis Caburi, in flumine Puruni, Guyana brittanica, in herb. U.*

A congeneribus omnibus staminibus numerosis necnon lobis attenuatis utroque latere petioli insertis faciliter distinguendus. Forma foliorum Rh.flagellifolia similior.

Jenmaniella fimbriata. — cf. p. 122.

Statura parva, acaulis. Folia repetito furcata vel pinnata, laciniis ultimis fere filiformibus, acutis, enerviis, petiolo in sectione transversa rhombiformi, basi dilatato, parte superiore interdum unilateraliter cristata. Flores pauci; tepalis 4; staminibus 3; antheris mucronatis, introrsis; ovario ellipsoideo, costis 6-distinctis prominulis; stylis subulatis, paulo compressis, papillatis interdum apice dilatatis et emarginatis. Fructus ovario similior, utraque valva costis 3 distinctis ornata, costis marginalibus indistinctis.

Typus: *Huber 1816, Brasilia, in herb. Gen.-Boiss.*

J.varianti similior sed ab ea granulis pollinis multo majoribus, stylis longioribus, laciniis ultimis filiformibus recedens.

Jenmaniella isoetifolia. — cf. p. 124.

Statura pusilla, acaulis. Folia filiformia, apice in pinnas paucas semel vel bis-furcatas exeuntia. Tepalis 2 vel 3, si 3, tertio dorso staminis inserto, filiformibus; stamine 1; anthera acuta, basi penito incisa, extrorsi; ovario ellipsoideo vel ovoideo, indistincte 6-costato; stylis subulatis, obtusis. Fructus utraque valva 5-costata, sed costis 2 indistinctissimis, gynophoro teteti elatus.

Typus: *Jenman 7417, summa cataracta Kaieteur in flumine Potaro, Guyana brittanica, in herb. U.*

Hac species affinis est Jenmaniella varianti, sed differt foliis longioribus et staminibus extrorsis.

Jenmaniella ceratophylla Engler, **var. parva.** — cf. p. 125.

Statura pusilla, acaulis. Folia repetito furcata vel pinnata, pinnis bifurcatis, nervo mediano prominenti in foliis supremis stipulam triangularem, acutam, intrapetiolarem gerente, laciniis ultimis numerosis, filiformibus. Tepalis 2 vel 3; staminibus 1 vel 2; antheris subacutis, extrorsis; ovario ellipsoideo, sutura prominula, costis duplicibus carpellis aequalibus vel inaequalibus; stylis subulatis, obtusis, papillatis, liberis. Fructus maturus ignotus.

Typus: *Othmer s.n., in flumine Caroni, in ostio Curapacay, Venezuela, in herb. B.*

Differt ab var. ceratophyllae laciniis ultimis numerosioribus, filiformibus, brevioribus.

Macarenia gen. nov. — cf. p. 125.

Herbae parvae acaules foliis identidem pinnatis, basi stipula intrapetiolari instructis. Flores 10—20 in spathellam communem coriaceam inclusi; spathae fasciculatae vel solitariae, quaque spatha basi stipulis duabus membraneis circumdata. Tepala 3—5 in verticillum subcompletum vel incompletum disposita; stamina 2—4 basi breviter connata, unilateraliter aggregata, antheris introrsis sagittatis; granula pollinis ellipsoidea, 3-sulcata; ovarium biloculare, carpellis duobus aequalibus 3-costatis; styli 2, subulati. Fructus aequaliter 2-valvatus, utraque valva costis 5 ornata.

Typus: *Macarenia clavigera v. Royen.*

Distributio: genus adhuc monotypicum in fluminibus Colombiae quae a montibus Macarenensibus ad septemtriones et ad occasum descendunt endemicum.

Genus hoc floribus numerosis intra spatham communem inclusis a generibus Podostemacearum aliis differt.

Macarenia clavigera v. Royen. — cf. p. 126.

Basis forma variabili. Folia identidem pinnata; segmenta ultima linearia, acuta, nervo distincto munita. Spathellae nunc solitariae, nunc 2 vel 3 fasciculatae, pedunculus teres, subulatus, tenacior, pauco umbilicatus, leavis, basi stipulis duabus circumdantibus; flores ipsi spathella carentes. Tepala 3—5; stamina 2—4; antherae truncatae vel obtuse bilobatae; ovarium ellipsoideum ad obovoideum; styli subulati, obtusi, papillati. Fructus ovario similior, 6-costatus.

Typus: *Philipson c.s. 1724 in BM, "El Mico Airstrip a montibus Macarenentibus ad septemtriones, Colombia.*

Haec species fide Philipson in fluminibus a Montibus Macarenensibus ad septemtriones et ad occasum descendentibus.

Rhyncholacis carinata v. Royen. — cf. p. 106.

Statura mediocris; basi ramosa vel non ramosa, carnosa. Folia sessilis vel petiolo carnoso, compresso, dorso distincte carinato instructa; multipinnata rache compressa, axillis pinnarum membranaceo-dilatatia; laciniis ultimis numerosis filiformibus. Flores multi, fasciculati; pedicello apice paulo dilatato; spathe juvenili angustissime clavata, acuminata vel obtusa, apice papillata; matura anguste tubuliformi; tepalis 8—10, lanceolatis; antheris obtusis vel apice obtuse 2-lobulatis, angustis; ovario ellipsoideo, obtuso, basi subattenuato, compresso, 6-costato, costa mediana distincte alata, costis aliis indistinctis vel nullis; stylis spathulatis vel clavatis, obtusis vel emarginatis, paulo papillatis. Fructus ovario similior; utraque valva distincte 3-costata, apice stylorum deciduo.

Typus: *Goeldi s.n., in flumine Gounany, Guyana brasiliana, in herb. hauniensi.*

Rh.cristatae petiolo distincte cristato similima sed ab ea divisionibus foliorum ultimis multi angustioribus et subfiliformibus distinguenda.

LIST OF COLLECTORS' NUMBERS.

The collectors' numbers are printed in italics; the numbers in parentheses are the pages on which the concerning collectors' numbers are cited. S.n.: unnumbered specimens.

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GENERAL INDEX.

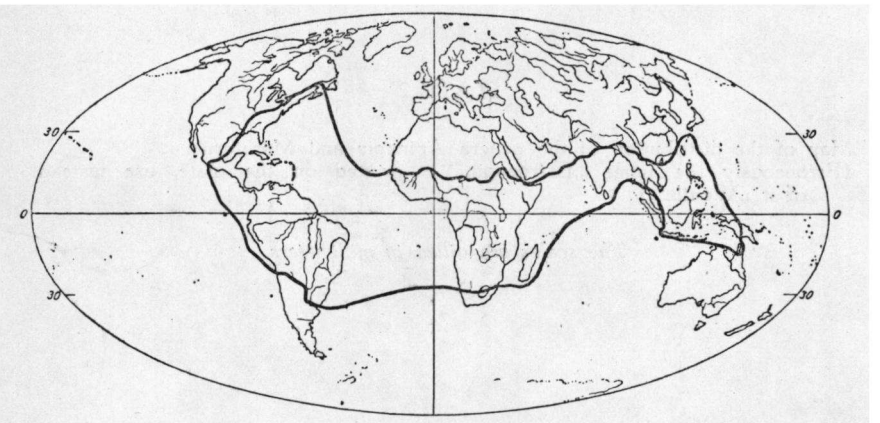
Synonyms are printed in *italics;* new sections, species, varieties, forms, and combinations are printed in **bold** face type; previously published names in ordinary type.

Dutch Summary.

In deze publicatie is een deel der Amerikaanse Podostemaceae van de onderfamilie Podostemoideae opgenomen nl. de nauw verwante geslachten Apinagia, Marathrum, Rhyncholacis, Wettsteiniola, Lophogyne, Monostylis, Jenmaniella en het nieuwe geslacht Macarenia.

Nagegaan wordt waarom deze geslachten verwant zijn. Uit het onderzoek is gebleken dat de geslachten Apinagia en Oenone, zoals die beschreven werden door Tulasne in 1852, niet als twee afzonderlijke geslachten gehandhaafd kunnen blijven. De indeling van de onderfamilie Podostemoideae, zoals Engler die in 1930 gaf, is gewijzigd in die zin dat de subtribus Mourerinae tot tribus is verheven en de subtribus Apinagiinae en Marathrinae met de tribus Eupodostemeae tot één tribus Eupodostemeae verenigd zijn. In het beschrijvende deel zijn de beschrijvingen van de soorten opgenomen met gegevens over type, verspreiding en vindplaatsen. Tabellen ter determinatie van dè soorten zijn opgenomen. 1 Nieuw geslacht, 30 nieuwe soorten, 8 variëteiten en 2 vormen zijn beschreven. Aan deze beschrijvingen zijn de Latijnse beschrijvingen toegevoegd terwijl 16 pagina's afbeeldingen van de nieuwe soorten en van enige oudere soorten geven.

Een literatuurlijst welke alleen de Amerikaanse en de algemene literatuur omvat maken een nadere studie van deze familie mogelijk op die gebieden die in deze publicatie niet behandeld zijn.



a. Distribution of the Podostemaceae:

PLATE 2

Map of the distribution of the genera Apinagia and Marathrum.
(Erroneously the name „**Extronagia**" is printed on the plate, use instead of it „**Wentia**".)

The scales are given in millimeters.

PLATE 2


MARATHRUM
APINAGIA - groups typified by:
A. longifolia
A. crispa
A. richardiana
A. membranacea
Section Extronagia
INTERMEDIATE SPECIES
(Which obscure the limit between Apinagia and Marathrum)

PLATE 3

1—4. **Apinagia kochi** (Engler) v. Royen (Koch-Grünberg 10).
1. fruit.
2. leaf with young tufts of threads.
3. habit.
4. young thread.
5—7. **Apinagia corymbosa** (Tul.) Engler var. **capillarifolia** (Engler) v. Royen (Ule 30).
5. flower.
6. one leaf.
7. young flower enclosed by 2 leaves.
8—13. **Apinagia exilis** (Tul.) v. Royen (Stahel 7000).
8. habit.
9. flower.
10. young fruit.
11. styles.
12—13. young pollen grains.
14—16. **Apinagia pilgeri** Mildbraed (Pilger 834).
14. young flower between 2 leaves
15. flower.
16. habit.

The scales are given in millimeters.

PLATE 3

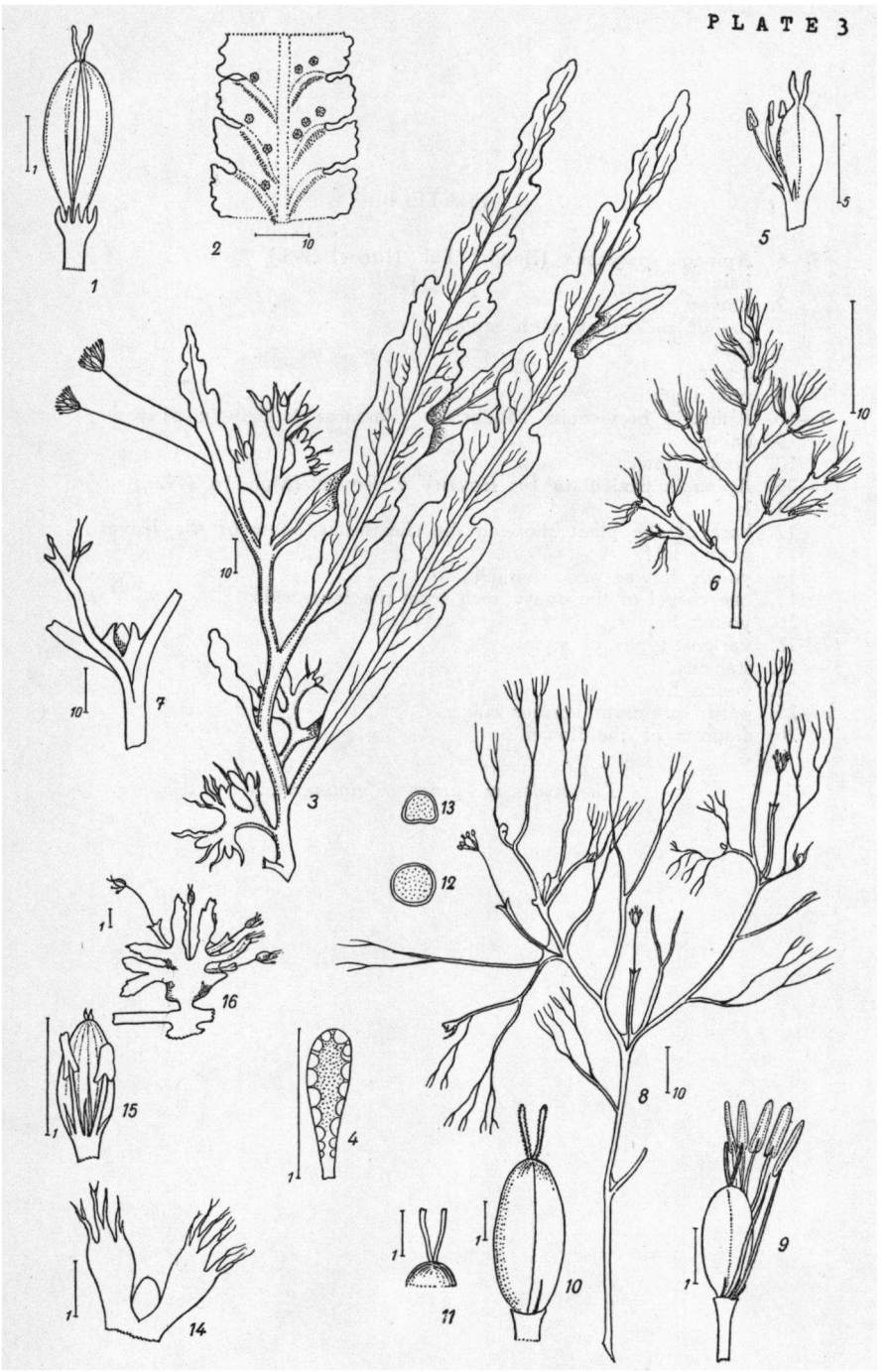


PLATE 4

1—8. **Apinagia pygmaea** (Bong.) Tul. (Riedel 393.)
1. habit.
2. flower.
3. top of the ovary with styles.
4. fruit.
5—6. stamens.
7—8. pollen grains.
9—10. **Apinagia brevicaulis** Mildbraed (Passarge & Selwyn 814).
9. habit.
10. young flower.
11—26. **Apinagia penicillata** (v. Royen) v. Royen (Maguire 24927).
11. leaf.
12. base of the plant showing the sheath-like bases of the leaves.
13. young leaf.
14. young flower and spathella.
15. one carpel of the ovary seen from the inner side.
16. young flower.
17—18. various types of styles.
19—21. stamens.
22. young flower.
23—25. pollen grains in various stages.
26. diagram of the flower.

The scales are given in millimeters.

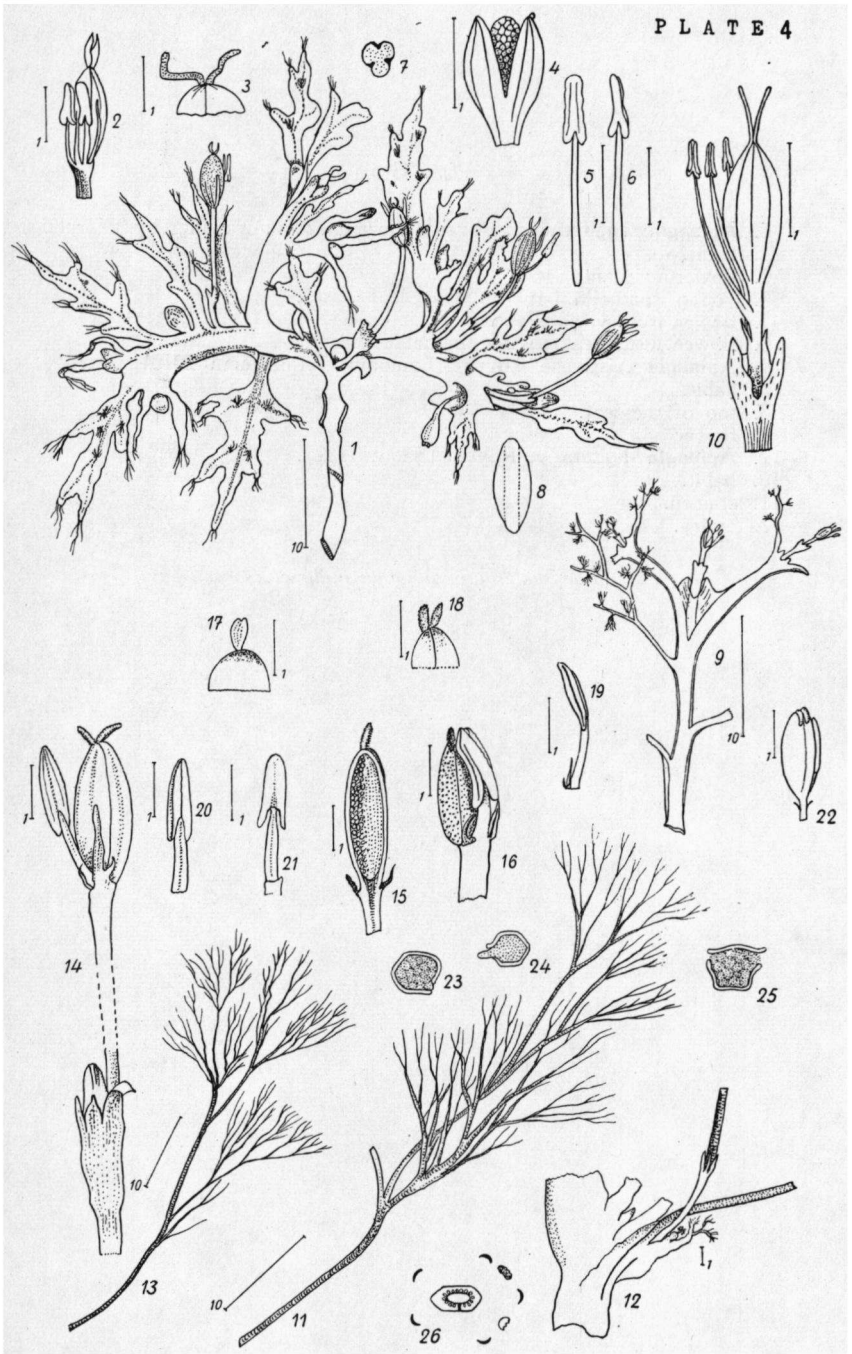


PLATE 4
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PLATE 5

1—6. **Apinagia rangiferina** v. Royen (Glaziou 22001, drawings by Warming).
1. habit.
2. flowering plant.
3. young spathella between two leaf bases.
4—5. flower from various sides.
6. flower just breaking the spathella.
7—9. **Apinagia crispa** v. Royen (Lanjouw & Lindeman 2010).
7. habit.
8. top of the leaf.
9. flower
10—12. **Apinagia digitata** v. Royen (Sagot 1112).
10. habit.
11. stamen.
12. ovary.

The scales are given in millimeters.

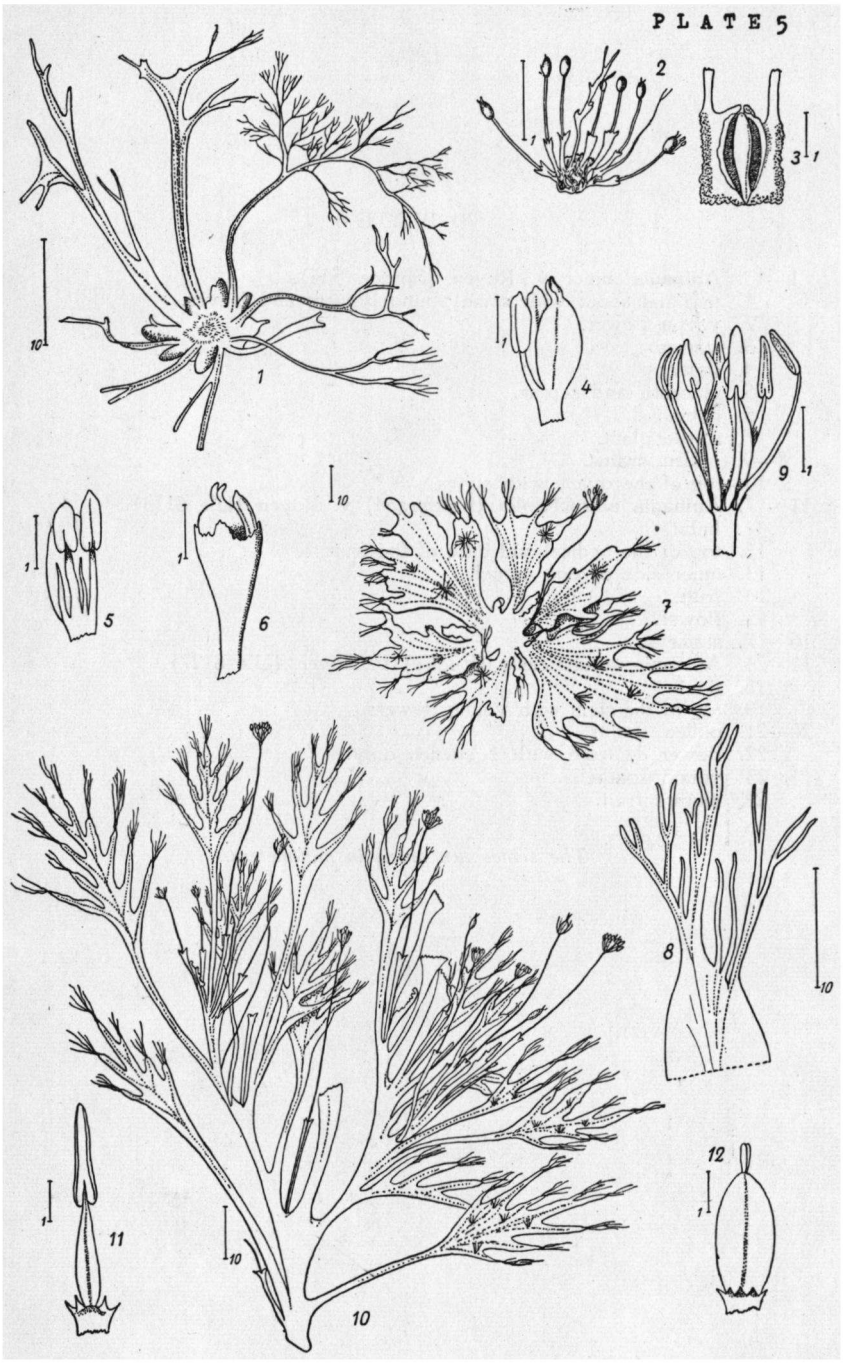
PLATE 5
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PLATE 6

1—10. **Apinagia minor** v. Royen (Spruce 555).
1. terminal shoot with some young flowers and leaves.
2. young flower.
3. stamen.
4. flower
5. placenta and septae.
6. habit.
7. sterile plant.
8—9. pollen grains.
10. top of the ovary with styles.
11—17. **Apinagia batrachifolia** (Mildbraed) v. Royen (Ule 6113).
11. habit.
12. top of the pedicel and base of the fruit.
13. inner side of one carpel.
14. fruit.
15. flower.
16—17. stamens.
18—24. **Apinagia surumuensis** (Engler) v. Royen (Ule 8127).
18. habit.
19. top of the stem with young flowers.
20—21. pollen grains.
22. flower depicted with 1 stamen only.
23. young spathella.
24. mature fruit.

The scales are given in millimeters.

PLATE 6

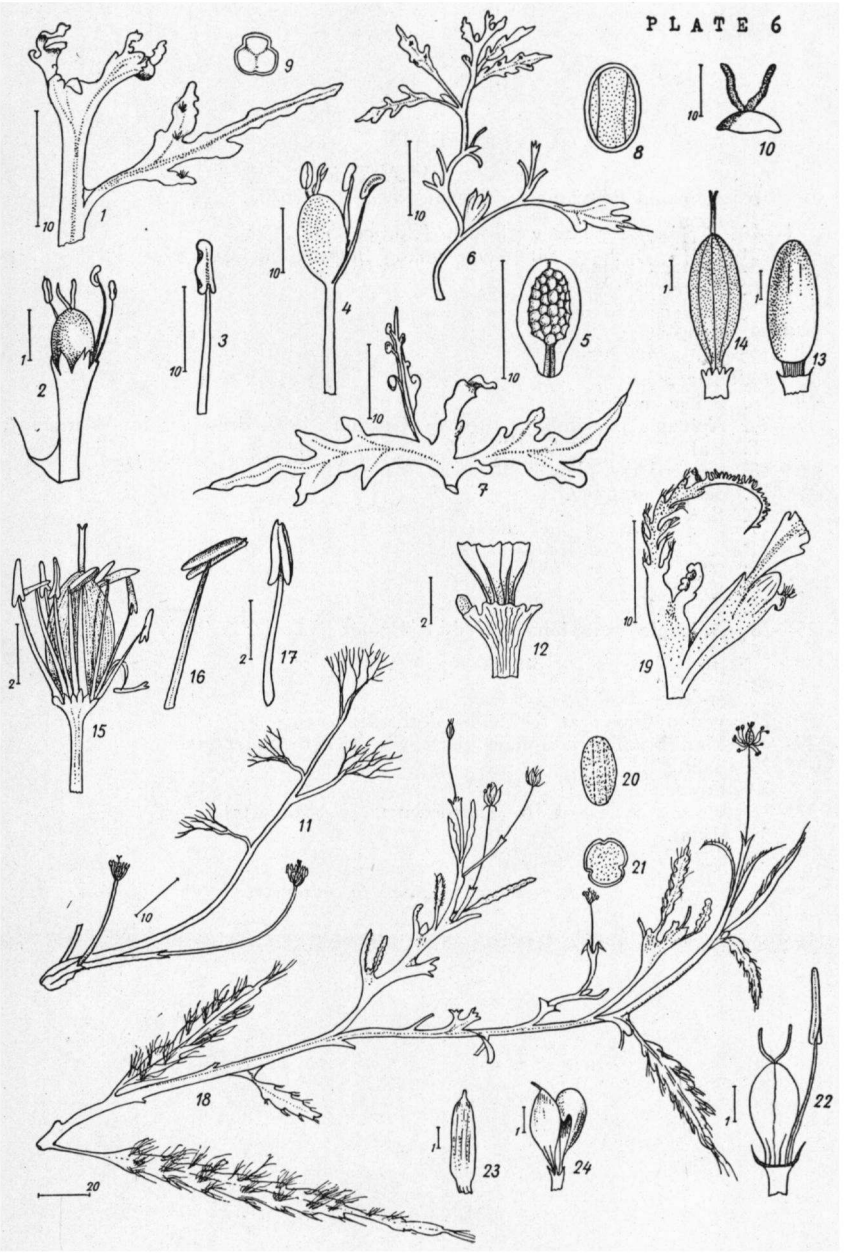

PLATE 7

1—16. **Apinagia boliviana** v. Royen (Williams 1570).
1. habit.
2. idem.
3. primary pinna.
5—6. flower.
7. stamens and tepals.
8—9. stamens.
10—12. styles.
13. placenta.
14—16. pollen grains.
17—24. **Apinagia parvifolia** v. Royen (Glaziou 21992, drawings by Warming).
17. leaf.
18. base of the plant with some leaves.
19. petiole of a leaf.
20. flower.
21. fruit.
22. flower.
23. styles.
24. young flower.
25—28. **Apinagia peruviana** (Wedd.) Engler (Lechler 2298).
25. habit.
26. flower.
27. androceum.
28. young flower at the base of the leaf.
29—34. **Marathrum striatifolium** v. Royen (Weberbauer 6426).
29. habit.
30. flower.
31—33. various types of the androeceum.
34. styles.

The scales are given in millimeters.

PLATE 7

PLATE 8

1—2. **Marathrum aeruginosum** v. Royen (Steyermark 58428).
1. habit.
2. base of two leaves and one spathella.
3—6. **Apinagia platystigma** v. Royen (v. Lutzelburg 20224).
3. habit.
4. leaf
5—6. two various types of styles.
7—9. **Apinagia arminensis** v. Royen (Lanjouw 536).
7. habit
8. top of young leaf.
9. stamen.
10—12. **Apinagia fluitans** v. Royen (Baldwin 2996).
10. top of a branch with some flowers.
11. flower.
12. fruit
13—17. **Apinagia fimbrifolia** v. Royen (Glaziou 21982).
13. ultimate pinna of a leaf.
14. ultimate divisions.
15. base with some flowers.
16—17. flowers.

The scales are given in millimeters.

PLATE 8

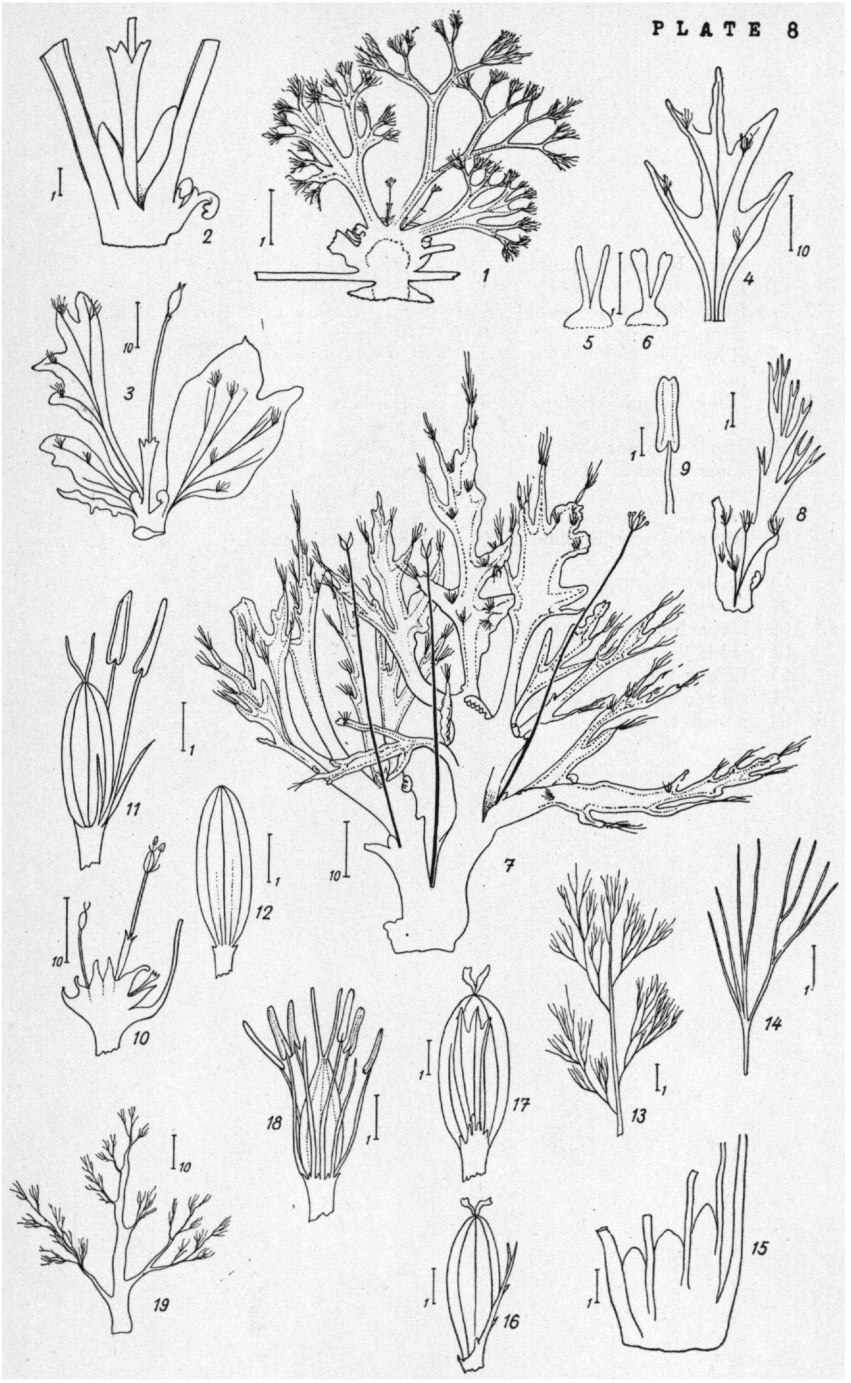

PLATE 9

1. **Rhyncholacis unguifera** v. Royen (Stradelli 4344).
1. habit.

2—4. **Rhyncholacis jenmanii** Engler forma **laciniata** v. Royen (Tutin 648).
2. ultimate pinna.
3. flower.
4. pollen grain.

5—7. **Rhyncholacis cristata** v. Royen (Hulk s.n.).
5. part of the base with some flowers.
6. ultimate pinna.
7. some bases of leaves.
8. flower.
9. ultimate pinnae.

10—12. **Rhyncholacis applanata** Goebel var. **laxipinnata** v. Royen (Jenman 7612).
10. flower.
11. ultimate pinnae.

12—16. **Rhyncholacis flagellifolia** v. Royen (Ule 7965).
12. habit
13. flower.
14. stamen.
15—16. pollen grains.

The scales are given in millimeters.

PLATE 9

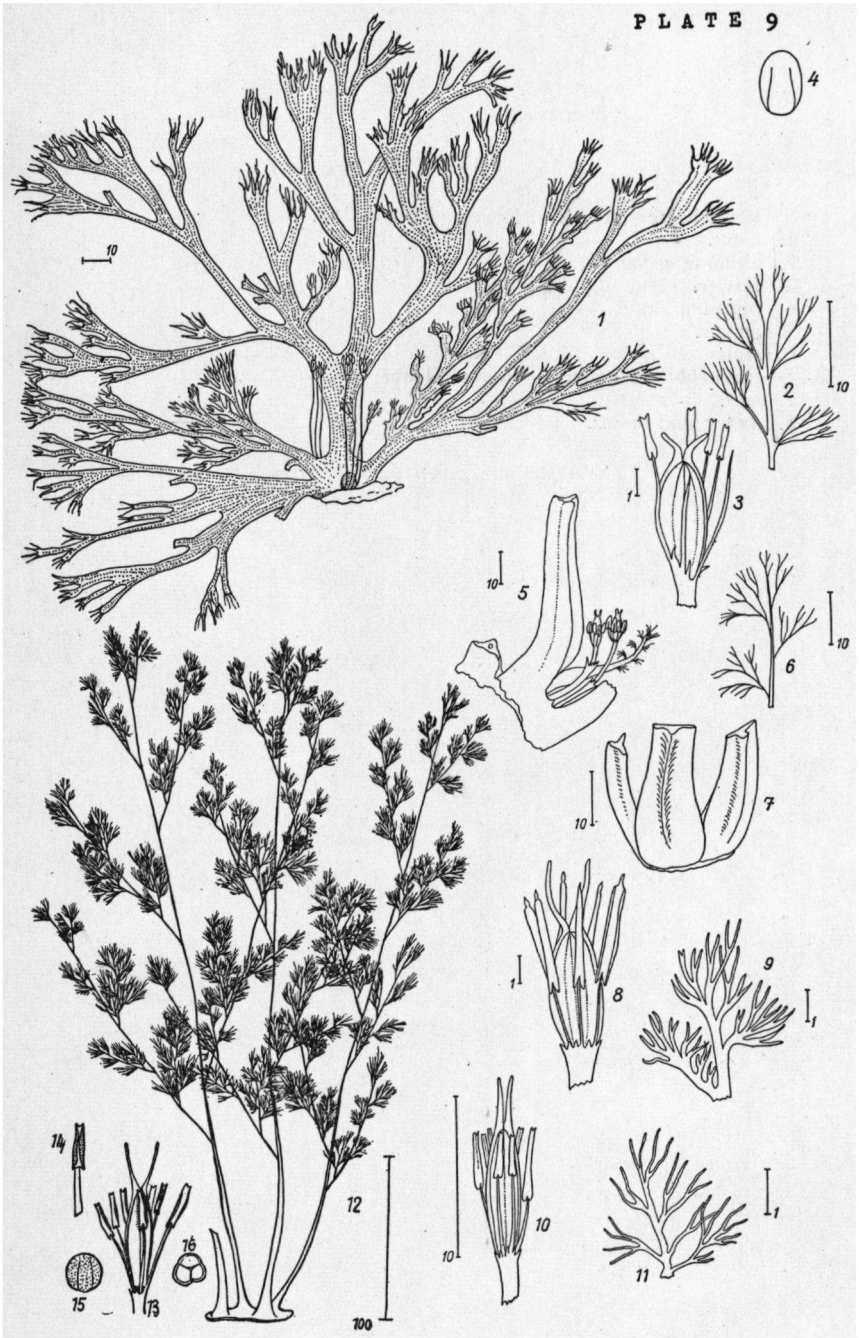

PLATE 10

1—6. **Rhyncholacis nobilis** v. Royen (Allen 3215).
1. habit.
2. ultimate segments.
3. flower.
4. pollen grain.
5. anther.
6. styles.

7—8. **Rhyncholacis minor** v. Royen (Huber s.n.)
7. leaf.
8. ovary and tepals.

The scales are given in millimeters.

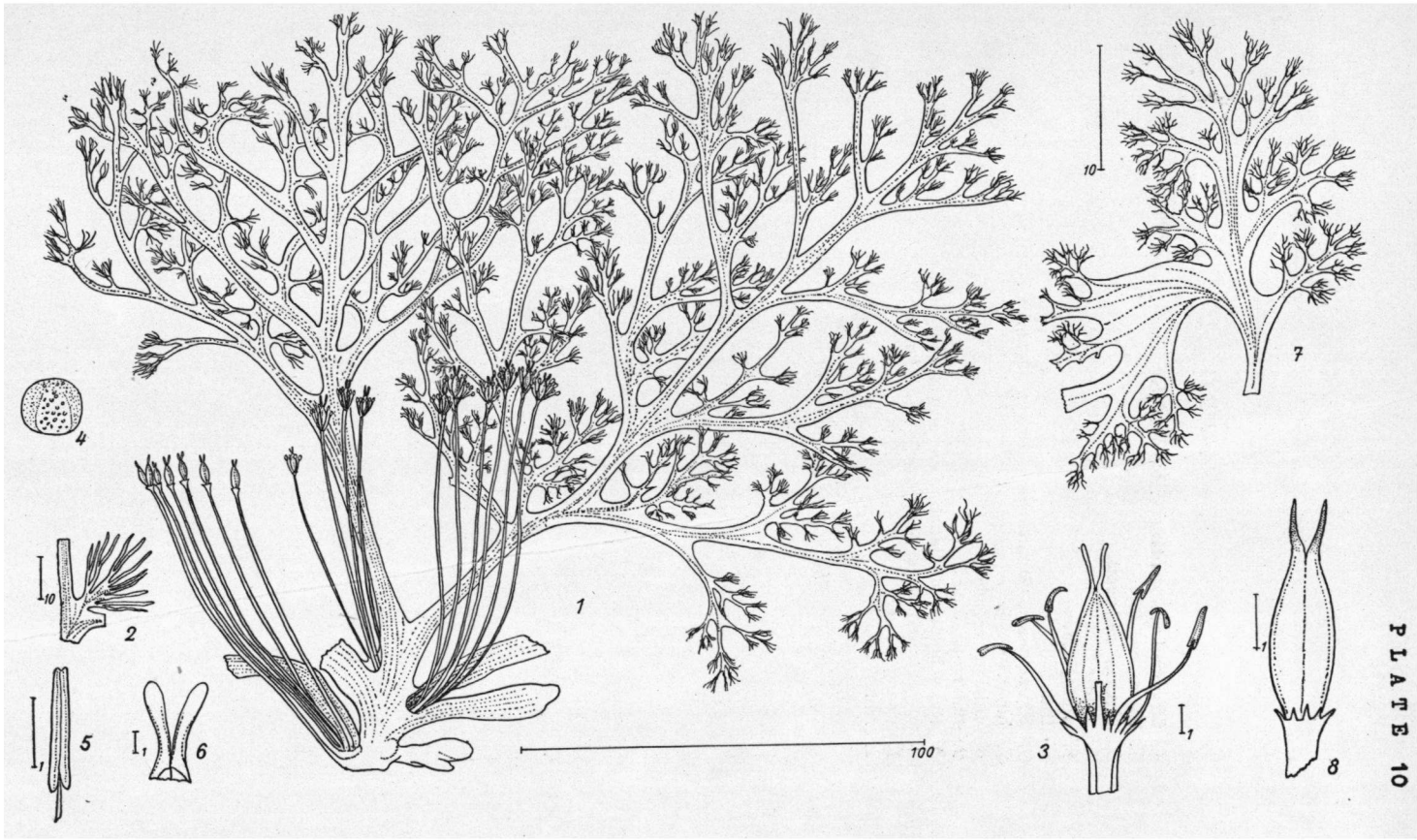

PLATE 10

PLATE 11

1—6. **Rhyncholacis dentata** v. Royen (Geyskes 1016).
1. habit.
2—3. ultimate segments.
4. young spathella.
5. young flower
6. fruit.
7—9. **Rhyncholacis guyanensis** v. Royen (Jenman 7605).
7. habit.
8. ultimate segments.
9. flower.
10—12. **Rhyncholacis applanata** Goebel (Goebel 54).
10. ultimate segments
11. young flower.
12. fruit.

The scales are given in millimeters.

PLATE 11

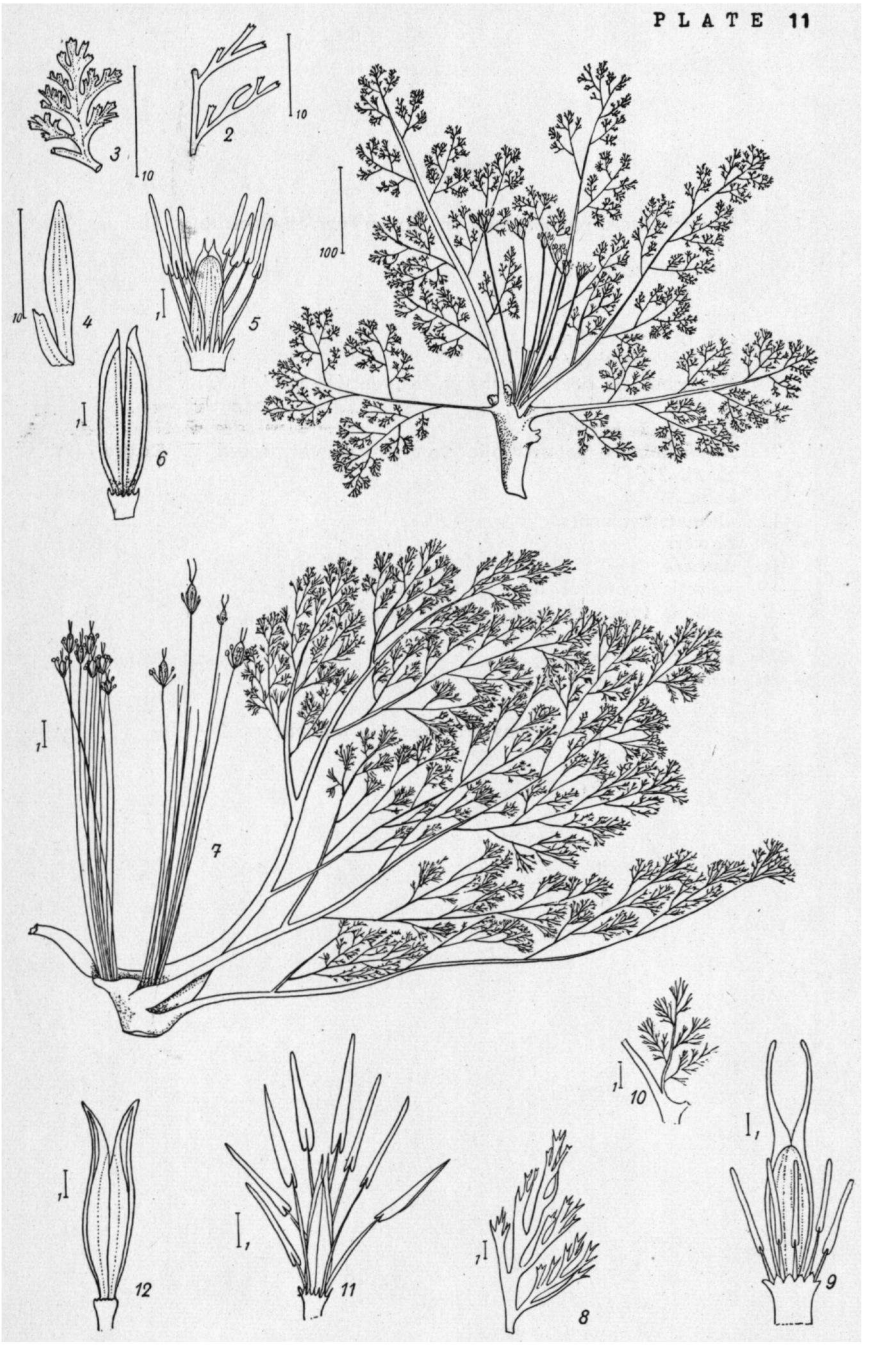

PLATE 12

1—8. **Rhyncholacis palmettifolia** v. Royen var. **palmettifolia** (Linder 59).
1. habit.
2. ultimate segments.
3. flower.
4—5. tepals.
6—7. top of the anthers.
8. base of the thecae.
9—10. **Rhyncholacis brevistamina** v. Royen (Jenman 4152).
9. flower.
10. ultimate segments.
11—26. **Rhyncholacis palmettifolia** van Royen var. **rosea** v. Royen (A. C. Smith 2101).
11. habit.
12. ultimate segments.
13—14. flowers.
15—16. anthers.
17—19. various types of tops of the anthers
20—21. various types of bases of the thecae.
22—23. pollen grains
24. base of the fruit.
25—26. styles of various types.

The scales are given in millimeters.

PLATE 12

PLATE 13

1—10. **Rhyncholacis brassicifolia** v. Royen (Cuatrecasas 6986).
1. habit.
2. ultimate segments.
3. flower.
4—6. anthers.
7—8. pollen grains.
9. styles.
10. fruit.
11—17. **Rhyncholacis apiculata** v. Royen (Jenman 7615).
11. habit.
12. juvenile spathella.
13. styles.
14—15. various types of tops of the anthers.
16—17. pollen grains.

The scales are given in millimeters.

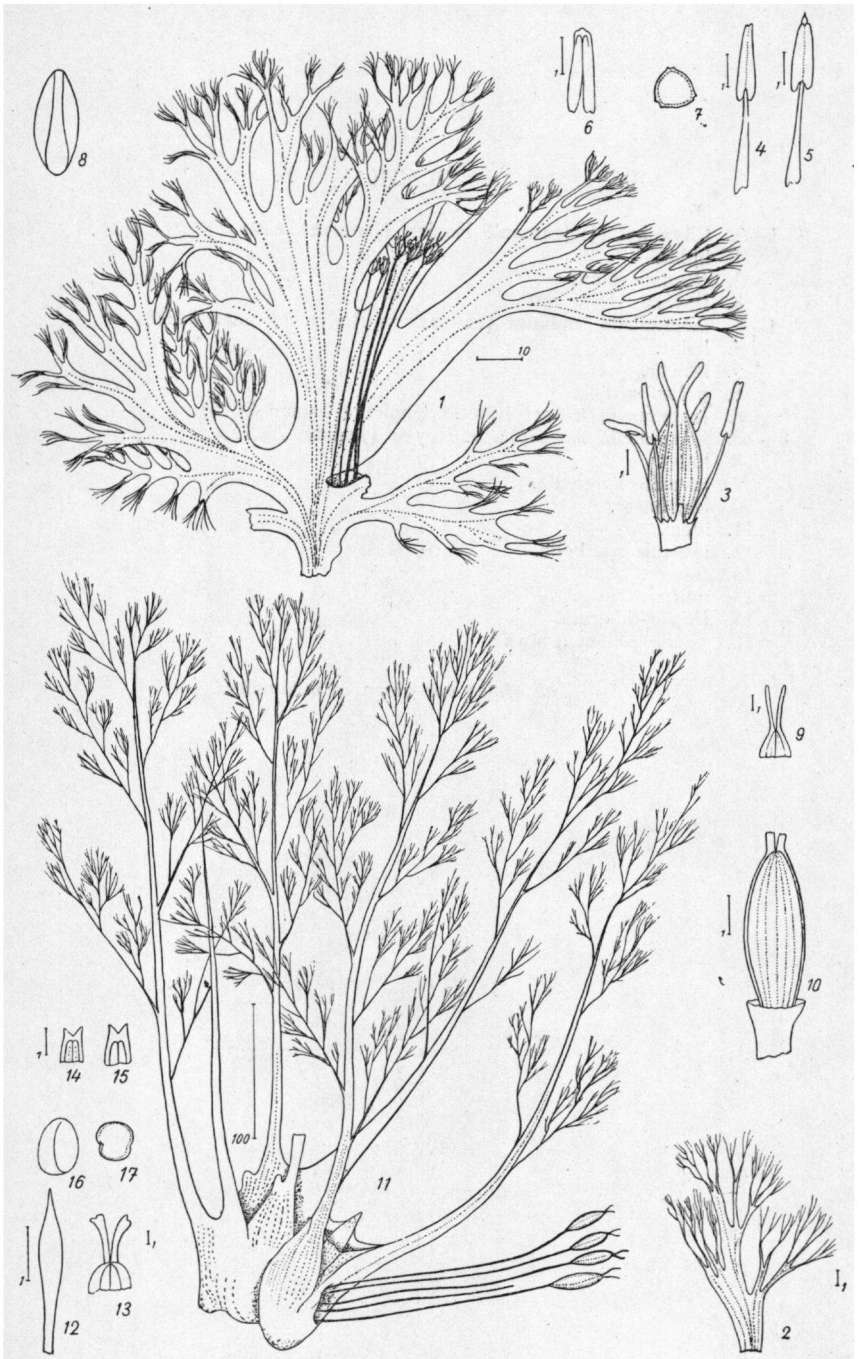
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PLATE 14

1—3. **Rhyncholacis jenmanii** Engler (Jenman 7420).
1. habit.
2. ultimate pinna.
3. flower.
4—6. **Jenmaniella jenmanii** (Engler) v. Royen (Jenman 7418).
4. habit.
5. flower.
6. pollen grains.
7. **Jenmaniella tridactylitifolia** Engler (Jenman 7616).
8—16. **Jenmaniella isoetifolia** v. Royen (Jenman 7417).
8. habit.
9. juvenile spathella.
10. leaf-bases.
11. idem.
12. juvenile spathella.
13. flower.
14. anther.
15. flower-diagram.
16. young pollen grains.

The scales are given in millimeters.

PLATE 14

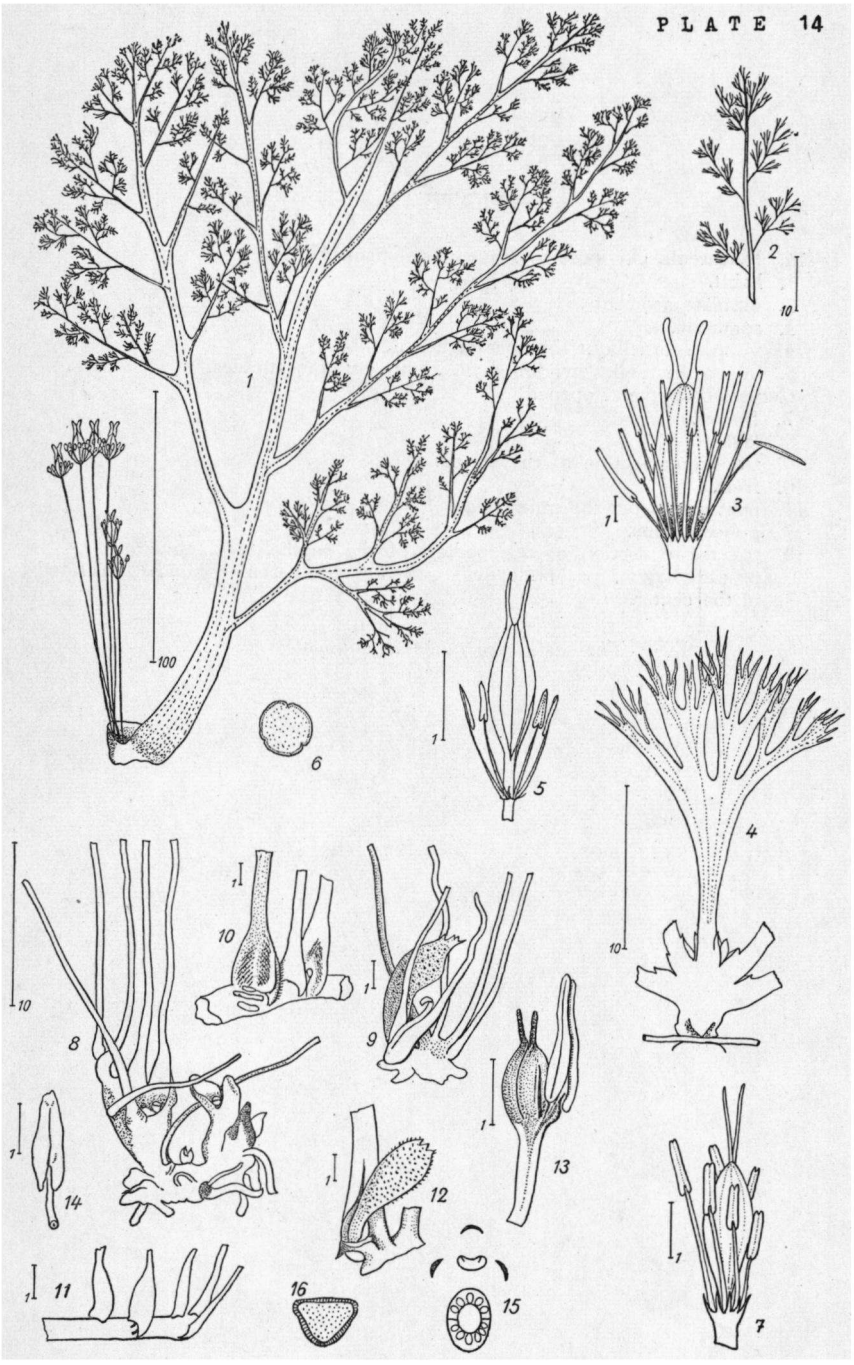

PLATE 15

1—14. **Macarenia clavigera** v. Royen (Philipson 1724).
1. habit.
2. ultimate segments.
3. spathella.
4. young spathella at the base of a leaf.
5. young spathella enveloped in 2 intrapetiolar stipules.
6. young spathella opened.
7. flower.
8. idem.
9. transverse section of the ovary.
10. fruit.
11. fruit seen from the inner-side.

12—13. pollen grains.

14. transverse section of the pedicel of the spathella; e. epidermis, p. parenchym, pe. pericykel, cvb. central vascular bundle lacerated in the center.

The scales are given in millimeters.

PLATE 15

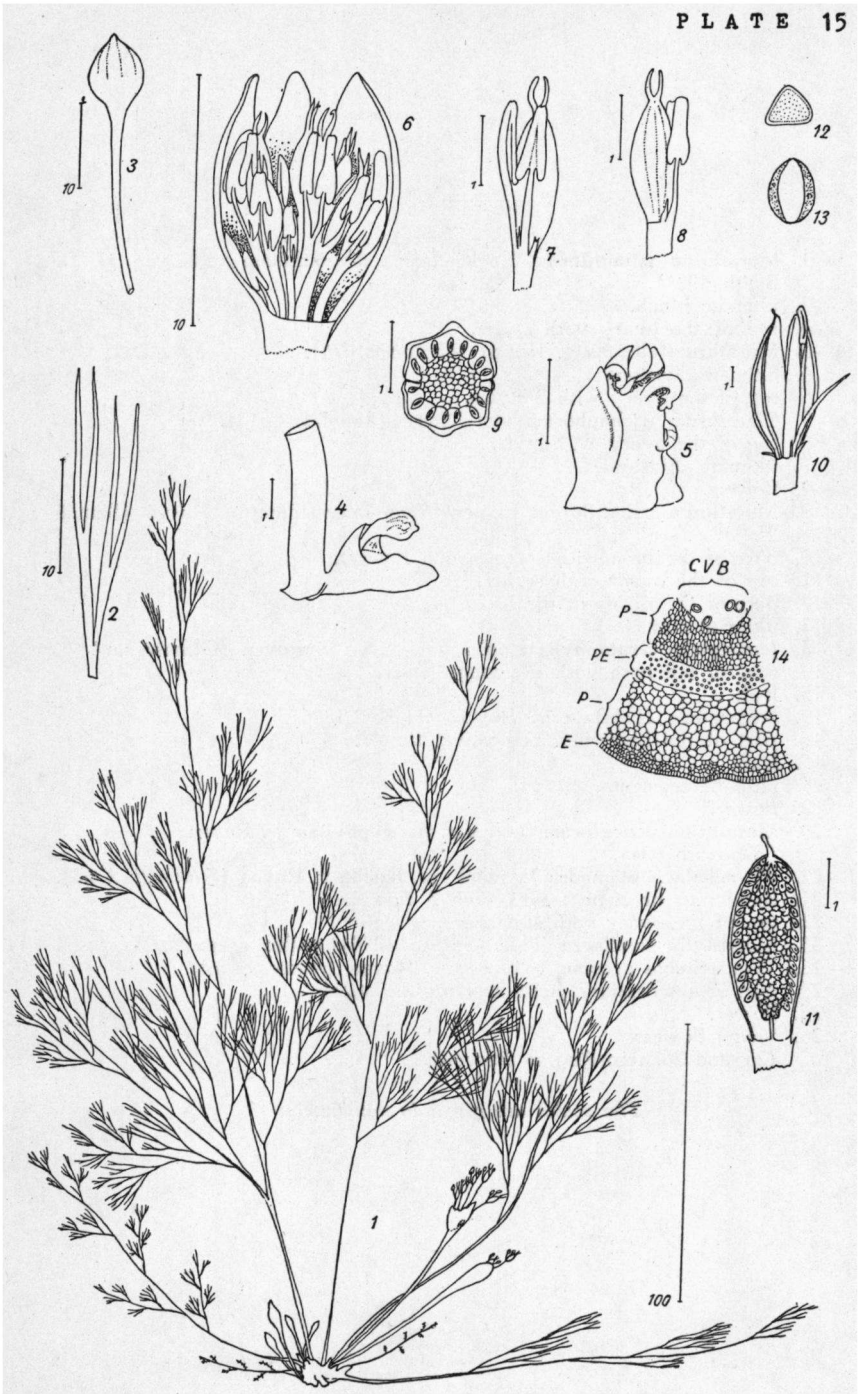

PLATE 16

1—3. **Marathrum minutiflorum** Engler forma **diversifolium** v. Royen (J. D. Smith 4921).
1—2. ultimate pinna.
3. top of the ovary with styles.
4—5. **Marathrum elegans** v. Royen (Hinton 11624).
4. ultimate divisions
5. top of the ovary with 2 styles.
6—9. **Marathrum trichophorum** van Royen (Langlassé 613).
6. top of the ovary with styles.
7. ultimate divisions.
8—9. flowers.
10—13. **Marathrum minutiflorum** Engler forma **intermedium** v. Royen (Skutch 2598).
10. part of the base with some young flowers.
11. top of the ovary with styles.
12. part of the rachis of the leaf.
13. ultimate pinna.
14—15. **Jenmaniella ceratophylla** Engler var. **parva** v. Royen (Othmer s.n.)
14. part of the base with a young flower.
15. leaf.
16—19. **Jenmaniella fimbriata** v. Royen (Huber 1816).
16. part of the base with one young flower.
17. leaf.
18. ultimate segments.
19. flower.
20. **Marathrum pauciflorum** Tul. var. **heterophyllum** v. Royen (Sandwith 694).
21—22. **Rhyncholacis oligandra** Weddel var. **tenella** v. Royen (Sandwith 1263).
21. basal part of some leaves with 3 flowers.
22. top of the ovary with styles.
23. **Monostylis capillacea** Tul. (Spruce 1038) pollen gran.
24—26. **Wettsteiniola accorsii** (Toledo) v. Royen (Accorsi s.n.).
24. part of a secondary pinna showing the stipels.
25. flower.
26. young flowers.
(25 and 26 according to Accorsi).

The scales are given in millimeters.

PLATE 16