

# A MONOGRAPH OF THE VOCHYSIACEAE

## I. *Salvertia* and *Vochysia*

by

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## A. INTRODUCTION

This publication is intended to be the first part of a taxonomic monograph of the family *Vochysiaceae* and deals with the genera *Salvertia* and *Vochysia*. Since Warming's excellent treatise of the Brazilian species of this family in the *Flora Brasiliensis* (Vol. XIII, II, 1875) a large number of new species has been described, especially from neighbouring countries, and much new material has been collected. The fact that the number of species of *Vochysia* has been doubled since Warming may give a *raison d'être* to this monograph.

A large quantity of material was kindly put at my disposal by several herbaria. These herbaria are indicated in this monograph by the following abbreviations proposed by the Standing Committee for Urgent Taxonomic needs of the International Botanic Congresses for the planned *Index Herbariorum*.

- |   |        |
|---|--------|
| 1. British Museum of Natural History, Dept. of Botany.                                  | BM     |
| 2. Jardin Botanique de l'Etat, Bruxelles.   | BR     |
| 3. Universitets Botaniske Museum, Copenhagen.   | C      |
| 4. Chicago Natural History Museum (Field Museum).                                       | F      |
| 5. Institut de Botanique Systématique de l'Université;<br>Herbier Boissier, Genève.     | G-BOIS |
| 6. Conservatoire et Jardin Botanique de l'Université;<br>Herbier De Candolle, Genève.   | G-DC   |
| 7. Conservatoire et Jardin Botanique de l'Université;<br>Herbier Delessert, Genève.     | G-DEL  |
| 8. Gray Herbarium, Harvard University, Cambridge<br>Mass. U.S.A.                        | GH     |
| 9. Botanisch Laboratorium der Rijksuniversiteit, afd.<br>Plantensystematiek, Groningen. | GRO    |
| 10. Imperial Forestry Institute Herbarium, Oxford<br>(G.B.).                            | IFI    |
| 11. Herbarium of the Royal Botanic Gardens, Kew.  | K      |
| 12. Rijksherbarium, Leiden.   | L      |
| 13. The Linnean Society of London.  | LINN   |
| 14. New York Botanical Garden, New York (NY).   | NY     |
| 15. Oxford University Herbarium (Fielding Museum)<br>Oxford (G.B.).                     | OXF    |
| 16. Muséum d'Histoire Naturelle, Phanérogamie, Paris.                                   | P      |
| 17. Botanické oddel. Národniko Musea, Praha.  | PR     |

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|--|----|
| 18. Jardim Botânico, Rio de Janeiro.   | RB |
| 19. Naturhistoriska Riksmuseum, Botaniska Avdelingen, Stockholm.               | S  |
| 20. Botanisch Museum en Herbarium van de Rijksuniversiteit, Utrecht.           | U  |
| 21. United States National Herbarium, Smithsonian Institution, Washington D.C. | US |
| 22. Naturhistorisches Museum, Botanische Abteilung, Wien.                      | W  |

I wish to express my best thanks to the directors of these herbaria for their great assistance. My grateful acknowledgments go to the directors and staff of the herbaria and libraries that I have myself visited, and I thank them most sincerely for the great help and kind hospitality given during my stay in Geneva, Kew, Leiden, Oxford and Paris.

My most sincere thanks go to Prof. Dr. A. A. Pulle, Director of the "Botanisch Museum en Herbarium van de Rijksuniversiteit" at Utrecht, under whose direction this work was accomplished and whose continual interest and advice were of great value to me.

I am greatly obliged to Mr. N. Y. Sandwith M.A. of Kew, and Miss Dr. G. J. H. Amshoff, Dr. J. Lanjouw and Dr. F. P. Jonker of Utrecht, who were always prepared to give me the most generous assistance.

## B. GENERAL SECTION

### I. HISTORY OF THE GENERA SALVERTIA AND VOCHYSIA.

The genus *Salvertia* was first described by A. de St. Hilaire in 1820. His diagnosis gave all important characters and he placed the genus in his family of the *Vochisiae*, described in the same publication. It was named after M. Dutour de Salvert, friend and brother-in-law of de St. Hilaire.

The name *Vochysia* is a latinisation, first used in this orthography by Poiret (1808), of the original vernacular name *Vochy*, used by Aublet (1775) to name his *Vochy guianensis*.

Vandelli (1788) described *Vochya*, without mentioning a specific name. He based it on a specimen belonging to *V. emarginata* (Vahl) Poir. This is the first latinisation of *Vochy* and for this reason Standley (1924, 1926) used this name again e.g. in "*The North American Flora*". In 1789 De Jussieu in his "*Genera Plantarum*"

used the name *Vochisia*, referring to *Vochoy Aubl.* Although this work was completed already in 1774, it was published only in 1789. So *Vochisia* is the second latinisation of Aublet's original name; it has been used by Briquet (1919) as the correct orthography. The third version—*Vochysia*—was given by Poiret (1808) and with this spelling the name has been listed as a *nomen conservandum* (Reg. Int. Nom. Bot. art. 2c, list in ed. 3 p. 101). Curiously enough this list gives "*Vochysia* Juss." although De Jussieu spelled the name *Vochisia*. Sprague (1929) is of the opinion "that in the present circumstances it is doubtful whether *Vochisia* Juss. or *Vochysia* Poir. is intended to be conserved". Briquet (1919) sees no reason to modify the spelling of De Jussieu. However, the main authors (Martius, Pohl, Warming) of *Vochysia* species, Decandolle in his *Prodromus*, and Warming in his treatment of the *Vochysiaceae* in the *Flora Brasiliensis*, used *Vochysia*, so that it might be understood that the intention was to conserve *Vochysia* Poir. and not *Vochisia* Juss. It seems reasonable in this case to maintain *Vochysia* Poir. and it is desirable to correct the name of the author in the list of conserved generic names.

In 1777 Scopoli proposed *Salmonia*, and in the same year as De Jussieu (1789), Schreber proposed *Cucullaria* as an alternative for *Vochoy*. It is clear that these names had to be rejected.

The only synonym not originally intended as an alternative for *Vochoy* is *Strukeria* of Vellozo (1790, descr. ed. 1880).

Poiret (1808) mentions three species. Martius (1824) described 10, and Pohl (1831) added 10 new species, most of which still stand. From then onwards the number remained practically constant until 1875 when Warming's treatment of the Brazilian species appeared in the XIIIth volume of the *Flora Brasiliensis* and 54 species were mentioned. This is the latest synopsis; since then a large number of species has been described, especially by Ducke in a magnificent series of publications from 1913 onwards, but no synthetic work has been done.

Aublet (1775) describes his *Vochoy* under *Diandria, Monogymia*. He mentions a single filament with two anthers and a tetrapetalous corolla. He evidently considered the large fourth calyx-lobe as a petal. De Jussieu (1789) placed the genus under "*Polypetalae germine superior*". Poiret (1808) described it as a genus "dont la famille et les rapports naturels n'ont pas encore pu être déterminées." De St. Hilaire (1820) first speaks of the genera *Salvertia* and *Vochysia* belonging to the *Vochisiae*. Martius (1824) is the first to use the spelling *Vochysiaceae*.

Fossil specimens of *Vochysia* and *Salvertia* are unknown.

## II. TAXONOMIC REMARKS.

### General remarks.

Of the ranks subordinate to the species, the variety in particular has been loosely and inconsistently used by many authors. This was pointed out by Lanjouw (1932) and made him plead for a uniform use of this designation. Recently Maas Geesteranus (1947) again discussed this problem on the occasion of his revision of the Dutch *Parmeliaceae*. I agree with him that "if a family is split up into genera and a genus into species one may logically expect the species to be entirely subdivided into its varieties". However another aspect is that it is rather doubtful whether this is yet generally possible and practicable in contemporary work on tropical Angiosperms. Certainly, when working with abundant material, with morphological, cytological, physiological, genetical and anatomical methods one may come to the conclusion that the Linnean species — and especially the cultivated ones — may sometimes comprise an "enormous number of varieties" (Vavilov 1940). And when working with species occurring in well known parts of the world — e.g. Western Europe —, abundance of material may allow a complete subdivision of the species purely on comparative morphological grounds, as is the case with Dutch Lichens. But neither situation is possible with tropical, non-cultivated Angiosperms. The material is in most instances restricted to a very small number of collections. Of the 41 species of *Vochysia* found in the *Hylaea americana* (see table I p. 412), only three have been collected more than twenty times, while about 70 % (29) have been collected 1-5 times.

It will be clear that, with such limited material to hand, and in the complete absence of experimental taxonomic results, it would be highly unjustifiable to give a subdivision of all species in lower ranks. In some cases, with abundant material available it may be possible, and in this monograph *V. rufa* Mart. and *V. acuminata* Bongard have been split into subspecies on purely morphological grounds.

In other cases one or two of the specimens differ in a few characters from the others, and to mark this such specimens are often treated as a separate variety. In such instances the evidence is not sufficient to justify a definite judgment of the affinities or taxonomic position (e.g. because of lack of material) of the specimens in question and this situation is expressed by treating them provisionally as a separate variety. It would, then, be premature to refer the other specimens to a "var. typica" or some other similar name, and any such procedure has therefore been omitted in this monograph.

Again, in other cases (*V. haenkeana* Mart., *V. tucanorum* Mart.) a relatively large number of specimens is available showing some variability. The variations, however, are fluid and series of specimens can be arranged from one extreme to the other. Sharp delimitations are absent. In such cases too I have refrained from subdivision, which would have been highly arbitrary.

From this discussion it may be clear, that no phylogenetic significance whatsoever is attributed to the subdivision of some of the species of *Vochysia* in this monograph.

The same is true of the arrangement of the species within the subsections and of that of the sections and subsections within the genus. These arrangements are all on comparative morphological grounds and are no expression of any suspected phylogenetic relationships.

A discussion of the position of *Salvertia* and *Vochysia* within the family will be given with the monographic treatment of the other genera.

### The subdivision of the genus *Vochysia*.

The first to give a subdivision was Warming (1875):

- Series I: DECORTICANTES. Ovary tomentose. Flowers large. Cortex brownish, exfoliating. Nervation irregular.
- Series II: CALOPHYLLOIDEAE. Ovary tomentose. Flowers small. Cortex blackish, exfoliating. Nervation regularly minutely reticulate.
- Series III: MICRANTHAE. Ovary glabrous. Flowers small. Cortex blackish, sometimes exfoliating.
- Series IV: LUTESCENTES. Ovary glabrous. Flowers large. Cortex yellow or brownish. Entire inflorescence yellowish.
- Series V: FERRUGINEAE. Ovary glabrous. Cortex and lower surface of the leaves mostly ferruginous-tomentose. Leaves opposite. Petals and stamen pilose.

Petersen (1896) in Engler und Prantl's *Pflanzenfamilien* endorses this subdivision, but he uses the term *section*.

As mentioned before, since Warming's monograph a large number of new species has been described. The total number of species mentioned in the present monograph is 97 and this greatly increased material makes it necessary to give a more detailed subdivision. The present author therefore proposes the following (the Latin

diagnoses of the new units have been provided in the taxonomic section):

- Section A: VOCHYSIELLA. Ovary tomentose. Cortex exfoliating. Petals and stamen glabrous or nearly so.
- Subsection I: DECORTICANTES. Flowers large. Nervation irregular. Central Brazilian Campos.
- Subsection II: CALOPHYLLOIDAE. Flowers small. Nervation regularly reticulate with narrow meshes. Hylaea.
- Section B: CILIANTHA. Ovary glabrous. Cortex not or only rarely exfoliating. Petals and stamen or one of both ciliate or pilose.
- Subsection I: MICRANTHAE. Flowers small. Cortex black, sometimes exfoliating. Stamen always glabrous. Petals glabrous or ciliate. Leaves glabrous. Hylaea.
- Subsection II: LUTESCENTES. Flowers large. Petals and stamen glabrous or ciliate. Leaves glabrous. Mainly Central American and S. E. Brazilian.
- Subsection III: DISCOLORES. Flowers large. Petals glabrous. Stamen ciliate. Leaves tomentose. S. E. Brazil.
- Subsection IV: CHRYSOPHYLLAE. Flowers large. Petals pilose on the back. Stamen glabrous. Leaves sericeous. Cortex exfoliating. Hylaea.
- Subsection V: MEGALANTHAE. Flowers very large. Petals and stamen villose. Leaves in whorls, glabrous. Mainly in subtropical parts of the N. Andes.
- Subsection VI: FERRUGINEAE. Petals and stamen pilose. Leaves opposite, pilose, at least when young. Staminodes ciliate. Widely distributed.
- Section C: PACHYANTHA. Ovary tomentose. Cortex not exfoliating. Petals absent. Stamen villose.

The genus *Vochysia* is a very natural one. There is no need to split it up into other genera or even subgenera. The "*Vochyopsis*" ("seccione vel genere") with the species *V. radlkoferi*, described by Kuntze (1896), is extremely doubtful and based on deplorably insufficient material. The few fragments which are still available (see p. 524) show no affinity whatsoever with any known species of *Vochysia*. The capsule is globose and indehiscent, while the nervation of the leaf fragments is semi-palmate.

The subsections will be referred to with characters and figures: subsection B III indicates the subsection *Discolores* of the section *Ciliantha*.

## Scope of the subsections and the arrangement of the species of *Vochysia*.

### Section A: VOCHYSIELLA.

This section unites the two series of Warming with a pilose ovary and an exfoliating cortex, which have been raised to the rank of subsection. These characters place it near *Salvertia*.

#### Subsection I: Decorticantes.

This subsection is again most closely related to *Salvertia* because of the irregular nervation, the tomentum on the vegetative parts, the variable size and shape of the flowers etc. The species are, like *Salvertia*, characteristic trees or shrubs of the Brazilian Campos and this common, somewhat extreme environment probably accounts for some convergences in the shape and indumentum of the vegetative parts, which therefore are of less taxonomic value.

The name is misleading because of the fact that the "*Decorticantes*" are not the only species with an exfoliating cortex. The arrangement of the species is the same as in Warming's treatment (1875). The species with a strong indumentum on the vegetative parts come first, next follow those with pruinose leaves and, lastly, *V. divergens* Pohl and *V. gardneri* Warm., standing nearest to the next subsection as regards nervation and indumentum.

#### Subsection II: Calophylloideae.

Only *V. obscura* Warm. and *V. venulosa* Warm. belong to this subsection in Warming's monograph (l.c.). *V. haenkeana* Mart. and *V. micrantha* Pohl were placed by him under the previous subsection, with the remark that they were transitional. I refer them to this second subsection on account of their small flowers and their nervation.

The name of this subsection is also misleading because *V. calophylla* Spruce ex Warm. does not belong to it.

First in the arrangement of the species come those which have both the petals and stamen glabrous, next those with ciliate petals and, lastly, three with a ciliate stamen. This last trio comprises Andean species, those with ciliate petals are Upper Amazonian. The species of the first category, however, have no common area.

### Section B: CILIANTHA.

This section comprises the bulk of the species of *Vochysia*, that is, all species with a glabrous ovary.

### Subsection I: Micranthae.

This subsection shows most affinities with *Vochysiella*, some of its species have an exfoliating and blackish cortex, and the stamen and petals are practically glabrous.

The name does not refer to *V. micrantha Pohl*, which belongs to *Vochysiella*.

The characters of the cortex and of the petals determine the arrangement of the species. The first six have an exfoliating cortex and fall into two groups of three species each with glabrous and ciliate petals respectively. The rest have a cortex that does not exfoliate, three of them have glabrous, the others ciliate petals.

### Subsection II: Lutescentes.

This subsection agrees with the series of the same name described by Warming (l.c.). Five species, however, of Warming's series have been placed in other subsections, three in the "*Discolores*" and two (*V. spathulata* Warm. and *V. selloi* Warm.) in the "*Ferrugineae*".

The arrangement is determined by the presence or absence of cilia on the petals, the colour of the cortex and the inflorescence, etc. Several arrangements are possible, varying with the value attributed to the different characters. In the present work an arrangement has been chosen which coincides with a geographical one. First come species with glabrous petals, from the coastal Brazilian rain forests. Next come the Central American ones which have ciliate petals and a true yellowish cortex. In the third place come three Hylaeae species with a blackish cortex and, lastly, the Campo species with brownish cortex and ciliate petals as well as stamen.

### Subsection III: Discolores.

Warming (l.c.) has already pointed out that *V. discolor* stands apart because of its peculiar indumentum which is also found in some of the species of the *Ferrugineae*. However in *V. discolor* this indumentum is combined with flowers of a structure similar to those of the *Lutescentes*.

### Subsection IV: Chrysophyllae.

*V. calophylla Spruce ex Warm.*, the only species of this subsection differs essentially from the *Ferrugineae*, to which it was referred by Warming (l.c.), in the characters of its indumentum, the exfoliating cortex and the glabrous staminodes. It differs from the *Micranthae* in the size of the flowers, the pilose petals and the indumentum on the vegetative parts.

This subsection has been named after the golden sericeous indumentum of the lower surface of the leaves, the name *Calophylloideae* having been used by Warming already for another group.

#### Subsection V: *Megalanthae*.

This is a very natural subsection: it is isolated in a taxonomic as well as in a geobotanical sense. It comprises a group of species from the subtropical parts of the Andes, which share the pilose stamen and petals with the *Ferrugineae*, but which stand apart on account of their verticillate leaves, glabrous staminodes, a large capitate stigma and an extremely short filament.

#### Subsection VI: *Ferrugineae*.

This subsection is taken in the same sense as Warming's (l.c.) series of that name. The arrangement of the species is determined by the number of petals (3,1 or 0), the position and dimension of the stigma and the prominence of the leaf-nerivation.

#### Section C: *PACHYANTHA*.

This section unites three very specialised species with a tomentose ovary, no petals, a villose stamen, subcoriaceous calyx-lobes and a cortex that does not exfoliate. The absence of petals is a feature not limited to this section, the morphological significance of which will be discussed in the next paragraph.

#### Morphological remarks.

Only a few remarks concerning the morphology are to be made, the main facts having been given in the descriptions of the genera in the taxonomic section. A comparison with the other genera of the *Vochysiaceae* will be given together with the treatment of *Qualea*, *Callisthene* and *Erisma*.

#### *Salvertia*.

The diagrams of the flowers of *Salvertia* given by Baillon (1874 p. 93) and Warming (1875 t. XVII) differ essentially in the arrangement of the calyx-lobes and petals. My own findings generally agree with those of Warming, except for two points:

1. The corolla is in most cases regularly quincuncial like the calyx and the third petal stands opposite the fourth calyx-lobe, (the stamen stands in front of this third petal and so between the fifth and third calyx-lobe).

2. Warming indicates the presence of four staminodes, whereas

I found only two, flanking the stamen, in front of the first and fifth petal.

Sometimes, however, irregularities occur, especially in the arrangement of the petals. I never noticed the development of one of the staminodes into a second stamen, as noted by Baillon (l.c.).

### **Vochysia.**

I am in complete agreement with Warming's diagram (1875 t. XVI). The position of the stamen is the same as in *Salvertia*, alternating with the third and fifth calyx-lobe, but differing from the situation in *Qualea*, where the stamen stands in front of the fifth calyx-lobe, combining with the fourth calyx-lobe, which is spurred, to make the flower asymmetrical.

The characters used for the subdivision of the genus and for the distinction of the species have been given in the keys and diagnoses of the taxonomic section and need not be repeated here. They are mostly of small general morphological value, because they are derived for the most part from indumentum, quantitative relations of dimensions, etc., and do not call for general remarks of any importance.

However an exception must be made for the number of petals. *Salvertia* has five petals, showing in their dimensions some bilateral symmetry, *Callisthene* and *Erisma* have one petal and *Qualea* one or — rarely — two. *Vochysia* normally has three petals, the major, centre petal corresponding with the third petal of *Salvertia* but differing from it in enveloping both lateral ones in the bud. In a number of cases the lateral petals or even all of them are absent.

This absence is found in different floral structures: In the section *Ciliantha* a few species in various subsections are mono- or apetalous on the one hand, but, on the other, show a close relationship with other species of the respective subsection in which they are placed. *V. apopetala* Ule certainly belongs to the subsection *Lutescentes* because of its large flowers, its ciliate stamen combined with glabrous staminodes and its entirely glabrous vegetative parts, but the petals are absent. *V. punctata* Spruce ex Warm. and probably *V. majuscula* Pilger also have no petals, but other characters bring them to the *Ferrugineae*. The species of the section *Pachyantha*, all apetalous, are closely interrelated and show no affinity to others.

The monopetalous species of *Vochysia* are *V. pacifica* Cuatrecasas, which has not been seen by the present author, but which probably belongs to the *Lutescentes*, *V. eximia* Ducke and *V. schomburgkii* Warm. *V. eximia* clearly belongs to the *Ferrugineae* above all because of its characteristic indumentum on the vegetative parts, the opposite

leaves and the villose petal and stamen. The same holds for *V. schomburgkii* Warm., although the indumentum on the leaves and branchlets is found only on the young parts. It does not seem justifiable to place these species in a separate subsection when the floral and vegetative structures are more closely related to the *Ferrugineae* than to other mono- or apetalous species. It would be highly artificial to divide *Vochysia* into 3-, mono- and tripetalous sections. The loss of petals seems to have taken place in different morphological groups.

### The designation of the type specimens.

Difficulties arose because of the burning of the extensive Berlin collections. Warming, one of the main authors of *Vochysia* species, worked especially with the Berlin material and it may be understood, that many of his type specimens were to be found amongst it. However, he rarely mentions special herbaria, so whether he saw a particular duplicate or not is to be learned only from his writings on the labels, and it is not certain whether he consistently annotated each specimen that he saw. Furthermore, when he had several collections at his disposal, he never referred specially to one of them as the type, he considered them all "specimina originalia" (in sched.). Now in order to designate the type of a Warming species in case of doubt the following rules have been followed:

1. The type specimen belongs to the first cited collection.
2. When this collection consists of a number of duplicates, the Copenhagen specimen is considered as the type, the other ones are "typi dupla".
3. When no Copenhagen duplicate is at hand, the specimen from the first set of the collector (original collection, see Lanjouw 1945) is considered as the type. There are no cases in which it was improbable that Warming ever saw the first set.
4. When no Copenhagen specimen is at hand and the first set is the Berlin specimen (e.g. Sellow) a specimen annotated by Warming which is found in some other herbarium is considered as the type.

The type specimens of the Pilger species, *V. majuscula*, *V. densissima* and *V. retusa*, have also been burnt in all probability, but of them no duplicates are known.

Of *V. majuscula* however an excellent photograph exists and from this, together with the description, it seems to be an easily recognisable, distinct species. I see no reason why a second gathering could not be identified as this species.

Of *V. densissima* also an excellent photograph exists and from this and the description it seems to be a variety of *V. vismiifolia* Spruce ex Warm., which I provisionally propose on p. 498.

Of *V. retusa* no photograph exists. Pilgers description (1939) agrees with that of *V. braceliniae* Standley (1940), but it is rather incomplete. This makes it impossible ever to determine a specimen as *V. retusa* by this description alone; with the given characters one would always run it down to *V. braceliniae*. This same incompleteness, however, makes it impossible to declare *V. retusa* and *V. braceliniae* identical. I propose therefore to ignore *V. retusa* until material from the type locality is available.

Of the type of *V. duquei* Pilger (Duque 55) a duplicate exists in the US herbarium; this specimen has been designated as the lectotype.

### III. GEOBOTANICAL REMARKS.

#### The geobotany of the areas of *Vochysia* and *Salvertia*.

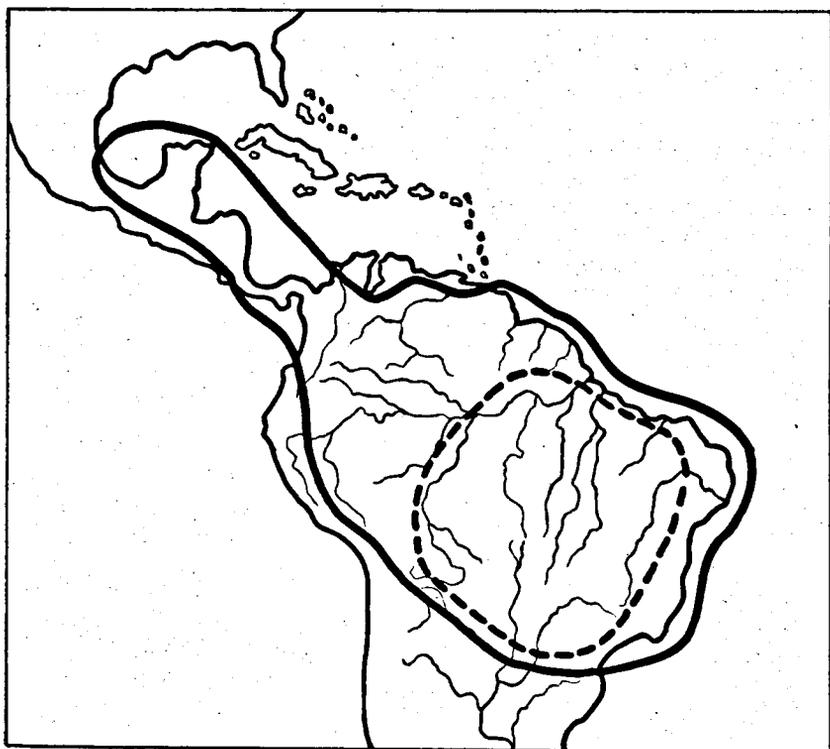
The area of the *Vochysiaceae* is bicontinental, as is shown on the map given by Hutchinson (1926 p. 119) owing to the presence of the monotypic genus *Erismadelphus* in equatorial West Africa. I hope to discuss the taxonomic value of this genus in a subsequent section of my monograph.

The area of *Vochysia* is continuous and biregional, that is, it lies in tropical South and Central America (type IX 6 of Vester 1940) and is given in map I. The area of *Salvertia* is uniregional in Vester's sense as it is limited to South America.

All species of *Vochysia*, except one, also show uniregional areas, they even are often "Kleinareale" after the designation of Vester, being limited in general to a minor geographical unit like the Central Brazilian Plateau or the Amazon basin. The one exception is *V. ferruginea* Mart., which is found in the Amazon basin as well as in Costa Rica, Panama and Colombia.

Except for a brief survey by Smith and Johnston (1945) no modern synthetic treatment of the geobotany of Latin America<sup>1)</sup> exists. A vivid picture of that of Brazil is given by Sampaio (1934), shorter treatments of different countries are given by various authors in "*Plants and Plant Science in Latin America*" edited by Fr. Verdoorn

1) By Latin America I wish to indicate the mainlands of Central and South America including Guiana.



MAP I. Distribution of *Vochysia* and *Salvertia*. Major area: *Vochysia*, minor area: *Salvertia*.

(1945). General subdivisions are given by Engler (1912) and Hayek (1926).

Sampaio (l.c.) accepts the division given by Engler (l.c.) for the Neotropical Region. Inside this region the *Vochysia* area is to be found in the "Tropical American Territory", which is subdivided into six provinces. In five of them (the Caribbean, the Subequatorial Andean, the Llanos, the Hylaeian and the Southern Brazilian Provinces) *Vochysia* is found. Sampaio (l.c.) proposes to call Engler's Southern Brazilian Province: Extra-Amazonian Province.

The Caribbean Province contains three endemic species of *Vochysia* in its portion North of Costa Rica (*V. guatemalensis* J. D. Smith, *V. hondurensis* Sprague and *V. tabascana* Sprague)

and another three south of it (*V. aurea* Stapf., *V. macrophylla* Stapf. and *V. pacifica* Cuatrecasas).

The Province of the Subequatorial Andes has in its subtropical regions eight species of *Vochysia* (see under paragraph "habitats").

The Province of the Llanos has in parts of the Llanos proper one endemic *Vochysia* (*V. venezuelana* Stapf.) and in the Rio Branco-Rupununi savannas, which might be included, *V. crassifolia* Warm. and *V. glaberrima* Warm.

A large number of species is found in the Hylaeae Province, which is subdivided by Sampaio (l.c.) as follows:

- I. Eastern Andine Zone.
- II. Amazon-Upper Orinoco Zone.
  - a. Upper Amazonian District, with Northern and Southern subdistricts.
  - b. Lower Amazonian district, with Northern and Southern subdistricts.
- III. Guiana Zone.

In table I the distribution of the forest species of *Vochysia* inside this Hylaea americana is given. The Eastern Andine Zone may be considered identical with the tropical part of the Montana-zone of Weberbauer (1936; see also L. Williams 1936), comprising the forested slopes of the Hylaeae side of the Andes.

There appears to be an outstanding peak in *Vochysia* endemism in Upper Amazonia, especially in the Rio Negro region. It is remarkable that only a few species are typical of more than one district. It should, however, be borne in mind that Latin America and especially the Hylaea Americana, is incompletely known from the botanical standpoint and that much collecting remains to be done. Thus after further research areas may prove to be even considerably larger.

Another large number of species is found in the Extra Amazonian Province, subdivided by Sampaio (l.c.) as follows:

- I. Zone of the Cocaes (Palm forests).
- II. Zone of the Caatingas (Tropical deciduous forests).
- III. Zone of the Coastal Forests.
- IV. Zone of the Pinhaes (Araucaria Forests).
- V. Zone of the Campos.
- VI. Maritime Zone.

*Vochysia* and *Salvertia* are not found in the Maritime and the Araucaria Zones. In the Caatinga and in the Cocaes Zones they are found only in types of Vegetation which, according to Sampaio, are to be considered as parts ("disjunctions") of neighbouring zones.

TABLE I: DISTRIBUTION OF FOREST SPECIES OF VOCHYSIA INSIDE THE HYLAEA AMERICANA.

District	Species	Coll.	Habitat	Sub-section
<b>I. AMAZON-ORINOCO ZONE.</b>				
Northern Upper Amazonia	<i>V. expansa</i> Ducke	1	upland	A II
	<i>V. venulosa</i> Warm.	1	upland	A II
	<i>V. ingens</i> Ducke	1	upland	B I
	<i>V. catingae</i> Ducke	1	upland	B I
	<i>V. parviflora</i> Warm.	1	igapo?	B I
	<i>V. complicata</i> Ducke	4	upland	B II
	<i>V. revoluta</i> Ducke	2	floodplain	B II
	<i>V. calophylla</i> Spr. ex. Warm.	2	floodplain	B IV
	<i>V. splendens</i> Warm.	5	floodplain	B VI
	<i>V. saccata</i> Stafl.	1	floodplain	B VI
	<i>V. javitensis</i> Stafl.	1	upland	B VI
	<i>V. angustifolia</i> Ducke	2	floodplain	B VI
	<i>V. punctata</i> Spr. ex. Warm.	1	unknown	B VI
	<i>V. pachyantha</i> Ducke	1	upland	C
Southern Upper Amazonia	<i>V. diversa</i> Macbr.	2	upland	A II
	<i>V. citrifolia</i> Poir.	2	upland	B I
	<i>V. calamana</i> Stafl.	2	upland	B VI
Upper Amaz.	<i>V. grandis</i> Mart.	6	upland	B I
Northern Lower Amazonia	<i>V. obidensis</i> Ducke	2	upland	A II
	<i>V. mapuerae</i> Huber	1	floodplain	B I
Southern Lower Amazonia	<i>V. maxima</i> Ducke	2	upland	B VI
	<i>V. biloba</i> Ducke	2	upland	B VI
	<i>V. assua</i> Stafl.	1	upland	B VI
Lower Amaz.	<i>V. inundata</i> Ducke	6	floodplain	B VI
Northern Amazonia.	<i>V. vismiifolia</i> Spr. ex. Warm.	12	upland	B VI
	<i>V. eximia</i> Ducke	5	variable	B VI
Southern Amazonia	<i>V. floribunda</i> Mart.	6	floodplain	B VI
<b>II. EASTERN ANDINE ZONE.</b>				
Venezuelan Montana	<i>V. lehmannii</i> Hier.	14	upland	A II
Peruvian-Bolivian Montana	<i>V. mapiensis</i> Rusby	12	upland	A II
	<i>V. braceliniae</i> Standl.	1	upland	B VI
	<i>V. sprucei</i> Warm.	1	unknown	B VI
	<i>V. majuscula</i> Pilger	1	upland	B VI
I AND II.	<i>V. obscura</i> Warm.	16	upland	A II
	<i>V. lomatophylla</i> Standl.	4	floodplain	B VI
<b>III. GUIANA ZONE.</b>				
	<i>V. surinamensis</i> Stafl.	9	upland prob.	A II
	<i>V. guianensis</i> Aubl.	21	upland	B I
	<i>V. tetraphylla</i> (Mey.) D.C.	75	floodplain	B I
	<i>V. tomentosa</i> (Mey.) D.C.	28	upland	B VI

The species found in the zones of the Campos and of the Coastal Forests are given on p. 418 and 416.

### The geobotany of the sections and subsections of *Vochysia*.

The subsection *Decorticantes* of the section *Vochysiella* is limited to the zone of the Campos, which includes also parts of Northern Paraguay and of the Eastern Bolivian Plateau. The subsection *Calophylloideae*, is almost confined to the Hylaea, with the exception of *V. haenkeana* Mart., which is also found in the fringing forests of watercourses in the Campos (which may be considered as protrusions of the Hylaea), and the Llano species *V. venezuelana* Stapf.

The *Micranthae* — first subsection of *Ciliantha* — are mainly Hylaeal. As said before, *V. crassifolia* Warm. and *V. glaberrima* Warm. are typical of the Rio Branco-Rupununi savannas. *V. lucida* Presl. is a Bahia endemic in fringing forests along rivulets.

The *Lutescentes* — second subsection — show three centres of distribution of which two nearly overlap. The first one is Central American and the species belonging to it are closely related and might be considered as a separate series in the subsection. The same holds for the species typical of the coastal rain forests of S. E. Brazil. This series and the previous one vicariate in ecologically similar habitats. A third group is found in the Eastern parts of the Campos, two of its species — *V. tucanorum* Mart. and *V. magnifica* Warm. — also occurring in the coastal forests of Rio de Janeiro. The three Hylaeal species — *V. revoluta* Ducke, *V. complicata* Ducke and *V. speciosa* Warm. — are closely related to the *Micranthae*.

The *Discolores* are confined to the S. E. Brazilian mountain regions; the only species of the *Chrysophyllae* is Hylaeal.

The *Megalanthae* — fifth subsection — are taxonomically and geographically isolated: taxonomically, because of the peculiar floral structure; geographically, because of the fact that they are confined to the Subequatorial Andean Province.

The *Ferrugineae* — sixth subsection of *Ciliantha* — are mainly Hylaeal but a number of them are found in the Coastal Forests and some in the Campos.

The species of the section *Pachyantha* — notable because of the absence of petals together with a pilose ovary and subcoriaceous sepals — have been collected only a few times. *V. pinkusii* A. C. Smith may be another Pakaraima endemic, whereas the other species come from the Rio Negro and the Peruvian Montana.

It seems that *Vochysia* shows a large number of species endemic in different geobotanical zones of Latin America. Only a few species are found in more than one of these zones.

### The boundaries of the *Vochysia* and *Salvertia* areas.

*Vochysia* reaches its northern limit in the Caribbean part of the tropical region of Mexico which is, according to Ochoterena (1945), more humid than the Pacific part. The Central American Boundary of *Vochysia* runs along the subtropical forests on the Caribbean side of the Central Range of mountains. This eastern side is characterised by the presence of extensive rain forests, whereas the western side is much dryer and bears arid and semi-arid formations. The Central American group of species of *Vochysia* is confined to this eastern side. It is in the southern part of Costa Rica, west of the Gulf of Nicoya that tall and dense Pacific rain forests appear (Skutch 1945) in which *V. aurea* Stafl. is found. The Colombian Pacific coastal rain forests with *V. macrophylla* Stafl. e.g. belong to the same area. Further southwards the western limits of *Vochysia* are constituted by the forests on the eastern side of the Andes. From Ecuador onwards towards the Parana Atlantic coast the *Vochysia* borderline follows nearly exactly the 18° C. isotherm of the coldest month, which may be used for the delimitation of the tropical zone (v. Everdingen 1947 map 2) and in this case owing to sufficient rainfall (Stone 1945 fig. 4, 5), for the delimitation of the tropical American rain climates (Boerman 1945 p. 42, 48 ex Köppen 1931). Apart from regions with tropical rain climates *Vochysia* is also found in the subtropical parts of various mountainranges inside these regions.

*Vochysia* is entirely absent in arid or semi-arid climates which are found in direct contact with *Vochysia*-supporting climate without any geographical barriers, for instance in the northern coastal areas of Venezuela.

When we compare the area of *Vochysia* with the phytogeographic map of Latin America given by Smith and Johnston (1945), it is apparent that *Vochysia* occupies the region of the tropical and subtropical rain forests and those of the savannas, while it is sometimes found in special habitats in the region of the tropical deciduous forests, e.g. the Caatingas. It is interesting to note that the transgression of the Andes of the western boundary near the Equator corresponds to a change from tropical rain forest towards semi-arid thornforest along the Pacific coast.

The area of *Salvertia* clearly corresponds to the Zone of the Central Brazilian and Bolivian Campos. The northern extension into the Hylaea is due to the presence of *Salvertia* on the lower Amazonian savannas. The northernmost collections have been made in the Sipaliwini savannas of southern Surinam, while the eastern boundary runs along the inner margin of the coastal rain forests.

### Habitats of *Vochysia* species.

It is often difficult to get an idea of the habitat of certain species because of the mostly incomplete data on field-labels, especially those of the older collectors. Thus, in a number of cases, the indication of habitat given below is based upon relatively few notes of collectors. Some travelogues and short collectors' accounts proved to be useful (e.g. Ule 1914, Ll. Williams 1947).

This is only a general survey; notes about individual species mentioned below are to be found in the taxonomic section.

#### A. FOREST SPECIES.

##### I. Tropical rain forest.

###### a. AMAZONIAN RAIN FOREST OR HYLAEA.

Comprising the forests of the Amazon basin, determined by heavy rainfall, alluvial soil and even high temperature. Not included are the savanna regions found between the main streams, especially in Lower Amazonia. Divisible into three ecological types, according to the water available (L. B. Smith, 1945 p. 298).

###### i. *Forest of the upland plain* (Mattas de Terra Firme).

Forest not inundated during the rains, in lower parts passing into the floodplain jungle, in higher parts often into savannas or scrub vegetation. Some of these transitional types of vegetation have been placed here.

Primeval upland forests, in the Amazon basin itself.

- |                                 |                                 |
|---------------------------------|---------------------------------|
| 13. <i>V. obidensis</i> Ducke.  | 68. <i>V. calamana</i> Stافل.   |
| 16. <i>V. diversa</i> Macbr.    | 71. <i>V. biloba</i> Ducke.     |
| 21. <i>V. ingens</i> Ducke.     | 81. <i>V. assua</i> Stافل.      |
| 27. <i>V. grandis</i> Mart.     | 95. <i>V. pachyantha</i> Ducke. |
| 43. <i>V. complicata</i> Ducke. |                                 |

Montana forests on the eastern slopes of the Andes between 300-1100 m.

- |                               |                                 |
|-------------------------------|---------------------------------|
| 18. <i>V. lehmannii</i> Hier. | 20. <i>V. mapirensis</i> Rusby. |
|-------------------------------|---------------------------------|

Secondary upland woods. The upland forests are subject to fire-cultivation; a secondary vegetation develops, when abandoned, which—when forest—is often called caapoera.

15. *V. venulosa* Warm.

Rio Negro catingas, open scrub forests, discovered by Spruce (1908 I p. 206), sharing only the name with the deciduous forests of N. E. Brazil. Park-like type of vegetation with isolated shrubs and trees (description see Sampaio 1934).

- |                              |                              |
|------------------------------|------------------------------|
| 17. <i>V. expansa</i> Ducke. | 28. <i>V. catinae</i> Ducke. |
|------------------------------|------------------------------|

Sabanetas (Ll. Williams 1947), semi-open patches in or along riparian forests in the Upper Orinoco region, edaphic in origin (mostly fire, Ll. Williams in litt.), characterised by *Capirona decorticans* Spruce, *Humiria floribunda* Mart. and:

80. *V. javitensis* Stافل.

2. *Floodplain forests or Varzea*, Jungle periodically inundated during the floods of the rainy season.

30. *V. tetraphylla* (Mey.) D.C.      75. *V. inundata* Ducke.  
 58. *V. calophylla* Spr. ex Warm.    76. *V. saccata* Stapf.  
 66. *V. floribunda* Mart.            83. *V. angustifolia* Ducke.  
 74. *V. lomatophylla* Standl.

3. *Igapos or Swamp-forests*. Forests in places with stagnant water, mostly in the Varzea, but also on the Terra Firme.

29. *V. parviflora* Spr. ex Warm. indicated as such by Spruce, but probably in Varzea, Spruce using "Igapo" for our Varzea.  
 92. *V. eximia* Ducke. probably.

b. ATLANTIC COASTAL RAIN FOREST OF EASTERN BRAZIL.

From Rio Grande do Sul up to Cape Roque, situated on the Cordilheira do Mar, which rises more or less abruptly near the coast towards the Central Plateau. Mean width about 200 km. Atlantic S.E. trade-winds rise against these mountains, releasing the major part of their humidity in the process, creating together with the rich soil favorable circumstances for a rain forest, Amazonian in richness and abundance (See Sampaio 1934, L. B. Smith 1945). Heavily deforested. Only the occurrence, not the habitat, in this zone is known of the species in the second column.

32. *V. oppugnata* (Vell.) Warm.      33. *V. saldanhana* Warm.  
 34. *V. oblongifolia* Warm.            37. *V. glazioviana* Warm.  
 36. *V. bifalcata* Warm.                87. *V. rectiflora* Warm.  
 86. *V. acuminata* Bongard. ssp.      89. *V. spatulata* Warm.  
     *laurifolia* (Warm.) Stapf.  
 90. *V. selloi* Warm.

c. CARIBBEAN COASTAL RAIN FOREST OF CENTRAL AMERICA.

Heavy tropical rain forest supported by the abundant rainfall (often more than 200 cm per annum) throughout the year on the plains and foothills along the Caribbean. (See different authors in Verdoorn 1945).

38. *V. hondurensis* Sprague.          40. *V. tabascanica* Sprague.

d. PACIFIC COASTAL RAIN FOREST OF COLOMBIA, PANAMA AND COSTA RICA. Luxuriant forests on lowlands along the Pacific from the Gulf of Nicoya onwards to S. Colombia. No dry season, annual precipitation in places exceeding 500 cm per annum.

41. *V. aurea* Stapf.                      54. *V. pacifica* Cuatrecasas.  
 42. *V. macrophylla* Stapf.

II. Subtropical rain forest.

Mountain forests in tropical America roughly between 1000-2500 m. (See Smith and Johnston 1945 p. 14), the absolute elevation of these extremes varying with their position relative to the Equator. Temperature roughly between 17-22' C. (In Colombia, see Dugand 1945).

a. ALTA VERA PAZ.

Wet forests in Alta Vera Paz (N. Guatemala) and adjacent Honduras. Rainfall evenly distributed, 200-300 cm per annum (see Popenoe 1945 p. 279).

39. *V. guatemalensis* J. D. Smith.

## b. COLOMBIAN.

Andean highland forests in mild to temperate regions (see Dugand l.c.). Rainfall 150-600 cm per annum. Of the species 59 and 63 only the occurrence in this zone, not the special habitat is known.

60. *V. duquei* Pilger.                      59. *V. megalantha* Staf. l.  
 61. *V. aurantiaca* Staf. l.                63. *V. gigantea* Staf. l.  
 72. *V. magna* Staf. l.

## c. BOLIVIAN.

70. *V. boliviana* Rusby has been collected in forests between 500 and 2000 m, thus in tropical as well as subtropical parts of the Bolivian Andean Slopes.  
 62. *V. caesia* Staf. l. has once been collected at 1500 m in this region.

## d. PAKARAIMA.

53. *V. apopetala* Ule has been collected in the forest at foot of the escarpment of the Roraima plateau at 1900 m.  
 97. *V. pinkusii* A. C. Smith comes from the Rio Cotinga region at 1350 m.  
 14. *V. surinamensis* Staf. l. var. *inflata* Staf. l. comes from the Venezuelan side of the Pakaraima ridge at 1000-1500 m.

## III. Gallery Forests in Central Brazil.

Edaphic forests fringing watercourses in regions with a pronounced dry season and low humidity, insufficient to support rain forest, but bearing campos or catingas.

9. *V. divergens* Pohl.                      85. *V. pyramidalis* Mart.  
 22. *V. lucida* Presl.

Obs. *V. divergens* Pohl is also typical of the "Pantanal" (floodplain of Rio Paraguay and tributaries in Matto Grosso), which bears savanna-like vegetation subject to alternate draught and inundation. (See Malme 1905).

## B. SAVANNA SPECIES.

In this monograph the use of the word savanna as adopted by Smith and Johnston (1945) is adhered to. General term for tropical American plains "covered with more or less xeromorph herbs and small shrubs and with a few trees and larger shrubs" (see Lanjouw, 1936 p. 849, who adds a further geographical limitation). Main edaphic factors: dry climate, soil structure and fires. Since this is not the place to discuss opinions about these matters, references are given of authors giving the delimitations of the terms used below.

## I. Llanos.

Venezuelan and Colombian savannas. Dry season of five months entirely without rain; precipitation irregularly spread over the other months. Probably true climatic savannas. Soil often imper-vious. (See Myers 1933, Dugand 1945, Pittier and Williams 1945) Areas with *Vochysia* described by L. Williams (1940).  
 12. *V. venezuelana* Staf. l.

## II. Campos.

Comprising a host of—mainly savanna-like—types of vegetation in the interior Brazilian Plateau. Rainfall insufficient to support

continuous forest, but lack of forest conversely making for lower humidity (L. B. Smith 1945 p. 300). References to habitats on labels of specimens from these regions are more than usually fragmentary, and so these types of vegetation are summarily dealt with.

a. CAMPOS CERRADOS.

Park-like grassplains with scattered trees and small open forests or cerrados. The trees have a fruittree-like aspect and generally do not exceed 10 m in height. Monographic treatment among others by Warming (1893, 1894, 1909). Description of *Vochysia* habitats by Spencer Moore (1895), Pilger (1901) and Malme (1905).

Salvertia convallariodora St. Hil. 4. *V. rufa* Mart.  
5. *V. sessilifolia* Warm.

3. *V. cinnamomea* Pohl. 46. *V. tucanorum* Mart.

b. Different Campo-formations, poorly indicated, often mountainous and partly subtropical. See separate descriptions of the ecology of the species.

1. <i>V. petraea</i> Warm.	49. <i>V. emarginata</i> (Vahl) Poir.
6. <i>V. pruinosa</i> Pohl.	50. <i>V. pygmaea</i> Bongard.
7. <i>V. elliptica</i> Mart.	51. <i>V. rotundifolia</i> Mart.
8. <i>V. pumila</i> Pohl.	52. <i>V. martiana</i> Stafl.
47. <i>V. thysoidea</i> Pohl.	55. <i>V. discolor</i> Warm.
48. <i>V. magnifica</i> Warm.	86. <i>V. acuminata</i> Bongard ssp. <i>quadrangulata</i> (Warm.) Stafl.

III. Rio Branco-Rupununi savannas.

Sometimes considered to belong to the llanos, but surrounded by extensive rain forests, so that edaphic factors (soil, fire) may play an important rôle. Fire climax? (See Ule 1914, Myers 1936, Sampaio 1934).

23. *V. crassifolia* Warm. 25. *V. glaberrima* Warm.

IV. USES.

*Salvertia convallariodora* St. Hil. is of no use whatsoever, and the same is true of most species of *Vochysia* from the savannas or campos.

A number of rain forest species are in use as timber- or lumber-trees but for the most part the products are of inferior quality.

Record and Hess (1944) give a short general survey of the economic possibilities of the *Vochysiaceae* and come to the conclusion that "the timbers are of little or no commercial importance at present, but that a few of them are promising." Indeed a number of authors mention the use of *Vochysia* as a timber-tree (Stone and Freeman 1914; Zon, Raphael and Sparhawk 1923; Record and Meil 1924; Pfeiffer 1926; Benoist 1931), but they generally agree about the low

or moderate quality. The genus is, however, very incompletely known in this respect and, as the trees are of marketable proportions, new prospects may arise on further research.

Recently "Kwarrie" (*Vochysia* as well as *Qualea*) has been included in some quantity among wood imported from Surinam into Holland for industrial purposes. The main species of *Vochysia* involved are *V. tomentosa* (G. F. W. Meyer) D.C., *V. guianensis* Aubl., *V. tetraphylla* (G. F. W. Meyer) D.C. and *V. densiflora* Spruce ex Warm. Research into the qualities and anatomy is now in progress in particular in the Utrecht Botanical Museum and Herbarium.

The use of *Vochysia* species as lumber-trees is limited and purely local, mainly for miscellaneous carpentry. *V. venezuelana* Stapf. is mentioned as such by Ll. Williams (label); *V. obscura* Warm., *V. maxima* Ducke and *V. vismiifolia* Spruce ex Warm. by Le Cointe (1934); *V. guianensis* Aubl. and *V. tomentosa* (G. F. W. Meyer) D.C. by Benoist (l.c., mainly for barrel staves); *V. tetraphylla* (G. F. W. Meyer) D.C. by Stone and Freeman (l.c.; wood not durable, used mainly for barrel staves); *V. hondurensis* Sprague by Record and Mell (l.c.); *V. oppugnata* (Vell.) Warm. by Correa 1931. *V. acuminata* Bongard (sub *V. laurifolia* Warm.) may be used in parks (Correa 1926).

In other respects species of *Vochysia* are of still less importance. Record and Mell (1924) mention that "the sap of the "Vinheiro do matto" of southeastern Brazil, *Vochysia tucanorum* Mart., is gathered by the natives and that it yields upon fermentation a kind of wine or beer."

The gum arabic like resin found in the bark of some of the species (e.g. *V. thyrsoidea* Pohl sec. Silveira 1921 p. 164) seems to have excellent qualities as such and may become of some importance.

## V. NOTES AND ABBREVIATIONS.

The symbols which have been used for the herbaria are those given by Lanjouw in his lists in *Chronica Botanica* V p. 142-150 and VI p. 377-378.

The citation of herbarium specimens in the taxonomic section has been limited to a few of the more important ones in those cases, in which large numbers of collections of one species were available from a relatively small area.

The citation of localities has in general been limited to the state

or province in question. In those cases, in which only a few collections are available, the complete location given by the collector has been cited.

All epithets of species and lower ranks have been printed with small initials.

Various abbreviations:

- Fl. Months during which flowering specimens have been collected.  
 Fr. Months during which fruiting specimens have been collected.  
 B.W. Boswezen; Forestry Service of Surinam.  
 For. Dept. Forestry Department of British Guiana.  
 s.n. unnumbered specimen.

## C. TAXONOMIC SECTION.

### I. SALVERTIA.

A. St. Hilaire in *Mém. Mus. Par.* VI 1820 p. 259; - IX p. 340; Sprengel 1830 p. 8; Meisner 1836-1843 I p. 119; - II p. 85; Endlicher 1836-1840 p. 1178; Bentham and Hooker 1862 p. 977; Kuntze 1898 p. 11; Post and Kuntze 1903 p. 497 (*Salvertea*). Main citations under species.

Tree or shrub. Stipules deciduous, small. Leaves verticillate, petioled, simple, coriaceous, penninerved, equal-sided; midrib strong, prominent on the lower side; margin entire. Inflorescence thyrsoid: a compound raceme with cincinni as partial inflorescences arranged in whorls; bracts caducous, small. Flowers hermaphroditic, tetracyclic. Calyx gamosepalous, imbricate, quincuncial, base cup-shaped, limb five parted, obliquely zygomorphous, fourth calyx-lobe calcarate; lobes subequal, as large as the flower-bud. Corolla choripetalous, quincuncial, perigynous, inserted on the calyx. Petals five, membranaceous, white, subequal, alternating with the calyx-lobes. Stamen one, in front of the third petal, perigynous, inserted on the calyx; filament relatively short; anther innate, bithecate; thecae introrse, two-celled. Staminodes two, in front of the first and fifth petal, small, petaloid. Pistil tricarpellary. Ovary superior, pyramidal, trilocular; dissepiments complete, true; ovules two per cell, axile, epitropous; funicle distinct, partly adhering to the pla-

centa, raphe absent, integuments two. Style one, simple. Stigma one. Fruit a trilobular, loculicidal capsule, three-winged, each cell bearing one seed; pericarp coriaceous, exocarp blackish, firmly adhering to the shining golden yellow endocarp. Seed exalbuminous, oblong, winged; wing consisting of numerous long hairs inserted upon the brown, thin chartaceous testa, limb of the seed tomentose. Embryo homotropous, straight; radicle cylindrical, cotyledons unequal, spirolobal; plumule relatively small.

**Distribution:** See under species.

1. **Salvertia convallariodora** A. St. Hilaire sub *S. convallariaeodora* in Mém. Mus. Par. VI 1820 p. 266; Roemer et Schultes 1822 p. 52; Martius 1824 p. 153 t. 93; D.C. 1828 p. 28; Pohl 1831 p. 18 t. 110 f.; A. Dietr. 1831 p. 114; Spach 1835 p. 325; - 1846 t. 33 fig. 2; D. Dietr. 1839 p. 24; Schnizlein 1843-1870 t. 260; Lindley 1853 p. 379 fig. 265; Warm. 1875 p. 105 t. 17 fig. II; - 1889 p. 28; - 1892 p. 434; Liais 1872 p. 601; Wille 1882, p. 180 seq. (anat.); Petersen 1896 p. 316; Pilger 1901 p. 166 (ecol. p. 208); Glaziou 1905 p. 33; Ducke 1915 p. 42; - 1938 p. 45; Luetzelbourg 1923 p. 225 (ecol.); Bouillenne 1930 p. 99, 121, 141, 152 (ecol.). *Salvertia convallariaeodora* St. Hilaire 1820 p. 266; - 1824/1946 p. 40; Warm. 1867 p. 41; Baillon 1874 p. 93 fig. 124-126, p. 95; Malme 1900 p. 50; - 1905 p. 12; Spruce 1908 p. 159 (ecol.); Lemée 1934 p. 936; Record and Hess 1944 p. 552 (wood). *Salvertia thyrsiflora* Pohl 1831 p. 16 t. 110 (tab. under *S. densiflora*); A. Dietr. 1831 p. 115; D. Dietr. 1839 p. 24; Walpers 1843 p. 69.

Young parts except for the leaves fulvous puberulous. Leaves on the flowering branchlets in congested, tetra- to polymerous whorls on the thickened tops, leaving orbicular or rhomboid cicatrices after dropping. Petioles 1.0-2.5 rarely up to 4.0 cm long, terete, base incrassate. Blade 14-30 × 7-15 cm, cuneate, obovate or rarely oblong; base acute; apex broadly rounded, truncate, retuse or emarginate, sometimes mucronulate; both surfaces glabrous or nearly so, at least in adult ones. Lateral nerves prominent on the lower surface, not strictly parallel, angle with the midrib 40-70', sparsely puberulous, ending in the margin or anastomosing irregularly. Veins less prominent, reticulate. Margin flat, entire. Inflorescence terminal, pyramidal, laxiflorous. Rhachis firm, fulvous puberulous. Cincinni mostly 2-3 flowered, in polymerous whorls. Peduncles and pedicels firm, up to 3.5 and 1.5 cm long resp. Flower-bud 2-3 × 0.6-1.0 cm, apex rounded or obtuse. Flowers fragrant. Spur straight or recurved, mostly 1.5-1.8 × 0.3-0.4 cm, angle with the pedicel 30-90'. Petals

glabrous, oblong-obovate. Stamen glabrous, in the bud somewhat shorter than the petals; filament short, 0.2-0.4 cm long. Staminodes 0.2-0.3 cm long; deltoid ovate, glabrous, base cordate, apex acute. Ovary tomentose. Style glabrous, incrassate towards the apex, after anthesis excrescent. Stigma lateral, lingulate. Capsule one per peduncle, 3.0-4.5 × 1.5-2.0 cm, pseudovoid or oblong with three obtuse angles, base truncate, apex obtuse or apiculate, brownish puberulous or glabrescent. Seed at 4.0 × 1.2 cm, wing about 2.5 cm long.

Type: A. de St. Hilaire s.n. in P.

Distribution: Zone of the Brazilian Campos and in the Lower Amazonian savannas.

BRAZIL, Sao Paulo: Burchell 5385 (BR, K); Riedel 2678 (C, G-BOIS, GH, K, NY, OXF, P); Regnell III 525 (S, US). Minas Geraes: numerous collections, e.g.: St. Hilaire s.n. type (K, NY, P); Mexia 5648 (BM, F, G-DEL, GH, NY, K, P, S, U, US). Goiaz: Pohl s.n. (1257 in W) (BR, OXF, W) (monstrositas, type of *S. thyrsoflora* Pohl.); Pohl s.n. (1905 in W.) (OXF, PR, W); Glaziou s.n. (G-DEL). Matto Grosso: D. G. Smith 139 (K); Sp. Moore 28 (BM); Martius 1285 (BM, BR, C, G-DEL, GH, K, L, NY, P, S, W); Malme 1758 B (S); Lindmann A 3551 (S). Amazonas: Ducke 283 (NY). Para: Bastos 37 (RB, U); Spruce s.n. (936 in K) (BM, C, G-BOIS, G-DEL, GH, K, NY, OXF, P, US, W). Maranhao: Krukoff 2058 (G-DEL, K, NY, U, US). Piauhay: Snethlage 635 (F); Dahlgren 987 (F, US); Gardner 2570 (BM, G-BOIS, K, NY, OXF, P, US, W). Bahia: Blanchet 2896 (BM, BR, C, F, G-BOIS, K, NY, P, W).

BOLIVIA: Kuntze s.n. (F, NY, US).

SURINAM: Rombouts 275 (Upper Sipaliwini) (U).

Ecology: Characteristic tree of campos cerrados, often on dry rocky soils. Flowering reports from every month. Fruiting reports from March, May and November.

Vernacular names: BRAZIL, Minas: Bananeira do campo, Folha Larga do Campo; Colher de Vaqueiro (Glaziou l.c., Record and Hess l.c.), Moliaria (Regnell ex Warm. 1875). Matto Grosso: Folha Larga. Maranhao: Folha Larga. Piauhay: Folha Larga. Amazonas: Pau de Arara (Ducke 1915).

Observation 1: I have adopted the spelling *convallariodora* which was used for the first time by Roemer and Schultes (1822) and not *convallariaodora* which was used by St. Hilaire (1820). This is in accordance with the "International Rules of Botanic Nomenclature" (IIIrd. ed. 1935). The use of the wrong connecting vowels ae is treated as an unintentional orthographic error (art. 70 p. 22; note 2 p. 22) "which may be corrected". The correct connecting vowel is "i" (Rec. XLIV p. 24), which is eliminated because the second root begins with a vowel.

Observation 2: *Salvertia thyrsoflora* Pohl must be considered a monstrosity: it has fastigiate inflorescences with mostly sterile flowers. Only one collection of it is known.

## II. VOCHYSIA.

Poir. Encyc. VIII 1808 p. 681; Mart. 1824 p. 139; D.C. 1828 p. 26; Pohl 1831 p. 18; A. Dietr. 1831 p. 103; Spach 1835 p. 321; Meisner 1836-1843 I p. 119, II p. 85; Endlicher 1836-1840 p. 1178; D. Dietr. 1839 p. 22; Steudel 1841 II p. 779; Walpers 1843 p. 69; Benth. Hook. 1862-1867 p. 976; Baillon 1874 p. 95; - 1892 IV p. 262; Warm. 1875 p. 56; Hemsley 1888 p. 65; Glaziou 1905 p. 31; Record and Mell 1924 p. 366 (wood, use); Sprague 1929 p. 40; Benoist 1931 p. 165; Lemée 1935 p. 883; Record and Hess 1944 p. 552 (wood, use). *Vochy Aublet* 1775 p. 18. *Vochya Vandelli* 1788 p. 1; Roemer 1796 p. 69; Standley 1924 p. 302, - 1926 p. 1668. *Vochisia Juss.* 1789 p. 424; St. Hilaire 1820 p. 266; Briquet 1919 p. 377. *Salmonia Scopoli* 1777 p. 209; Necker 1790 n. 808. *Cucullaria Schreb.* 1789 p. 6; Gmelin 1791 p. 10; Willd. 1797 p. 17; Vahl 1804 p. 4; Roem. Sch. 1817 p. 36; - 1822 p. 51; Spreng. 1825 p. 16; - 1827 p. 9, - 1830 p. 7. *Strukeria Vellozo* ed. 1880 p. 7.

Trees, shrubs, rarely herbaceous. Stipules deciduous, small. Leaves scattered, opposite or in whorls, petioled, simple, coriaceous, penninerved, equal-sided; midrib strong, prominent on the lower side; margin entire or subundulate. Inflorescence terminal and sometimes also axillary; thyrsoid: a compound raceme with cincinni as partial inflorescences, scattered or arranged in whorls; rarely simple racemes; bracts caducous, small, mostly ovate and acute, size diminishing with order. Flower-bud straight or recurved. Flowers hermaphroditic, tetracyclic. Calyx gamosepalous, imbricate, quin-cuncial, base cup-shaped, limb five-parted; lobes unequal: fourth lobe large, calcarate, enveloping the inner cycles, as long as the flower-bud; of the four smaller lobes, which rarely surpass in length one fourth of the calcarate lobe, the first and the second (lateral ones) are smallest. Corolla mostly yellow, choripetalous, perigynously inserted upon the calyx. Petals mostly three, sometimes none, rarely one; membranaceous, mostly unequal, centre petal alternating with the third and the fifth calyx-lobe; lateral ones if present alternating with the first and third and the second and fifth calyx-lobe respectively, partly enclosed by the centre petal. Stamen one, in front of the centre petal, perigynously inserted on the calyx, filament never longer than half the stamen; anther elongate, innate, bithecate, thecae introrse and two-celled, connective mostly surpassing cells as a cucullate apex. Stamnodes two, opposite the lateral petals, small, petaloid. Pistil tricarpellary. Ovary superior, pyramidal, trilocular, dissepiments complete and true; ovules two per cell, axile, epitro-

pous; funicle distinct; raphe absent; integuments two. Style one, simple. Stigma one. Fruit a trilocular loculicidal ovoid or oblongoid capsule, three-winged, each cell bearing one seed, pericarp coriaceous or nearly woody, exocarp mostly blackish or dark blueish, strongly adhering to the shining golden-yellow endocarp. Seed exalbuminous, oblong, winged; wing consisting of numerous long hairs inserted on the brown, thin, chartaceous testa; limb of the seed tomentose. Tegmen very thin, paperwhite, adhering to the testa. Embryo homotropous, straight; radicle cylindrical; cotyledons unequal, spirilobal; plumule relatively small.

Type: *Vochysia guianensis* Aubl.

Distribution: 97 species in tropical Latin America.

Ecology: Mostly trees from rain forests or campos.

### Key to the sections.

1. *a.* Ovary pilose . . . . . 2
- b.* Ovary glabrous. . . . . Sect. B. *Ciliantha* p. 445
2. *a.* Cortex exfoliating, petals present, stamen glabrous or at most subpilose. . . . . Sect. A. *Vochysiella* p. 424
- b.* Cortex not exfoliating, petals absent, stamen villose . . . . . Sect. C. *Pachyantha* p. 522

### Section A. VOCHYSIELLA StafI. nov. sect.

Decorticantes. Petala tria, glaberrima, rarissime apice ciliata. Stamen glaberrimum, rarissime margine ciliatum. Staminodia parva, glaberrima, circa 0.1 cm longa. Ovarium tomentosum.

Adult branchlets terete or subterete. Cortex exfoliating. Stipules if present smaller than 0.1 cm, acute, deciduous. Leaves mostly in tri- to polymeric whorls. Marginal nerves none or subdistinct. Veins reticulate. Margin entire, flat or subrevolute. Cincinni 1-3 flowered, rhachis angled, rarely subterete. Petals three, glabrous or apex rarely ciliate. Stamen glabrous, rarely with some marginal cilia. Staminodes glabrous, rarely surpassing 0.1 cm. Style glabrous except for the tomentose base. Ovary tomentose.

Distribution: Widely distributed in the Hylaea americana and the Extra-Amazonian Province of Brazil.

### Key to the subsections.

1. *a.* Flower-buds larger than 1.3 cm, nervation irregular, leaves glabrous, pilose or glaucous . . . . . Subject. A. I. *Decorticantes* p. 425

- b.* Flower-buds smaller than 1.2 cm, nervation regularly reticulate with narrow meshes. Leaves never tomentellous nor glaucous beneath . . . . . Subsect. A II. *Calophylloideae* p. 435

### Subsection A I. DECORTICANTES Warm.

Warming in *Flora Bras.* XIII, II, p. 57 sub titulo series.

Mostly shrubs. Leaf-base variable. Lateral nerves irregularly anastomosing, not or only in part parallel, on both sides only slightly prominent or not prominent at all; angle with the midrib 60-80°. Veins in some cases nearly obsolete, otherwise inconspicuous or faintly developed. Inflorescence mostly terminal, rarely also axillary, indumentum variable, but always present. Flower-buds subrecurved. Spur, except in *V. divergens* Pohl, recurved, cylindrical, apex often incrassate and discolor, always shorter than the flower-bud. Petals glabrous, shorter than the stamen except in *V. cinnamomea*. Filament attaining 1/3-1/5 of the length of the stamen. Style mostly cylindrical, rarely subclavate at the top or subincrassate at the base.

*Distribution:* Zone of the Central Brazilian and Bolivian campos.  
*Ecology:* Mainly shrubs from the campos.

### Key to the species.

1. *a.* Leaves densely tomentose beneath, especially the younger ones . . . . . 2
- b.* Young leaves glabrous . . . . . 7
2. *a.* Base of the leaf-blade cuneate . . . . . 3
- b.* Base of the leaf-blade cordate or rounded. Leaves mainly greyish or brownish greyish tomentose beneath. Blade oblong-ovate. Petiole 0.2-0.4 cm long . . . 1. *V. petraea* Warm.
3. *a.* Petioles shorter than 1.0 cm, leaves almost sessile . . . 4
- b.* Petioles 2-3 cm long. Indumentum on the lower side of the leaf moderately developed. Leaves in conferted whorls on the tops of the flowering branchlets. . . . . 4. *V. rufa* Mart. spp. *eu-rufa* Stfl.
4. *a.* Spur straight or only slightly recurved, tree or shrub. . . 5
- b.* Spur of younger buds strongly recurved. Suffruticose or herbaceous plant with a fulvous indumentum. . . . . 2. *V. herbacea* Pohl.
5. *a.* Leaves beneath densely canescent cinamomeous-tomentose . . . . . 3. *V. cinnamomea* Pohl.
- b.* Leaves beneath not cinamomeous-tomentose . . . . . 6

6. *a.* Indumentum rufous. Flower-bud tomentose. Leaves subdistinctly petioled: 1 cm or less. . . . . 4. *V. rufa* Mart. ssp. *eu-rufa* Stafl. var. *brevipetiolata* Warm.  
*b.* Indumentum fulvous. Flower-bud sericeous. Leaves sessile . . . . . 4. *V. rufa* Mart. ssp. *sericea* (Pohl) Stafl. var. *fulva* Stafl.
7. *a.* Leaves sessile or very shortly petioled . . . . . 8  
*b.* Petioles longer than 1.0 cm. . . . . 12
8. *a.* Leaf-base cordate, rounded or broadly obtuse, leaves glaucous . . . . . 9  
*b.* Leaf-base acute . . . . . 10
9. *a.* Peduncles and pedicels densely ferrugineous-tomentose . . . . . 6. *V. pruinosa* Pohl.  
*b.* Peduncles and pedicels subpilose but not tomentose. Leaves mostly smaller than  $7 \times 4$  cm . . . . . 7. *V. elliptica* Mart.
10. *a.* Leaves subscattered, smaller than 10 cm; leaves and twigs glaucous; plants suffruticose . . . . . 8. *V. pumila* Pohl.  
*b.* Leaves in whorls. Trees or shrubs, never glaucous, adult leaves longer than 15 cm . . . . . 11
11. *a.* Cortex pilose . . . . . 4. *V. rufa* Mart. ssp. *sericea* (Pohl) Stafl.  
*b.* Cortex glabrous . . . . . 5. *V. sessilifolia* Warm.
12. *a.* Flower-bud rounded-obtuse, spur incurved, petiole 2.5-3.0 cm long . . . . . 9. *V. divergens* Pohl.  
*b.* Flower-bud acute or acuminate, spur recurved or slightly S-shaped, petioles 0.9-1.5 cm long 10. *V. gardneri* Warm.

1. *Vochysia petraea* Warm. in *Flora Bras.* XIII, II p. 63; Malme 1900 p. 47; - 1905 p. 8.

Shrub 2-4 m. Branchlets terete, cortex greyish-brown, very slightly greyish-pilose, wood reddish-brown. Stipules none. Leaves in trimerous whorls; petioles 0.2-0.4 cm long; blade broadly oblong or ovate-oblong,  $5-7 \times 3.0-3.5$  (2.6-3.8) cm, base and apex emarginate and rounded; young leaves glabrous, subnitid and yellowish-green above, densely greyish-tomentellous beneath; lateral nerves 12-15, angle with the midrib about  $80^\circ$ , slightly prominent. Inflorescence terminal, greyish or greyish-brown tomentellous; bracts at 1.0 cm long. Flower-bud 1.0-1.5 cm long, apex acute. Spur making an angle of about  $60^\circ$  with the pedicel,  $0.5-0.7 \times 0.2-0.3$  cm. First petal about 0.7 cm long, about half as long as the stamen. Filament about 0.4 cm long; anther about 0.9 cm long, apex rounded, apex-lobe of

the cucullate part of the stamen subtriangular. Staminodes about 0.05 cm long, triangular, subacute.

**Type:** Riedel s.n. Serra da Chapada, prob. in LE, excellent duplicate in OXF.

**Distribution:** Known only from the Serra da Chapada in Matto Grosso.

**BRAZIL, Matto Grosso:** Riedel s.n., type (OXF; C fragm.) Malme I 1654 B (S).

**Ecology:** On sunny windy rocks often wetted by clouds and mist. Fl.: May-June.

2. *Vochysia herbacea* Pohl, Plant. Bras. II p. 27, t. 118; A. Dietr. 1831 p. 114; D. Dietr. 1839 p. 24; Walpers 1843 p. 69; Warm. 1875 p. 64; Malme 1905 p. 8; Glaziou 1905 p. 31. *Vochysia douradensis* Taub. 1896 p. 440.

Perennial herb or undershrub completely covered with a fulvous-puberulous indumentum; petals, inner side of the sepals, stamen and style are partly or totally glabrous. Stem erect, simple, young parts subtomentose. Stipules 0.1-0.2 cm long, hidden in the indumentum. Leaves in tetra- to polymerous whorls, sometimes subscattered; petioles 0.2-0.5 cm long; younger leaves with a denser indumentum above than the adult ones; blade 8-10 × 3.5-5.5 cm, elliptic, obovate or ovate, upper leaves oblanceolate; apex mucronate, obtuse or rounded, rarely retuse; base cuneate; margin subrevolute; 12-15 major lateral nerves, parallel, angle with the midrib 60-70', specially marked by rows of hairs on the upper surface, subprominent on the lower side. Inflorescence terminal, solitary; cincinni 2-3 flowered; bracts linear or lanceolate, subsericeous. Flower-bud recurved, 1.5-1.8 × 0.3-0.4 cm, subsericeous, apex rounded or obtuse. Spur 0.4-0.8 cm, recurved, angle with the pedicel 60-90'. First petal about half as long as the stamen, apex obtuse or truncate. Stamen with minutely pilose margins. Filament about 0.4 cm, anther about 1.0 cm long. Staminodes lingulate. Stigma partly lateral, diam. about 0.05 cm.

**Type:** Pohl 1219, Goyaz, Rio Urubu in W.

**Distribution:** Central Brazilian Plateau.

**BRAZIL, Goyaz:** Pohl (1219 in W), type, (BR, G-BOIS, OXF, W, M acc. to fotogr. in GH); Glaziou 20690 (BR, C, G-DEL K, P); Burchell 7378 (K); - 6403 (K); Hilaire c. 887 (P). **Matto Grosso:** Malme II 3475 (S). No further location: Riedel s.n. (OXF); Tamberlik s.n. (W); Ule in herb. Glaziou 432, type dupl. of *V. douradensis* Taub. (P).

**Ecology:** In dry, rarely subhumid, rocky or sandy campos. Fl. reports from Feb., June; Fr. rep. from Aug.

3. *Vochysia cinnamomea* Pohl, Plant. Bras. II p. 29, t. 120; A. Dietr. 1831 p. 110; D. Dietr. 1839 p. 23; Walpers 1843 p. 69;

Warm. 1867 p. 38; - 1875 p. 65; - 1889 p. 24; Wille 1882 p. 180 seq. (anat.); Malme 1905 p. 8; Glaziou 1905 p. 31.

Shrub. Young leaves beneath and young parts of the petioles and the branchlets cinnamomeous tomentose; upper surface of the leaves canous-pubescent. Adult leaves nearly glabrous above, canescent beneath; inflorescence shortly ferrugineous-cinnamomeous tomentose. Branchlets rapidly exfoliating. Stipules under 0.05 cm long, hidden in the tomentum. Leaves in conferted polymerous whorls on the tops of flowering branchlets. Petioles 0.2-0.8 cm. long. Blade 12-15 (5-22) × 3-5 (2-8) cm, oblong, oblong-obovate or oblong-elliptic; base acute; apex obtuse-rotundate, sometimes retuse. Lateral nerves slightly prominent on the upper surface of the leaves, lost in the tomentum on the lower surface, numerous, angle with the midrib 60-75°, veins only visible above. Inflorescence terminal, elongate. Flower-buds straight or subrecurved, 1.5-2.0 cm long. Spur 0.5-1.0 cm long, terete, angle with the pedicel 30-120°. Centre petal as long as the stamen, obovate-oblong. Stamen glabrous; filament 0.06-0.10 cm wide, wider than in *V. rufa*; length of the anther 4-5 times that of the filament. Staminodes acute, about 0.05 cm long. Stigma lateral, suborbicular.

Type: Pohl 1056 in W.

Distribution: Central Brazilian Plateau and N. Paraguay.

PARAGUAY, Sierra de Amanbay, Rojas (Hassler) 10232 (BM, G-DEL, K, P, W).

BRAZIL, Sao Paulo: Lund s.n. (C, P); Regnell III 530 (S, US); - III 530 b (S, P); Burchell 5386 (K); - 5353 (K). Goyaz: Pohl 1056, type (BR, W, M acc. to fotogr. in GH); Glaziou 20687 (BR, C, G-DEL, K, P). Minas Geraes: Warm. s.n. (C); Glaziou 15947 (C, K, P); Hilaire c. 356 (P). Matto Grosso: Malme I s.n. (S); Malme II 3372 (S); - II 2017 (S). Locality unknown: Sello s.n. (K, NY, P, US); Barreto 7105 (F); Pohl s.n. (BR, OXF); Riedel s.n. (BM, C, G-DEL, GH, K, NY, P, S, US, W).

Ecology: In dry campos cerrados. Fl.: Dec.-June. Fr.: Aug.

4. *Vochysia rufa* Mart., Nov. Gen. I p. 144, t. 86; D.C. 1828 p. 27; A. Dietr. 1831 p. 109; Spach 1835 p. 322; D. Dietr. 1839 p. 23; Warm. 1869 p. 38; - 1875 p. 66; 1889 p. 24; Wille 1882 p. 180 seq. (anat.); Kuntze 1896 p. 12; Glaziou 1905 p. 31. *Cucularia rufa* Spreng. 1827 p. 9.

ssp. *eu-rufa* Stapf. n. ssp. (includes f. *typica* Warm. 1875 p. 66)

Diagn. vide Martius l.c.

Tree. Leaves on the tops of flowering branchlets in conferted polymerous whorls. Young leaves on both surfaces dark rufous-ferrugineous tomentellous, not canescent but deciduous above.

Petioles 2-3 cm long, together with the cortex greyish tomentellous. Blade 11-19 × 4-7 cm, oblong or elliptic; base acute; apex obtuse-rotundate, sometimes mucronate or retuse. Adult leaves beneath rufous-ferruginous tomentellous especially on the central parts. Nervation not prominent above, slightly prominent beneath. Major lateral nerves 12-18, subparallel, angle with the midrib 60-80', irregularly anastomosing. Inflorescence terminal, densely ferruginous tomentose, especially on the younger parts. Cincinni 2-4 flowered. Flower-buds obtuse, 1.5-2.0 cm long, typically tomentose in this subspecies. Spur 0.5-1.0 cm long, terete, straight, angle with the pedicel variable. First petal covering about 2/3 of the stamen (in the bud), glabrous. Stamen glabrous. Length of the filament 1/3-1/4 of that of the stamen, canaliculate, slender: 0.02-0.05 cm wide. Staminodes lingulate, apex obtuse or subrotundate. Stigma lateral, orbicular.

Type: Martius s.n. Minas Geraes ad Vao Paranon, prob. in M, not seen by the present author.

Distribution: Central Brazilian and Bolivian Plateau.

BOLIVIA, Kuntze s.n. (NY, US).

BRAZIL, Minas Geraes: Mexia 5538 (BM, GH, K, NY, P, S, U, US); Glaziou 19160 (C, P); Hilaire s.n. (K, P); Lund s.n. (C); Warm. 484 (C); - s.n. (C); Barreto 7101, 7102, 7104 (F). Claussen coll. 1837 (L); - 478 (C, GH, P, S); - coll. 1840 (BM, G-BOIS, NY); - coll. 1839 (G-DEL, K, P, W). Goyaz: Weddel s.n. (P). Locality unknown: Richard s.n. (P); Sello s.n. (P, US); Claussen 130 A (BR, GRON; NY).

Ecology: In campos cerrados. Fl. Feb.-July.

Vernacular Names: BRAZIL, Minas: Pao doce.

var. *brevipetiolata* Warm. in Flor. Bras. XIII, II, p. 66; Malme 1900 p. 48; *Vochysia brevipetiolata* Malme 1905 p. 9 (Most remarks however concern specimens belonging to *V. rufa* ssp. *sericea* var. *fulva*).

Petioles shorter than 1 cm, leaves elliptic-subobovate, stigma partly lateral, partly terminal.

Type: Gardner 4127 in K.

Distribution: BRAZIL, Minas Geraes: Burchell 5780 (K); Goyaz: Sao Domingo Gardner 4127 type (BM, BR, G-BOIS, K, NY, OXF, P, W).

ssp. *sericea* (Pohl) Staf. nov. comb. *Vochysia sericea* Pohl 1831 p. 28 t. 119; Geel 1828 seq.; A. Dietr. 1831 p. 109; D. Dietr. 1839 p. 22; Walpers 1843 p. 69. *Vochysia rufa* Mart. var. *sericea* Warm. 1875 p. 66.

Petioles 0.0-0.1 cm long. Leaves obovate-spatulate, always glabrous above in the typical form, on the lower surface mostly glabrous but

sometimes slightly pilose. Inflorescence subsericeous or subtomentose, indumentum fulvous. Flower-buds fulvous-sericeous. Stigma partly terminal, partly lateral.

Type: Pohl 4286, Olho d'Agoa, Goyaz in W.

Distribution: Central Brazilian Plateau.

BRAZIL, Minas Geraes: Regnell III 532 (S, US); Hilaire c. 1, 502 (P). Goyaz: Pohl 4286 type (BR, OXF, W); Weddel 2632 (NY, P); Hilaire 887-tert. (P). Sao Paulo: Burchell 5525 (K). Locality unknown: Riedel s.n. (G-BOIS, K); Burchell 705 A (K).

Ecology: Dry campos. Fl.: Mar.-Apr. Fr.: Sept.

Vernacular names: Vinhatu (Minas).

var. *fulva* Staf. nov. var.

Folia sessilia, fulvo-tomentosa, supra glabrescentia.

Leaves sessile, on both sides fulvous-tomentose, glabrescent above.

Type: Malme I 1540 B in S.

Distribution: Central Brazilian Plateau.

BRAZIL, Matto Grosso: Malme I 1540 B type (GH, S); - II 3126 (S); - II 1851 (S); Riedel s.n. (BM, K, OXF, P). Goyaz: Gardner 3712 (K). Locality unknown: Burchell 6759 (K).

Ecology: Among the largest trees of the campos. Fl.: Feb.-Jun.

Vernacular names: Pao doce (Goyaz).

Observation regarding the subdivision:

Warming (1875) pointed out already that *V. sericea* Pohl had so much in common with *V. rufa* Mart. that it ought to be brought back to the status of a variety. At the same time he described a var. *brevipetiolata* (type Gardner 4127) and a forma *typica*. Malme (1905) partly on account of his own collections considered this last variety as a separate species *V. brevipetiolata* with obovate-cuneate leaves and fulvous indumentum, but apparently did not see the Gardner-type. A survey of the material listed above shows:

1. Gardner 4127 differs from *V. rufa* as described by Martius only in a shorter petiole and elliptical-subobovate-leaves.

2. The Pohl-specimens named *V. sericea* Pohl, differ from *V. rufa* as described by Martius in the fulvous-sericeous indumentum on several parts of the inflorescence and in the absence of hairs on the leaves, the extremely short petioles and the spatulate-obovate leaves.

3. Malme 1540 B differs from *V. rufa* in the same respects as the "sericea" specimens, but has a fulvous-tomentellous indumentum on the leaves.

I don't think that the characters listed sub 2 are sufficient to justify the rank of species, but they are more important than ordinary varietal ones. The floral structure of both groups of specimens is exactly the same. For this reasons I have proposed the subdivision given above. The subsection which includes the type of Martius has been named *eu-rufa*, *rufa* being the earliest epithet.

5. *Vochysia sessilifolia* Warm. in Flor. Bras. XIII, II p. 67; Malme 1905 p. 8; Correa 1926 p. 416.

Shrub. Glabrous except for the slightly puberulous inflorescence

and the subsericeous flower-buds. Branchlets black, subnitid, striate. Stipules smaller than 0.1 cm, triangular. Leaves in polymerous whorls, almost or entirely sessile, petioles consisting of a broadened base of the midrib only. Blade 11-16 × 4-7 cm, obovate, spatulate or elliptic-obovate; apex rounded or obtuse, sometimes slightly emarginate; base cuneate. Nervation subprominent and concolor, on the upper side very slightly prominent, discolor on the lower side. Inflorescence terminal and elongate. Cincinni mostly 2-flowered. Rhachis subterete. Flower-bud 1.3-1.7 × 0.2-0.3 cm, apex obtuse or subacute. Spur slender, 0.6-0.8 × 0.1 cm, recurved or S-shaped. Centre petal covering 1/3-2/3 of the stamen (in the bud). Stamen glabrous; filament 0.3-0.4 cm long; anther about 1.0 × 0.2 cm, apex acute. Stigma lateral, small.

**Type:** Da Silva Manso 51. The G-DEL. specimen was not seen by Warming, but the whereabouts of his original specimen are unknown. Other specimens mentioned and seen by Warming are Lhotsky and Tamberlik in W.

**Distribution:** BRAZIL, MATTO GROSSO: Da Silva Manso 51, type (G-DEL); Malme (II 2339, II 2339a, II 2339b, II 3362, II 3362a, 1929, 1929a all in S); D. G. Smith 176 (K). **Locality unknown:** Lhotsky 51 cotype (or same as type?) (W); Tamberlik s.n. cotype (W).

**Ecology:** In campos cerrados. Fl.: May-Sep.

**Vernacular names:** Cambará do Campo (Matto Grosso sec. Correa l.c.).

**6. *Vochysia pruinosa* Pohl, Plant. Bras. II p. 22 t. 114; A. Dietr. 1831 p. 105; D. Dietr. 1839 p. 22; Walpers 1843 p. 69; Warm. 1875 p. 67.**

Shrub. Glabrous except for the inflorescence. Leaves and branchlets glaucous-pruinose. Cortex of the branchlets lurid. Leaves in tetramerous whorls. Petioles 0.2-0.3 cm long, striate. Blade 10-15 × 5-8 cm, elliptic, oblong-elliptic or sometimes subobovate; apex rounded, broadly emarginate, sometimes subobcordate; base rounded. Major lateral nerves 10-15, angle with the midrib 60-70°, not or only slightly prominent. Veins inconspicuous. Inflorescence terminal, cylindrical; rhachis subterete, together with the peduncles, pedicels and the outside of the calyx rufous-fulvous tomentellous, sometimes subsericeous. Cincinni 2-3 flowered. Flower-buds 2.0-3.5 × 0.3-0.4 cm, apex obtuse-rounded. Apex of the calyxlobes rounded. Spur recurved 0.15-0.25 cm wide, about 1 cm long. Petals subequal, centre one (in bud) covering about 2/3 of the stamen. Stamen glabrous, filament taking about 1/3 of the total length. Staminodes suborbicular. Stigma small, lateral.

**Type:** Pohl 1640 Goyaz, Serra Dourada in W.

**Distribution:** BRAZIL, Goyaz: Pohl s.n. (1640 in W, 327 in PR)

type (BR, G-BOIS, OXF, PR, W); Burchell 7112 (K) - 7626 (K); - 8273 (K); Gardner 3713 (BM, G-BOIS, K, NY, OXF, PR, W); Glaziou 20691a (C, P).

**E c o l o g y:** Dry mountainous campos. Fl.: Mar.-Sep. Fr.: Sep.-Nov.

**V e r n a c u l a r n a m e s:** Murici doce (Goyaz).

7. *Vochysia elliptica* Mart., Nov. Gen. I p. 141 t. 84, D.C. 1828 p. 27; A. Dietr. 1831 p. 107; Pohl 1831 (p. 31 sub *V. elliptica*, p. 30 sub *V. rotundifolia*); Spach 1835 p. 322; D. Dietr. 1839 p. 23; Warm. 1867 p. 33; - 1875 p. 68; - 1889 p. 24; - 1892 p. 434; Wille 1882 p. 180 seq. (anat.); Glaziou 1905 p. 32; Luetzelbourg 1923 p. 225 (habitat). *Vochysia elliptica* Briq. 1919 p. 384; *Vochysia warmingiana* Taub. ex Glaziou 1905 p. 33 n.n. *Cucullaria elliptica* Spreng. 1827 p. 9.

Shrub or small tree. Glabrous except for a scanty indumentum on the inflorescence. Leaves and cortex of the branchlets glaucous-pruinose. Stipules smaller than 0.2 cm, slightly pilose. Leaves in tri- or tetramerous whorls. Petioles 0.1-0.3 cm long. Young leaves pruinose. Blade 6-7 × 3-4 (3-10 × 2-5) cm, elliptic, oblong or ovate; base rounded and emarginate; apex rounded or obtuse, retuse or emarginate. Lateral nerves slightly prominent on both sides; angle with the midrib 60-70°. Veins slightly more conspicuous than in *V. pruinosa*. Margin subrevolute. Inflorescence terminal and axillary, pyramidate; rhachis, peduncles, pedicels and outside of the calyx scantily hairy. Cincinni 2-3 flowered. Flower-buds 1.5-2.0 (-2.5) × 0.3-0.4 cm, apex acute or acuminate. Smaller calyx-lobes deltoid acute. Spur 0.7-1.2 (-1.5) × 0.10-0.15 cm, recurved. Petals (in bud) covering half or one third of the stamen, subunequal. Stamen glabrous, filament about one fourth of the total length. Stigma partly lateral.

**T y p e:** Martius s.n. Minas, Serra de Itambé, prob. in M, not seen by the present author.

**D i s t r i b u t i o n:** BRAZIL, Minas Geraes: Numerous collections in many herbaria e.g.: Mexia 5878 (BM, F, G-DEL, GH, NY, P, S, US); Glaziou 19159 type of *V. warmingiana* Taub. (C, K, P); Pohl 655 (W); s.n. G-BOIS); - s.n. (3149 in W) (F, OXF, W); Hilaire b<sub>1</sub> 1239 (P; s.n. F). G o y a z: Lund s.n. (S); Glaziou 20691 (C, G-DEL, K, P); Hilaire c<sub>1</sub> 909 bis (P); R i o d e J a n e i r o: Hilaire s.n. (c<sub>1</sub> 684 in P) (F, K, NY, P). B a h i a: Blanchet s.n. (BR); - 2886 (BM, G-BOIS, K, NY, OXF, P, W).

**E c o l o g y:** Dry rocky campos cerrados. Fl.: Feb.-Oct. Fr.: Sep.-Oct.

**V e r n a c u l a r n a m e s:** Pao doce (sec. Warm. 1867, Minas).

**var. firma** Mart. ex Warm. in Flor. Bras. XIII, II p. 69.

Leaves larger (6-10 × 4-6 cm); shining or sometimes almost vernicose above; petioles longer: 0.6-1.0 cm.

Type: Martinus, Rio de Janeiro in M; not seen by the present author  
 Distribution: BRAZIL, Rio de Janeiro: see type; Pernambuco: Gardner 2840 (BM, K), probably belonging to this variety.

8. *Vochysia pumila* Pohl, Plant. Bras. II p. 22 t. 113; Geel 1828 seq.; A. Dietr. 1831 p. 113; D. Dietr. 1839 p. 23; Walpers 1843 p. 69; Warm. 1875 p. 69; - 1889 p. 24; Malme 1905 p. 9. *Vochysia alternifolia* Briq. ex Glaziou n.n. 1905 p. 33. *Vochysia alternifolia* Briq. 1919 p. 384.

Unbranched shrub or undershrub. Glabrous except for the scantily fulvous-pilose inflorescence. Stem and leaves slightly pruinose. Stipules none. Leaves scattered, subscattered or in heteromerous whorls; gradually attenuating towards the 0.0-0.8 cm long petioles. Blade 6-10 × 2-4 cm, elliptic, subspatulate or subobovate-elliptic; apex obtuse-rotundate, mucronate, rarely retuse. Nervation not prominent, discolor beneath. Lateral nerves inconspicuous, angle with the midrib 60-70°. Veins nearly obsolete. Midrib vanishing in the blade towards the apex. Margin discolor. Inflorescence terminal, top-part a simple raceme, lower part with 2- rarely 3-flowered cincinni. Flower-buds 1.5-2.0 × 0.30-0.35 cm, fulvous-subsericeous, apex obtuse or subacute. Spur with a slightly discolor apex, subrecurved or slightly S-shaped, 0.6-1.2 × 0.15-0.20 cm. Petals subequal, less than half as long as the stamen. Stamen glabrous, apex obtuse; length of the filament one third or one fourth of that of the stamen. Staminodes obovate-rotundate. Stigma terminal, diam. 0.05-0.07 cm.

Type: Pohl 654 in W; Serra Spilons, Minas Geraes.

Distribution: BRAZIL, Minas Geraes: Weddel 1876 (G-DEL, P); - 1877 (P); Pohl s.n. (654 in W) type, (BR, OXF, W); Claussen 129 A (BR); - 481 (P). Goyaz: Glaziou 20689, cotype *V. alternifolia* Briq. in G-DEL; type of *V. goyazensis* Gilg. mss n.n. in B; (BR, C, G-DEL, K, P) (B acc. to photogr. in F); - 20688, cotype *V. alternifolia* Briq. in G-DEL, (BR, C, G-DEL, K, P, S). Locality unknown: Riedel s.n. (K, P); Sello s.n., type of *V. achrophylla* Zucc. mss and of *V. alternifolia* Briq. in G-DEL, (G-DEL, P); Ferreira 818 (K).

Ecology: Campos. Fl. and Fr.: Sept.-Nov.

9. *Vochysia divergens* Pohl, Plant. Bras. II p. 19 t. 111; A. Dietr. 1831 p. 109; D. Dietr. 1839 p. 22; Walpers 1843 p. 69; Warm. 1875 p. 70; Malme 1905 p. 10 (ecol. p. 1 seq.); Correa 1926 p. 412.

Shrub or small tree. Entirely glabrous except for the slightly pilose inflorescence, stipules and young parts of the cortex. Wood of the branchlets after exfoliation red-brown. Stipules about 0.1 cm

long, triangular-lanceolate. Leaves in tri- or tetramerous whorls. Petioles 2.0-3.5 cm long; those of the young leaves relatively long. Blade 8-12 × 3-4 cm, oblong, elliptic or elongate elliptic; base cuneate; apex rounded or obtuse, retuse or emarginate; vernicose above, dull beneath. Lateral nerves not prominent, 15-20 major ones; angle with the midrib 60-70°; veins inconspicuous, nearly obsolete beneath. Inflorescence terminal and axillary; characterised by the long and slender pedicels, which have lengths varying with their order (0.5-1.3 × 0.05 cm). Cincinni 2-3 flowered. Flower-buds about 1.5 × 0.3 cm; apex obtuse-rotundate. Spur incurved, 0.5-1.0 × 0.10-0.15 cm. Petals half as long as the stamen, subunequal. Stamen subclavate, glabrous, obtuse. Apex and base of the style slightly incrassate. Stigma lateral, three-lobed, diam. 0.1-0.2 cm.

Type: Pohl 2254 in W; Rio Manoel Alvez, Goyaz, Brazil.

Distribution: BRAZIL, Goyaz: Pohl s.n. (2254 in W) type (BR, OXF, W; M acc. to fotogr. in GH). MATTO GROSSO: Cuyaba, Malme II 1744 (S); San Luis, Sandeman 2123 (K); Leeson s.n. (BM). Locality unknown: Richard s.n. (P); Riedel s.n. (BM, GH, K).

BOLIVIA, Cumming 227 (W); Bridges s.n. (BM, G-BOIS, K, S).

Ecology: In Gallery forests flooded during the rains in the zone of the Central Brazilian Campos. Fl.: Jun.-Aug. Visited by colibris.

Vernacular names: Cambara (Matto Grosso, sec. Malme l.c. and Correa l.c.).

#### 10. *Vochysia gardneri* Warm. in Flor. Bras. XIII, II p. 70.

Tree. Cortex of the branchlets pilosellous, brownish-black with yellowish stripes running down from the leaf-bases. Young parts and axillary buds fulvous-tomentellous. Leaves mostly in tri- rarely in di- or tetramerous whorls. Petioles 0.9-1.3 cm long. Blade 7-8 × 3.0-3.5 cm, oblong; base abruptly cuneate and acute; apex rounded or subtruncate, mostly retuse; upper surface shining, slightly hairy on the midrib, otherwise with the lower side entirely glabrous. Major lateral nerves 15-20, very slightly prominent on both sides, subparallel, angle with the midrib 60-70°; veins inconspicuous. Inflorescence terminal, cylindrical. Rhachis, peduncles and pedicels fulvous-tomentellous; outside of the calyx slightly adpressed pilose. Cincinni 1- rarely 2-flowered. Pedicels about 0.1 cm wide. Flower-buds acute or subacuminate. Spur recurved, 0.6-0.7 cm long, apex discolor. Petals about half as long as the stamen, subequal. Stamen glabrous; length of the filament about one third of that of the stamen. Staminodes lingulate, apex obtuse. Stigma partly lateral, diam. 0.05-0.10 cm.

Type: Gardner 4126 in K; San Domingos, Goyaz, Brazil.  
 Distribution: BRAZIL, Goyaz: Gardner 4126 type (BM, BR, G-BOIS, G-DEL, K, OXF, P, W) (In B acc. to photogr. in F).  
 Ecology: On a sandy chapada. Fl.: May.

### Subsection A II. CALOPHYLLOIDEAE Warm.

Warm. in Flora Bras. XIII, II p. 59 sub titulo series.

Trees of medium size. Cortex blackish. Stipules lighter coloured than the cortex, pilose. Petioles blackish. Adult blade glabrous, rarely sparsely pilose beneath; lower side often darker coloured than upper side; base cuneate. Lateral nerves parallel, angle with the midrib 60-80', arcuately anastomosing or joining a real marginal nerve. Nervation regularly reticulate, meshes small; mostly subprominent above. Inflorescence terminal and mostly also axillary; mostly multiflorous; cylindrical, mostly puberulous. Flower-buds straight or subrecurved, pilose, shorter than 1.2 cm. Spur cylindrical, only in one or two cases with a slightly incrassate apex. Petals glabrous or with a ciliate apex. Stamen with a 0.2-0.3 cm long filament, glabrous or slightly adpressed pilose.

Distribution: Hylaea americana.

Ecology: Mainly rain forest-trees, one or two savanna-species.

### Key to the species.

1. *a.* Spur straight, making an acute angle with the bud, often more or less inflated. Lateral nerves making an angle of 70-80' with the midrib . . . . . 2
- b.* Spur re- or incurved, slender . . . . . 3
2. *a.* Spur inflated, 0.3-0.4 cm wide. Leaves oblong . . . . . 14. *V. surinamensis* Staf. var. *inflata* Staf.
- b.* Spur not or only slightly inflated, leaves obovate . . . . . 14. *V. surinamensis* Staf.
3. *a.* Spur incurved. . . . . 4
- b.* Spur recurved. . . . . 5
4. *a.* Stigma terminal, small. Petioles longer than 1.5 cm . . . . . 19. *V. haenkeana* Mart.
- b.* Stigma lateral, larger than the diameter of the style. Petioles shorter than 1.3 cm . . . . . 20. *V. mapirensis* Rusby
5. *a.* Petals in the bud about half as long as the stamen. . . 6
- b.* Petals nearly as long as the stamen. Lower third of the style tomentose. . . . . 18. *V. lehmannii* Hier.
6. *a.* Marginal nerve present. . . . . 7
- b.* Marginal nerve absent or inconspicuous . . . . . 9

7. *a.* Marginal nerve running at less than 0.1 cm from the margin. Upper leaves up to 13 × 5 cm, shining on both surfaces . . . . . 15. *V. venulosa* Warm.  
*b.* Marginal nerve at 0.1-0.2 cm from the margin. Leaves smaller . . . . . 8
8. *a.* Stigma terminal and small. Leaves 4-6 cm long, upper surface dull . . . . . 17. *V. expansa* Ducke  
*b.* Stigma lateral and larger than the diameter of the style. Leaves 6-12 cm long, upper surface nearly vernicose . . . . . 16. *V. diversa* Macbr.
9. *a.* Fourth calyx-lobe passing into the spur with a rounded angle . . . . . 10  
*b.* Fourth calyx-lobe making an acute angle with the spur. Spur subrecurved or straight. Leaves in trimerous whorls . . . . . 14. *V. surinamensis* Stapf.
10. *a.* Stigma lateral and relatively large . . . . . 11  
*b.* Stigma terminal, small. Upper surface of the leaves shining, veins and lateral nerves equally subprominent . . . . .
11. *a.* Stigma 2-3 lobed. Leaves spatulate-oblong; on the tops of the branchlets mostly about 3 cm wide; upper surface dull . . . . . 13. *V. obidensis* Ducke  
*b.* Stigma suborbicular. Leaves mostly 4-5 cm wide, obovate, shining . . . . . 12. *V. venezuelana* Stapf.

11. *Vochysia obscura* Warm. in Flora Bras. XIII, II p. 73 t. 13; Huber 1910 p. 188; Ducke 1915 p. 43; - 1922 p. 193; - 1938 p. 32; Le Cointe 1934 p. 387 (wood); also Ducke 1915 p. 44 sub *V. glaberima*. *Vochysia urubuensis* Ducke 1943 p. 17; - 1944 p. 13.

Branchlets obtusely quadrangular owing to ribs running down from the stipules. Cortex glabrous. Stipules thick. Leaves opposite, rarely in trimerous whorls. Petioles terete, striate, glabrous, about 1.0 cm long. Young leaves with a slightly pilose midrib and a glabrous blade. Blade about twice as long as wide (5-9 × 2.5-5.0 cm), elliptic or elliptic-obovate, glabrous; apex generally rounded, sometimes retuse, sometimes shortly and broadly apiculate. Lateral nerves and veins subprominent and typically reticulate on both sides; angle with the midrib 60-70°. There is a slight indication of one or two marginal nerves especially at the base of the blade. Margin almost flat. Inflorescence terminal and axillary, multiflorous, sparingly pilose. Cincinni 2-1 flowered. Flower-buds about 1.0 cm long, recurved, cylindrical and obtuse. Spur slender, 0.8 × 0.1 cm, strongly recurved, gradually emerging from the fourth calyx-lobe

and so not making an acute angle with the flower-bud itself. Petals glabrous, equal, covering (in bud) half or two-third of the stamen, elliptic, apex rounded. Stamen glabrous, slightly clavate and curved. Staminodes orbicular, apiculate, about 0.05 cm long. Style glabrous, apex subclavate. Stigma terminal, smaller than the apex of the style, orbicular. Ovary subsericeous or sometimes nearly glabrous.

**Type:** Spruce 3700 in K (lectotype), Cotypes: Spruce 1286 and s.n. fr. at Manaus.

**Distribution:** Along the Amazon and its tributaries.

**BRAZIL, Para:** Ducke PG 11336 (BM, US); - PG 8970 (BM); - PG 10520 (BM, P, US); - PG 15651 (BM). **Amazonas:** Spruce s.n. cotype (BM, G-BOIS, GH, K, NY, OXF, P, W); - 1286 cotype (BM, C, G-BOIS, GH, K, NY, OXF, P, W); Kuhlmann RB 17770 (K, S, U, US); Ducke RB 23809 (S, U, US); - 52 first coll. (K, NY, S, US); - 52 second coll. (US); - 815 type of *V. urubuensis* Ducke (K, RB, U, US).

**VENEZUELA, Amazonas:** Spruce 3700 lectotype (BM, BR, G-BOIS, G-DEL, K, P, OXF, W); Ll. Williams 16013 (F, US); - 13827 (US).

**PERU, San Martin (Loreto):** Klug 3641 (BM, GH, K, NY, S, US); - 4105 (BM, GH, K, NY, S, US).

**Ecology:** Savannas, campos and dry, especially secondary woods. In Peru in montana forests up to 1100 m. Fl. mostly Oct.-Jan., in Peru Apr.-May. Fr.: mostly Dec.-Mar.

**Vernacular Names:** VENEZUELA **Amazonas:** Salado. **BRAZIL, Para:** Quaruba (Ducke 1915).

## 12. *Vochysia venezuelana* Staf. nov. spec.

Sectio Vochysiella, subsectio Calophylloideae Warm. Ramuli obtuse triangulati, cortice fulvo-puberulo. Folia 3-verticillata. Petiolus circa 1.0 × 0.2 cm. Lamina circa 10-13 × 4-5 cm, obovata, glaberrima, supra nitentia. Nervi laterales tenues. Costa marginalis abest. Inflorescentia laxiflora, puberula. Cincinni 1-2 flori. Alabastra recta vel subrecurva. Calcar recurvum, gracile, sub angulo rotundato ex alabastro emergens. Petala stamine duplo minora, obovata, truncata, glaberrima. Stigma laterale, suborbiculare, circa 0.10 × 0.13 cm.

Branchlets obtusely triangular; the rounded edges corresponding to the leaf-bases and lined by fine ribs running down from the stipules. Cortex fulvous-puberulous especially on the young parts. Leaves in trimerous whorls. Petioles about 1.0 × 0.2 cm, rugulose. Blade of young leaves on the lower side sparsely puberulous, midrib subsericeous. Blade of the adult leaves 10-13 × 4-5 cm, mostly  $2\frac{1}{2}$  times longer than wide, obovate, glabrous, shining above; apex rounded, retuse-emarginate. Lateral nerves thin, nowhere prominent, at most subprominent in young leaves, angle with the midrib 60-70', anastomosing or running into a subdistinct marginal nerve. Margin flat. Inflorescence terminal and axillary, laxiflorous, subaureous-puberulous. Cincinni 1-2 flowered. Peduncles and pedicels slender.

Flower-buds straight or slightly recurved, cylindrical or subclavate,  $1.3-1.5 \times 0.25-0.30$  cm, apex rounded-obtuse. Spur gradually emerging from the fourth calyx-lobe as in *V. obscura*, cylindrical, recurved,  $0.7-0.9 \times 0.1$  cm. Petals subequal, glabrous, about half as long as the stamen, obovate-truncate. Stamen glabrous, subclavate. Staminodes deltoid, rounded, about 0.05 cm long with a distinct filament. Style-base and apex subincrassate, base pilose. Stigma lateral, irregular, suborbicular, about  $0.10 \times 0.13$  cm.

Type: Ll. Williams 11200 in F; Edo, Bolivar, Venezuela.

Distribution: Llanos occidentales and Llanos orientales south of the Orinoco.

VENEZUELA, Bolivar: Ll. Williams 11200 type (F, US); — 13269 (F, K, US); — 13417 (F, K, US); Velez 2210 (US); Chardon 257a (US). Amazonas: Ll. Williams 13801 (F, US). Zamora: Karsten s.n. (W).

COLOMBIA, Vichada Cuatrecasas 4068 (US). Cundinamarca: Barriga 10757 (US). Locality unknown; Hermann 10933 (US).

Ecology: Characteristic of above mentioned parts of the Llanos in savannas and along river-banks where the vegetation is sparse (Ll. Williams in litt.).

Vernacular names: VENEZUELA: Salado, Saladillo.

13. *Vochysia obidensis* (Huber) Ducke in Arch. Jard. Bot. Rio III 1922 p. 194; Ducke 1938 p. 32; Le Cointe 1934 p. 386 (wood). *Vochysia obscura* Warm. var. *obidensis* Huber ex Ducke 1915 p. 43.

Branchlets slender, angled; angles obtuse, corresponding to the bases of leaves and accentuated by fine ribs running down from the stipules. Cortex and petioles pilose, especially on the young parts. Leaves in tri- (tetra-, penta-) merous whorls, which are sometimes congested near the tops of flowering branchlets. Petioles  $1.0-1.8 \times 0.1$  cm. Young leaves pilose on both sides of the blade, especially on the midrib; petioles relatively long. Adult blade max.  $9 \times 3$  cm, mostly 3-4 times longer than wide; spatulate or spatulate-ovate, glabrous, dull; apex rounded or subtruncate, retuse-emarginate. Lateral nerves very slightly prominent on both sides, angle with the midrib about  $70^\circ$ , marginal nerve absent; veins inconspicuous. This nervation gives a herring-bone aspect. Inflorescence terminal and axillary, cylindrical, sparsely fulvous-puberulous. Cincinni 1-2 flowered. Peduncles and pedicels 0.07-0.08 cm wide. Flower-buds straight, cylindrical, obtuse-rotundate,  $0.8-0.9 \times 0.1-0.2$  cm, never inflated. Spur strongly recurved, slender 0.6-0.7 cm long, cylindrical. Petals equal, half as long as the stamen, obovate-rotundate, glabrous. Stamen glabrous. Staminodes broadly oblong, apiculate, about 0.05 cm long. Style glabrous, apex subclavate. Stigma lateral, two-lobed,  $0.25 \times 0.15$  cm.

**Type:** Ducke 7220 in PG (?) (The present author saw only the duplicates from BM and US) cotype: Ducke PG 16316.

**Distribution:** BRAZIL, Para: Obidos: Ducke PG 7220 type (BM, US); - PG 16316 (is RB 5721) cotype (BM, P, S, U, US).

**Ecology:** Dry woods. Fl.: Jul.-Aug.

**Vernacular names:** Quaruba (Para, Ducke 1922).

**14. *Vochysia surinamensis* Staf1. nov. spec.**

Sectio *Vochysiella* Staf1., subsectio *Calophylloideae* Warm. Folia 3-verticillata. Petioli circa 1.0 cm longi. Lamina subobovata, circa 8-15 × 3-6 cm, supra nitida. Nervi laterales non prominentes, numerosi, tenues. Costa marginalis abest. Inflorescentia densiflora. Cincinni 1-2 flori. Pedunculi et pedicelli tenues. Alabastra recta vel subrecurva. Calcar rectum vel subrecurvum, subinflatum, sub angulo acuto ex alabastro emergens; basi et apice constrictum. Petala glaberrima, stamine duplo minora. Stamen glaberrimum. Staminodia circa 0.05 cm longa. Stigma pro parte laterale, suborbiculare, diam. 0.07 cm.

Glabrous except the inflorescences, the stipules and the young parts of the branchlets. Older parts of the branchlets subterete with slightly elevated lines running down from the stipules; younger parts triangular with rounded edges corresponding to the leaf-bases and accentuated by the same lines. Stipules thick, shining. Leaves in trimerous whorls. Petioles about 1.0 × 0.15 cm, rugulose, striate. Young leaves glabrous. Blade subobovate, 8-15 × 3-6 cm, about 2½ times longer than wide; apex broadly obtuse or subrotundate, retuse; base gradually narrowing. Upper surface shining, nervation slightly prominent; lower surface subnitid, nervation not prominent. Lateral nerves making an angle of 70-80° with the midrib, straight, no obvious division between major and minor ones. No proper marginal nerve. Veins reticulate. Margin subrevolute. Inflorescence terminal and axillary, multiflorous, subaureous-puberulous, cylindrical. Cincinni 1-2 flowered. Peduncles and pedicels slender, 0.08-0.10 cm wide. Flower-bud subrecurved, subclavate, sparsely pubescent, obtuse, in type 0.8 × 0.2 cm. Spur making a distinct acute angle of 30-90° with the fourth calyx-lobe, straight or subrecurved, slightly inflated and somewhat conical in shape, with narrowings at the base and just below the apex, as long as or slightly shorter than the fourth calyx-lobe. Petals glabrous, obovate-rotundate, subequal, half as long as the stamen. Stamen glabrous, clavate. Staminodes suborbicular-elliptic, about 0.05 cm long. Style somewhat clavate, glabrous. Stigma partly terminal, partly lateral, suborbicular, 0.07 × 0.07 cm.

**Type:** Boswezen Suriname 6915 in U.

**Distribution:** Guiana and Lower Amazon.

**SURINAM.** Brownsberg, tree 1306 B.W. 6915, type (U); Id. tree 1104 B.W. 2087 (BR, U); - 2092 (U); - 3260 (L, NY, U, US); Id., Gongrijp en Stahel 6510 (B.W.) (L, U); Patrickssavanna, Bosbeheer 82 (U).

**BRITISH GUIANA.** Demerara river, Mackenzie, For. Dept. 5218 (K, NY); Arawai Ck., Fanshawe 3050 (K, NY).

**BRAZIL, Para:** Almeirim, Ducke PG. 17284 (BM, G-DEL).

**Ecology:** Fl.: Feb.-Sep. Fr.: Sep.-Nov.

**Vernacular names:** **SURINAM:** Kwarrie, Watra Kwarrie (Negro English). **BRIT. GUIANA:** Hill Iteballi. **BRAZIL, Para:** Quaruba.

**var. inflata** Staf. nov. var.

*Folia* oblonga. *Calcar* inflatum. *Stigma* laterale.

Leaves oblong; spur inflated; stigma lateral, suborbicular, about  $0.1 \times 0.1$  cm.

**Type:** Steyermark 6064I in U.

**Distribution:** **VENEZUELA, Bolivar:** Steyermark 6064I type (F, U) (Ptari Tepui); - 68017 (F, U) (Sororopan Tepui).

**Ecology:** Woods 1000-1500 m. Fl.: Nov.

**Vernacular names:** **VENEZUELA:** Ararau-yek, Epunok-yek.

### 15. *Vochysia venulosa* Warm. in Flora Bras. XIII, II p. 74.

Glabrous except for the puberulous inflorescence and the pilose stipules. Branchlets obtusely angled, striate. Leaves in tri- or tetramerous whorls. Blade very gradually narrowing towards the — about 2 cm long — petiole; up to  $13 \times 5$  cm, spatulate, shining; apex variable, rounded, subtruncate or broadly acute, sometimes mucronate or retuse. Upper surface light-greyish green, lower surface darker. Lateral nerves numerous, angle with the midrib 60-75°, on both sides slightly but distinctly prominent; veins same, making the whole nervation typically reticulate. Marginal nerve running on less than 0.1 cm from the subrevolute margin. Inflorescence terminal, fulvous tomentellous-puberulous, peduncles firm, 0.10-0.15 cm wide; cincinni 2-1 flowered; bracts conspicuous, dropping late. Flower-bud firm, straight, thick, subclavate,  $0.8-0.9 \times 0.25-0.35$  cm, apex acute. Spur cylindrical, recurved, shorter than the flower-bud. Petals equal, ciliate at the apex, suborbicular or broadly oblong, length  $1/3$  or  $1/2$  of that of the stamen. Stamen glabrous; filament about 0.1 cm long; anther linear, sterile part 0.1-0.2 cm, fertile part about 0.5 cm long. Staminodes orbicular, about 0.05 cm long, apex rounded. Style glabrous, apex clavate. Stigma lateral, two-lobed,  $0.1 \times 0.2$  cm.

**Type:** Spruce 2717 in K, Brazil near Panuré on R. Uaupés.

**Distribution:** **BRAZIL, Amazonas:** Spruce 2717 type (BR, K, P, W).

**Ecology:** "In capoeiras" Fl.: Dec.

16. *Vochysia diversa* Macbride in Field Mus. Bot. XI 1931 p. 67.

Branchlets subterete, rapidly exfoliating. Cortex and stipules fulvous-puberulous. Leaves in tri- or tetramerous whorls. Petioles 0.5-1.5 cm long, slender, striate. Young leaves greyish-brown pilose beneath. Blade 8-12 × 2.5-3.5 cm, spatulate-oblongate, glabrous; apex obtuse and retuse. Upper surface shining, except for the younger blades; lower side with a slightly pilose midrib. Lateral nerves slightly prominent above, angle with the midrib 80°. Marginal nerve present. Margin flat. Inflorescence terminal and axillary, brownish pilose; pedicels less than 0.1 cm wide; cincinni one-flowered; bracts linear, acute 0.5-0.7 cm long. Flower-bud densely brownish pilose, subrecurved, 0.8-1.0 × 0.2-0.3 cm, obtuse. Spur recurved, almost cylindrical, 0.5-0.6 cm long, with a subincrassate apex. Petals subequal, length half or one third of that of the stamen, obovate, apex rounded and ciliate. Stamen glabrous. Staminodes elliptic, 0.05-0.10 cm long. Style glabrous, apex clavate. Stigma lateral, three-lobed at 0.30 × 0.15 cm.

Type: Klug 685 in NY.

Distribution: PERU, Loreto: Near Iquitos, Klug 685 type (G-DEL, NY, US). BRAZIL, Amazonas: Sao Paulo de Olivenca, Krukoff VII 8614 (BR, G-DEL, K, NY, P, S, U, US).

Ecology: In forests on terra firme. Fl.: Oct.-Dec.

17. *Vochysia expansa* Ducke in Arch. Inst. Biol. Veg. IV 1938 p. 32.

Branchlets angled; the rounded edges corresponding to the leaf-bases. Cortex, stipules and petioles greyish-brown sericeous. Leaves mostly in tetramerous whorls. Petioles 0.7-1.0 cm long. Blade 4-6 × 1.5-2.5 cm, elliptic or elliptic-obovate; apex rounded or subtruncate, retuse or emarginate. Upper surface glabrous, nervation almost inconspicuous. Lower surface sparsely brownish pilose. Lateral nerves arcuately anastomosing, 12 major ones, not prominent, like the veins visible only on the lower side. Margin flat. Inflorescence terminal, multiflorous, greyish-brown sericeous. Cincinni 1-flowered. Flower-bud subrecurved, 0.8 × 0.1-0.2 cm, subsericeous, obtuse. Spur recurved, constricted at the base, 0.3-0.5 × 0.1 cm. Petals covering 1/3 of the stamen (in bud), obovate-oblong; apex rounded and ciliate. Stamen glabrous. Staminodes apiculate, about 0.05 cm long. Apex of the style subincrassate, base slightly tomentose. Stigma terminal, orbicular, about 0.05 × 0.05 cm. Hairs on the ovary short and perpendicular.

Type: Ducke RB 34655 in RB, Rio specimen not seen by the present author.

Distribution: BRAZIL, Amazonas: Rio Curucuryary, Ducke RB 34655 type (G-DEL, K, NY, P, S, U, US).

Ecology: In upland Rio Negro "catingas". Fl.: Feb.

18. *Vochysia lehmannii* Hier. in Bot. Jahrb. XX Beibl. 49 1895 p. 38. Benoist 1915 p. 245. *Vochysia tintin* Pittier 1926 p. 382.

Branchlets angled owing to the ribs that run down from the stipules and vanish in the lower part of the internodia; cortex slightly puberulous. Leaves in tri- or tetramerous whorls; petioles 0.6-1.2 cm, terete, glabrous. The young leaves have a peculiar cuneate-spatulate shape with a sometimes almost obcordate apex and a relatively longer petiole. Blade at  $12 \times 5$  cm, oblong-obovate or -spatulate, with a long and very gradually narrowing cuneate base and a rounded or subtruncate, retuse or emarginate apex; entirely glabrous except for some hairs on both sides of the midrib. Lateral nerves irregularly diverging towards the margin and almost inconspicuously anastomosing; not or only slightly prominent. Veins subconspicuous. Margin subrevolute. Inflorescence terminal (and axillary?), cylindrical, multiflorous and brownishpilose. Cincinni 2-3 flowered, pedicels slender. Flower-buds  $0.8-1.3 \times 0.2-0.3$  cm, slightly inflated and recurved; apex obtuse-rotundate. Spur recurved, cylindrical, 0.4-0.7 cm long. Petals as long as the stamen, subunequal, glabrous, obovate, apex rounded. Stamen clavate, anther glabrous or sparsely pilose. Staminodes rhomboid, 0.05-0.10 cm long. Style densely tomentose on the lower third, base incrassate. Stigma lateral, about  $0.1 \times 0.1$  cm, as wide as the apex of the style.

Type: Lehmann 7427 in K; Colombia, Tolima, Purificacion.

Distribution: VENEZUELA: Zulia Tejera 30 (GH, US). Merida: Steyermark 56693 (F, U). Tachira: Funck et Schlimm 1273 (BM, G-BOIS, OXF, P, W). Zamora: Pittier 12014 type of *V. tintin* Pittier (G-DEL, NY, US). Amazonas: (Maquiritares) Triana 3784 (BM, K, P, W); Tamayo 1769 (US).

COLOMBIA, Cundinamarca: Pennel 2850 (US); Goudot s.n. (P). Tolima: Lehmann 7427 type (K). Santander: Linden 1358 (BM, G-BOIS, G-DEL, K, P, W); Schlimm 289 (G-BOIS, K, P); Cuatrecasas (US). Locality unknown: Allen 921 (K); Mutis 1609 (G-DEL, F, K, S, US).

Ecology: Woods 300-1100 m. Fl.: rep. from each month. Fr.: one report from Aug.

Vernacular names: VENEZUELA, Merida: Tambor. Zamora: Tintin. Maquiritares: Yayo blanco.

19. *Vochysia haenkeana* Mart., Nov. Gen. I p. 147 t. 89; D.C. 1828 p. 27; A. Dietr. 1831 p. 111; D. Dietr. 1839 p. 23; Warm.

1875 p. 72 t. 18 II; O. Kuntze 1898 p. 12 (including var. *lanceolata* O. Kuntze); Malme 1900 p. 48; - 1905 p. 10 (ecol. p. 1 seq.); Ll. Williams 1936 p. 26, 263 (anat., wood.); Ducke 1938 p. 32. *Vochisia haenkeana* Briq. 1919 p. 386 (including var. *genuina* Briq., var. *sprucei* Briq. and var. *microphylla* Briq.) *Cucullaria haenkeana* Spreng. 1825 p. 9; *Vochysia micrantha* Pohl 1831 p. 20 t. 112; A. Dietr. 1831 p. 111; D. Dietr. 1839 p. 23; Walpers 1843 p. 69; Warm. 1875 p. 70; - 1889 p. 24; Glaziou 1905 p. 32.

Entirely glabrous, except for the tomentose ovary and the slightly pilose outside of the calyx. Leaves in tri- or tetramerous whorls. Petioles 2-4 cm long, striate. Blade 10-18 × 3.0-5.5 cm, shape variable, lanceolate-oblong, oblong, elliptic, elliptic-ovate; apex obtuse and retuse or subcuspidate-retuse. Upper surface dull, shining or nearly vernicose. Lateral nerves making an angle of 65-75° with the midrib, strictly parallel for three quarters of their length, then dispersing and arcuately anastomosing, like the veins on both surfaces slightly prominent. Margin subrevolute. Inflorescence multiflorous, terminal and axillary. Cincinni 1-3 flowered. Pedicels and peduncles slender. Flower-bud cylindrical, straight or subrecurved, about 0.8 cm long, apex rounded. Spur incurved, as long as or longer than the flower-bud. Petals glabrous, length of the centre one 2/3-1/1 of that of the stamen. Anther slightly pilose, fertile part 0.4-0.6 cm long. Staminodes lingulate, about 0.1 cm long, rounded. Stigma almost entirely terminal, diameter about 0.08 cm.

**Type:** Haenke in Peruvia. Not seen by the present author, probably in the Martius collection of M.

**Distribution:** Widely distributed over Central South America.

**BRAZIL, G o y a z:** Burchell 8392 (BR, GH, K, L, P); Pohl s.n. (1924 in W) type of *V. micrantha* Pohl in W, (BR, OXF, W); Hilaire c<sub>1</sub> 728 (F, K, P); Glaziou 20693 c (C). **M a t t o G r o s s o:** Malme II 1785 (1735) (G-DEL, S); - II s.n. (S); - I s.n. (S); D. G. Smith 182 (K); Riedel s.n. (G-BOIS, K, P). **P a r a n a:** Riedel s.n. (OXF) (locality dubious). **A m a z o n a s:** Ducke RB 34645 (G-DEL, K, RB, S, U, US).

**PERU, S a n M a r t i n (Loreto):** Spruce 4078 (BM, BR, C, G-BOIS, GH, K, NY, OXF, P, W); Ll. Williams 5425 (F, S, US); - 6155 (F, US); - 6491 (US); Ule 6432 (G-DEL, K, L); Matthews 1650 (2835) (BM, K, OXF, P).

**BOLIVIA, L a P a z:** Prov. San Yungas, Krukoff VIII 10287 (G-DEL, NY, S, U, US). **L o c a l i t y u n k n o w n:** R. S. Williams 570 (K); - 410 (BM, K, NY, US); - 1578 (NY, K); - 2477 (NY); Kuntze s.n. (NY, US).

**E c o l o g y:** On humid sandy soil, In Peru in pampas. **Fl.:** Braz. and Bol.: Apr.-Jul., Peru: Dec., Oct. **Fr.** Braz. and Bol.: Aug.-Jan.

**V e r n a c u l a r n a m e s:** PERU: Killu-sisa. **BRAZIL, G o y a z:** Marapau-ba, Pao mulatto. **M a t t o G r o s s o:** Cambara (Malme 1905).

**O b s e r v a t i o n:** This species shows some variability. Two extremes of this variability were seen by Martius, Pohl and Warming, and named *V. haenkeana* Mart. and *V. micrantha* Pohl. However, apart from the apparent differences in thickness and shine of the leaves there are no essential ones and

the flowers are exactly alike. The small differences in dimensions mentioned by Warming fall within easy reach of a normal variability. Since then a number of specimens has been collected, which bridges the gap and it is possible to arrange the specimens in a fluid series. Kuntze (l.c.) and Briquet (l.c.) tried to distinguish varieties, but with this fluid transition in hand I don't feel justified in accepting them. There is a certain regularity in the variability: the specimens with elliptic-obovate blades all come from the Peruvian Andean slopes.

20. *Vochysia mapirensis* Rusby in Mem. Tor. Bot. Cl. VI 1896 p. 7. *Vochysia weberbaueri* Beckmann 1908 p. 279; Ducke 1915 p. 143.

Glabrous except for the stipules and the inflorescence. Branchlets subterete. Leaves mostly in tri- (to penta-) merous whorls. Petioles 0.5-1.2 cm long. Young leaves pilose on the upper side of the midrib, petioles relatively long. Blade 8-16 × 2.5-5.0 cm, elliptic-oblong; apex rounded, sometimes retuse; shining above, dull and darker coloured beneath. Major lateral nerves 20-25, angle with the midrib 70-80°, diverging at three quarters of their length and arcuately anastomosing, like the veins subprominent on both sides. Margin slightly revolute. Inflorescence terminal and axillary multiflorous, moderately brownish pilose. Rhachis angled, stout, about 0.4 cm wide at the base. Cincinni 2-3 flowered. Young peduncles and pedicels densely fulvous-tomentellous, stout. Flower-bud 1.0-1.3 × 0.2-0.3 cm; apex subclavate, obtuse or rotundate. Spur incurved, about half as long as the flower-bud. Petals equal, shorter than half the stamen, cuneate, glabrous; apex rounded or subtruncate. Stamen glabrous except for the ciliate inner margin; anther gradually narrowing towards the small filament. Staminodes about 0.05 cm long, lingulate, apex rounded or subapiculate. Style with a slightly incrassate base and apex, glabrous except for the slightly hairy base. Stigma lateral, irregularly 2-3 lobed, relatively large: about 0.2 × 0.1 cm.

Type: M. Bang 1382 in NY; Bolivia: Guanai-Tipuaní.

Distribution: In Montana of Bolivia and Eastern Peru. BOLIVIA, La Paz: Rusby 610 (BM, G-DEL, GH, NY, P, US); Buchtien 1699 (GH, NY, US); - 1700 (F, G-DEL, GH, K, US); Krukoff VIII 11272 (G-DEL, NY, U, US); - VIII 10142 (G-DEL, NY, U, US); Bang 1382 type (BM, C, G-BOIS, G-DEL, GH, K, NY, US, W). Santa Cruz: Steinbach 7516 (BM, G-DEL, GH, F, K, NY, S, U); Pearce s.n. (BM, K).

PERU, Junin: Macbride 5552 (G-DEL); Killip and Smith 25034 (BM, F, NY, US). San Martín: Weberbauer 4704 (type of *V. weberbaueri* Beckm.) (photogr. and fragm. of B-specimen in F.). Amazonas: Ule 9521 (K, L, U).

Ecology: In thickets and woods in mountainous country, 400-1200 m. Fl.: Mar.-Sep. Fr.: July-Nov.

Vernacular names: BOLIVIA, Palo Amarelo.

Section B. **CILIANTHA** Stafl. nov. sect.

Rarissime decorticantes. Petala tria, rarissime unum vel nullum. Petala et stamen ciliata vel interdum petala vel stamen glabra. Pistillum glabrum.

Young parts of the branchlets mostly angled. Cortex rarely exfoliating. Stipules nearly always present, rarely longer than 0.4 cm, mostly 0.1-0.2 cm long; deciduous, acute. Leaves opposite or in whorls. Marginal nerves sometimes present. Veins reticulate, rarely major ones obliquely transversal. Margin entire, rarely subundulate. Petals three, rarely one or none. Petals and (or) stamen ciliate along the margins, sometimes pilose on the back. Style glabrous. Ovary glabrous.

*Distribution:* Widely distributed in Tropical America.

## Key to the subsections.

1. *a.* Stamen glabrous or ciliate along the margin . . . . . 2
- b.* Stamen pilose on both sides or on one side only. Petals ciliate, pilose on the back. . . . . 5
2. *a.* Adult branchlets and leaves glabrous . . . . . 3
- b.* Adult branchlets and lower side of adult leaves pilose . . . 4
3. *a.* Flower-buds smaller than 1.0 cm, rarely up to 1.2 cm long. Cortex blackish, sometimes exfoliating. Stamen always glabrous . . . . . subsect. B I **Micranthae** Warm. p. 446
- b.* Flower-buds 1.2-2.5 cm long. Cortex mostly yellowish or brownish, never exfoliating. Stamen and petals ciliate or one of both glabrous. subsect. B II **Lutescentes** Warm. p. 457
4. *a.* Leaves in whorls. Cortex not exfoliating. Lower surface of the leaves tomentose or tomentellous . . . . . subsect. B III **Discolores** Stafl. p. 480
- b.* Leaves opposite. Cortex of the branchlets exfoliating. Leaves golden-yellow, indumentum on the lower side aureous-sericeous . . . subsect. B IV **Chrysophyllae** Stafl. p. 483
5. *a.* Leaves in tetramerous whorls. Staminodes glabrous. Filament 0.0-0.1 cm long. Stigma capitate. Three petals . . . . . subsect. B V **Megalanthae** Stafl. p. 484
- b.* Leaves opposite, in two species in whorls. Staminodes nearly always ciliate. Filament longer than 0.1 cm. Stigma variable. Three, one or no petals . . . . . subsect. B VI **Ferrugineae** Warm. p. 490

## Subsection B I. MICRANTHAE Warm.

Warming in Flora Bras. XIII, II p. 59 sub titulo series.

Large or medium sized trees. Adult branchlets glabrous. Cortex blackish and sometimes exfoliating. Stipules blackish, sometimes pilose. Petioles black, mostly striate, base not or only slightly incrassate. Blade glabrous or rarely — only on the lower surface — slightly pilose. Nervation regular. Veins reticulate. Marginal nerve sometimes present. Inflorescence cylindrical, multiflorous. Rhachis sharply angled. Flower-bud rarely larger than 1.2 cm. Spur recurved, rarely straight, apex subincrassate. Smaller calyx-lobes ciliate and often subpuberulous. Petals rarely as long as the whole stamen, glabrous except for the sometimes ciliate apex. Stamen entirely glabrous; anther linear-oblong or subclavate. Staminodes glabrous, 0.05-0.10 cm long.

Distribution: *Hylaea americana*.

## Key to the species:

1. *a.* Spur longer than the flower-bud . . . . . 2
- b.* Spur shorter than or nearly as long as the flower-bud . . . 3
2. *a.* Petioles shorter than 0.5 cm. Leaves obovate; marginal nerve present; margin revolute . . . . . 22. *V. lucida* Presl.
- b.* Petioles longer than 0.7 cm. Leaves elliptic, oblong or ovate, no marginal nerve; margin flat. . . . . 26. *V. guianensis* Aubl.
3. *a.* Leaves in tetra-, rarely pentamerous whorls . . . . . 4
- b.* Leaves opposite or in trimerous whorls . . . . . 8
4. *a.* Margin of leaf flat or only subrevolute . . . . . 5
- b.* Margin of leaf strongly revolute. Flower-bud 0.5, petioles 1.5-2.0 cm long . . . . . 29. *V. parviflora* Spruce ex Warm.
5. *a.* Apex of leaf obtuse or rounded. . . . . 6
- b.* Apex of leaf acuminate. Petiole 0.2-0.6 rarely 1.0 cm long, spur incurved 30. *V. tetraphylla* (G. F. W. Meyer) D.C.
6. *a.* Lateral nerves ending in margin or anastomosing with wide irregular arcs . . . . . 7
- b.* Marginal nerve distinct especially in the basal part of the blade. Petioles 1-4 cm long. Stigma lateral, relatively large . . . . . 27. *V. grandis* Mart.
7. *a.* Leaves spatulate-obovate; apex rounded; petioles 0.0-1.5 cm long . . . . . *subsect. B II. V. riedeliana* Stapf. (35)
- b.* Leaves oblong. Petioles about 1.0 cm long. Major lateral nerves ending in the margin. (If petiole 1.5-2.5 cm long and

- the branchlets not blackish see *B II. V. hondurensis*, 38)
31. *V. mapuerae* Huber ex Ducke.
8. *a.* Leaves in trimerous whorls . . . . . 9  
*b.* Leaves opposite . . . . . 16
9. *a.* Margin of the leaf flat . . . . . 10  
*b.* Margin of the leaf strongly revolute. Flower-bud 1.5-2.0 cm long; spur incurved . *subsect. B II. V. revoluta* Ducke (44)
10. *a.* Spur incurved. . . . . 11  
*b.* Spur straight or recurved . . . . . 13
11. *a.* Leaves 4.0-6.5 × 0.7-2.0 cm, lanceolate; apex and base similar, acute . . . . . *subsect. B II. V. saldanhana* Warm. (33)  
*b.* Leaves larger, not lanceolate; apex and base dissimilar . 12
12. *a.* Leaves acuminate, top 1 cm long. Normally leaves in tetramerous whorls. Stamen entirely glabrous. . . . . 30. *V. tetraphylla* (G. F. W. Meyer) D.C.  
*b.* Leaves obtuse or shortly apiculate, stamen ciliate . . . . . *subsect. B II. V. macrophylla* Stapf. (42)
13. *a.* Apex of the leaf obtuse, sometimes rounded. Nervation distinctly prominent and reticulate on the upper surface of the leaves. . . . . 14  
*b.* Apex of the leaf truncate and retuse. Leaves thick, 4-7 cm wide; veins invisible on the upper surface; lateral nerves nowhere prominent . . . . . 28. *V. catingae* Ducke
14. *a.* Flower-bud acute . . . . . 15  
*b.* Flower-bud rounded or obtuse . . . . . 27. *V. grandis* Mart.
15. *a.* Stigma terminal. Cortex exfoliating. 21. *V. ingens* Ducke  
*b.* Stigma lateral. Cortex not or scarcely exfoliating . . . . . 27. *V. grandis* Mart. var. *uaupensis* (Spruce) Warm.
16. *a.* Spur incurved. Flower-bud 1.0-2.0 cm long. see *subsect. B II.*  
*b.* Spur straight or recurved . . . . . 17
17. *a.* Spur straight or subrecurved . . . . . 18  
*b.* Spur uncinately recurved, apex nearly touching the fourth calyx-lobe . . . . . 20
18. *a.* Apex of the leaves obtuse, obtuse-rotundate or acute-acuminate. Lateral nerves slightly prominent on the upper surface 19  
*b.* Apex of the leaves truncate or truncate-rotundate. Veins invisible on the upper surface of the blade; lateral nerves nowhere prominent. Leaves mostly in trimerous whorls, see: . . . . . 28. *V. catingae* Ducke
19. *a.* Stigma terminal. Upper surface of the leaf nearly vernicose; cortex exfoliating . . . . . 25. *V. glaberrima* Warm.  
*b.* Stigma lateral, relatively large. Upper surface of the leaf

- nitidulous. Cortex not or only slightly exfoliating . . . . .  
 . . . . . 27. *V. grandis* Mart.  
 20. a. Leaves thick and leathery, 9-15 × 5-7 cm. Inflorescence if  
 axillary also terminal on the same branchlet . . . . .  
 . . . . . 23. *V. crassifolia* Warm.  
 b. Leaves normal; 9-10 × 4-5 cm. Inflorescence sometimes soli-  
 tary axillary . . . . . 24. *V. citrifolia* Poir.

21. *Vochysia ingens* Ducke in Arch. Inst. Biol. Veg. II 1935  
 p. 50; Ducke 1938 p. 33.

Large tree, entirely glabrous. Cortex of the branchlets exfoliating. Stipules 0.1 cm long, deltoid, subulate. Leaves in trimerous whorls; petioles 1.0-1.5 cm long, subnitid. Blade 7-9 × 2.3-2.8 cm, elliptic or oblong; base cuneate; apex acute or acuminate, minutely retuse. Upper surface shining, nervation prominent. Lateral nerves strictly parallel, ending in a marginal nerve, five major ones per cm, not prominent beneath, together with the veins discolor. Marginal nerve at about 0.1 cm from the margin. Margin flat or subrevolute. Inflorescence terminal, cylindrical. Cincinni 1-3 flowered; bracts lanceolate-ovate; rhachis, peduncles and pedicels glabrous, dull and black. Flower-bud very slender: 1.0 × 0.1 cm, slightly recurved; apex acute or shortly acuminate. Spur 0.5-0.6 × 0.08-0.10 cm, recurved. Petals nearly half as long as the stamen, unequal. Stamen slender, anther only slightly longer than the filament. Staminodes elliptic, apiculate, 0.07-0.10 cm long. Base of the style slightly incrassate. Stigma terminal, orbicular, 0.05 × 0.05 cm.

Type: Ducke RB 24153. In RB.

Distribution: BRAZIL, Amazonas: between the Jacurupa and the Puruité, tributaries of the R. Ica. Ducke RB 24153, type (K, P, RB, S, U, US).

Ecology: In upland forests. Fl.: Oct.

Vernacular name: Cedro Rana (Ducke 1935).

22. *Vochysia lucida* Presl, Symb. Bot. II 1835 p. 12 t. 59; Walpers 1843 p. 69; Warm. 1875 p. 77 t. 15 I; Veloso 1946 p. 75 seq.

Small tree. Adult branchlets subterete, glabrous. Young branchlets before exfoliating obtusely angled, the angles corresponding to the leaf-bases. Cortex sparsely brownish adpressed pilose. Stipules 0.1-0.2 cm long, lanceolate, pilose. Leaves in tri- or tetramerous whorls; petioles 0.2-0.4 cm long, fulvous tomentose above between the decurrent leaf-margins, slightly adpressed pilose beneath. Lower side of the young leaves slightly pilose on the blade, moderately pilose on the midrib; upper surface sparsely pilose on the midrib

and glabrous on the blade. Blade 10-12 × 5-7 cm, obovate, glabrous, thick and leathery; apex rounded, sometimes retuse; base obtusely rounded or slightly obcordate. Major lateral nerves widely separated (distance about 1 cm) straight, very slightly prominent on both sides, running into an undulate marginal nerve at about 0.5 cm from the revolute margin. Veins inconspicuous. Inflorescence terminal, elongate-pyramidate or subcylindrical; multiflorous; brownish-puberulous especially on the young parts. Cincinni 2-4 flowered. Bracts about 0.3 cm long, ovate or ovate-lanceolate, acute, densely pilose. Flower-bud straight or very slightly recurved, 0.6-0.7 × 0.2-0.3 cm, apex obtuse or rounded. The long and slender spur gives the flower-bud a peculiar shape: spur 1.0-1.5 cm long, recurved, gradually narrowing towards the — subincrassate — apex. Petals unequal, first one as long as the stamen, lingulate, rounded. Filament 0.1 × 0.1 cm; anther oblong, apex acute, base biauriculate. Staminalodes about 0.05 cm long. Stigma lateral, about 0.05 × 0.05 cm.

Type: Lhotsky in G-DEL.

Distribution: Coastal zone of Bahia.

BRAZIL, Bahia: Lhotsky s.n. type, (G-DEL); Blanchet 314 (G-DEL); - 619 (NY); - s.n. (1832) (G-BOIS, G-DEL); - 1027 (G-DEL, W); - s.n. (1834 coll.) (BM, G-DEL, P); - s.n. (1851 coll.) (G-BOIS, G-DEL); - s.n. (G-DEL); Salzman s.n. (coll. 1830) (G-DEL, P); Curran 172 (GH, US); Anon. in herb. Juss. (P).

Ecology: In fringing forests of the subarboretum-type along rivulets in the zone of the former coastal forests of Bahia. (Velooso l.c.) Fl.: Apr. Fr.: May.

23. *Vochysia crassifolia* Warm. in Flora Bras. XIII, II p. 77. *Vochysia curvata* Klotsch ex Schomb. 1848 p. 1099, nomen nudum.

Glabrous except for the stipules and the inflorescence. Branchlets rapidly exfoliating, obtusely quadrangular. Stipules deltoid, 0.1-0.2 cm long, slightly pilose. Leaves opposite. Petioles 1.0-1.5 cm long, thick. Blade glabrous, very thick and leathery, elliptic or elliptic-ovate, 9-15 × 5-7 cm; base rounded; apex apiculate or shortly and broadly acuminate. Lateral nerves only on the lower side slightly prominent, arcuately anastomosing; no actual marginal nerve. Veins inconspicuous. Margin flat. Inflorescence terminal and axillary, cylindrical, multiflorous, fulvous-aureous subpuberulous. Cincinni 1 (-2) flowered. Flower-bud about 1.2 × 0.15 cm, apiculate or subacute, slightly recurved. Spur strongly recurved, the subincrassate apex sometimes touching the back of the fourth calyx-lobe, 0.6-0.8 × 0.1 cm. Petals unequal; centre one half as long as the stamen, broadly oblong or obovate, apex rounded and ciliate, some hairs on the back. Stamen linear-oblong and obtuse. Length of the filament about one

fourth of that of the stamen. Staminodes about 0.05 cm long, mostly oblong and obtuse, filament subdistinct. Style cylindrical. Stigma terminal and small, about  $0.05 \times 0.05$  cm.

Type: Ro. Schomburgk 585 (is Ri. Schomburgk 964) in K. Warming may have considered the Berlin specimen as the original one.

Distribution: BRIT. GUIANA. Roraima, Ro. Schomb. 585 (is Ri. Schomb. 964) type, (BM, G-BOIS, GH, K, OXF, P, W). (Also type of *V. curvata* Klotsch.; Rupununi-river. For. Dept. 2246 (K).

BRAZIL, A m a z o n a s: Rio Branco, S. d. Mairary, Suruma, Ule 8404 (G-DEL, K, L, U).

Ecology: In upland savannas of the Rio Branco-Rupununi region. Fl.: Oct.-Nov.

Vernacular names: BR. GUIANA: Iteballi (Arowaccan).

24. *Vochysia citrifolia* Poir., *Encycl. Supp.* V 491; D.C. 1828 p. 26; A. Dietr. 1831 p. 105; Warm. 1875 p. 103; Benoist 1915 p. 52. *Cucullaria citrifolia* Roem. et Sch. 1822 p. 52.

Adult branchlets terete, glabrous, light-brownish; young ones black and together with the stipules brownish-subsericeous; cortex exfoliating. Stipules ovate, acuminate, about 0.15 cm long, disappearing with the cortex. Petioles 1.5-2.0  $\times$  0.15-0.20 cm, rugulose. Leaves opposite. The young leaves give a typical aspect to the few known herbarium specimens. The inflorescence is axillary only and the main axis bears a tuft of young leaves, which are very thin, almost transparent, brownish-black when dried and greyish-cinereous puberulous. Blade elliptical or elliptic-oblong; 8-10  $\times$  4-5 cm, coriaceous-papyraceous; acuminate with an obtuse apex; base obtuse; shining above, some scattered hairs beneath. Nervation only above slightly prominent, reticulate. The 6-9 major lateral nerves make an angle of about 60' with the midrib and anastomose arcuately. No marginal nerve. Margin subrevolute. Inflorescence axillary in the few known specimens (whether this is a rule is doubtful); cylindrical, densiflorous, aureous-subsericeous or tomentellous. Cincinni mostly 1-flowered; peduncles and pedicels together 0.4-0.7 cm long. Flower-bud 0.8-1.2  $\times$  0.15 cm, aureous-subsericeous, recurved, subclavate or cylindrical; apex obtuse. Spur strongly recurved, about 0.5-0.7  $\times$  0.10-0.15 cm, the subincrassate apex often touching the back of the fourth calyx-lobe. Calyx-lobes irregularly developed. Petals about 0.3  $\times$  0.2 cm, slightly ciliate, ovate, one of the smaller ones is sometimes missing. Stamen subclavate, apex obtuse, filament 0.10-0.15  $\times$  0.02-0.13 cm. Staminodes 0.02-0.04 cm long, suborbicular or rhomboid, filament distinct. Style cylindrical. Stigma lateral, about 0.06  $\times$  0.06 cm.

Type: Anon. in herb. Jussieu in P.

Distribution: BRAZIL, Amazonas: Basin of Rio Purus, Acre, near mouth of Rio Macauhan, Krukoff IV 5494 (G-DEL, K, S, U, US). Locality unknown (prob. in Brazil): In herb. Jussieu in P. a specimen "apporté de Lisbon par M. Geoffroy" indicated as *V. citrifolia* Poir, which is probably the type-specimen. In herb. K sub herb. Ferreira 553 also a specimen from Lisbon: probably a duplicate.

Ecology: On upland. Fl.: Aug.

25. *Vochysia glaberrima* Warm. in Flora Bras. XIII, II p. 78; *Vochysia lucida* Klotsch ex Schomburgk 1848 p. 1099 nomen nudum.

Tree of medium size, entirely glabrous except for the sparsely pilose stipules and the lower-sides of the young leaves. Branchlets subterete, cortex exfoliating. Stipules deltoid 0.10-0.20 cm. Leaves opposite. Petioles 1.0-1.5 cm long, base incrassate. Petioles of the young leaves relatively longer. Blade elliptic, 8-10 × 2.5-4.5 cm, base cuneate, apex apiculate; vernicose-shining and yellowish green above, dull or nearly so beneath. Lateral nerves slightly prominent only on the lower surface, angle with the midrib about 60°, 15-20 major ones, straight, arcuately anastomosing at 0.3-0.4 cm from the subrevolute margin; no actual marginal nerve. Veins inconspicuous. Inflorescence terminal and axillary, densiflorous, cylindrical. Cincinni 1-3 mostly 2-flowered. Peduncles and pedicels slender. Flower-bud 0.8-1.0 × 0.1-0.2 cm, recurved, acute, glabrous. Spur 0.5-0.7 cm long, straight or subrecurved, attenuate. Petals subequal, broadly oblong, half as long as the stamen; apex rounded and slightly ciliate. Filament 0.15-0.20 cm long; anther linear-obtuse. Staminodes deltoid, 0.05 cm long, apex obtuse. Stigma lateral, about 0.05 × 0.05 cm.

Type: Ro. Schomburgk 642 (is Ri. Schomb. 841) in K.

Distribution: BRIT. GUIANA. Roraima, Ro. Schomburgk 642 (Ri. Schomb. 841) type (BM, G-BOIS, G-DEL, GH, K, L, OXF, P, W). (Also type of *V. lucida* Klotsch); Yupukari-R. in Rupununi basin, Smith 2258 (G-DEL, K, NY, S, U, US); Isherton, Rupununi-basin, Smith 2425 (G-DEL, K, NY, S, U, US).

BRAZIL, Amazonas: R. Branco, Caracarahy, Ducke 1396 (US); Id., Boa Vista, Kuhlmann RB. 16216 (K, S, US); Id., id., Ducke 1391 (K, RB, U, US).

Ecology: Along rivers and in savannas of the Rio Branco-Rupununi-Region. Fl.: Aug.-Nov.

Vernacular names: BRIT. GUIANA: Itaballi (Arowaccan); Dinakened (Wapisiana).

26. *Vochysia guianensis* Aublet, Plant. Gui. I 1775 p. 18, III t. 6. (Sub *Vochy guianensis*); Poir. 1808 p. 681; D.C. 1828 p. 26; Spach 1835 p. 324; D. Dietr. 1839 p. 22; Schomb. 1848 p. 1013;

Baillon 1874 p. 94 t. 127-131; Warm. 1867 p. 40; - 1875 p. 102; Benoist 1919 p. 319; - 1931 p. 166 pl. XXXIII (anat, uses); Hutchinson 1926 p. 120 fig. 44 A-D; Wiesner 1928 p. 1243 (uses); Correa 1931 p. 376 (wood, uses); Lanjouw et Uittien 1940 p. 160 t. IV. *Vochy guianensis* Aubl. 1775 p. 18 t. 6; König 1806 p. 179; *Vochysia guianensis* Lam. 1791 p. 35 t. II. *Vochysia melinonii* Beckmann 1908 p. 280; Benoist 1915 p. 246; Pfeiffer 1926 p. 348; Ducke 1930 p. 145; - 1938 p. 33; Le Cointe 1934 p. 387 (uses). *Vochysia paraensis* Huber ex Ducke 1915 p. 44; Ducke 1922 p. 194; - 1930 p. 145. *Vochysia excelsa* A. Dietr. 1831 p. 103; D. Dietr. 1839 p. 22. *Cucullaria excelsa* Willd. 1797 (non Vahl) p. 17; G. F. W. Meyer 1818 p. 13; Roemer et Schultes 1822 p. 51; Sprengel 1825 p. 16.

Tree. Branchlets subterete, cortex sparsely pilose, exfoliating. Stipules deltoid, thick, about  $0.1 \times 0.1$  cm, slightly pilose. Leaves opposite, rarely in trimerous whorls. Petioles  $1.5 (0.5-2.0) \times 0.1-0.2$  cm, terete, glabrous. Blade  $8-12 \times 4-5$  cm, elliptic, oblong or ovate, thin; base cuneate; apex obtuse and retuse, shortly apiculate or obtusely subacuminate. Nervation reticulate. Lateral nerves like-veins slightly prominent on both sides, thin, angle with the midrib about  $60^\circ$ , straight, subparallel, arcuately anastomosing. Marginal nerve absent. Margin flat. Inflorescence terminal and axillary, densiflorous, cylindrical or subpyramidate, sparsely brownish-pilose. Cincinni 3-5 flowered. Peduncles at  $1.0 \times 0.1$  cm, lengths of the pedicels varying with their order. Flower-bud about  $0.5 \times 0.1-0.2$  cm, recurved, obtuse, cylindrical. Length of the spur  $1\frac{1}{2}-2$  times that of the flower-bud, young ones recurved, adult ones straight or only recurved near the subincrassate apex. Petals unequal, obovate; apex ciliate; length of the centre one about  $\frac{2}{3}$  of that of the stamen. Anther subclavate, gradually passing into the  $0.1$  cm long filament, apex rounded. Staminodes deltoid or rhomboid, about  $0.05$  cm long. Stigma lateral, deltoid, diameter about  $0.05$  cm.

Type: Aublet in BM.

Distribution: Guiana, Para.

BRAZIL, Para: Belem, Huber PG 538, type of *V. paraensis* Hub. ex Ducke in PG, (BM, G-DEL, P, US); - PG 4978, cotype id. (BM, G-DEL, P, US); - Ducke 838 (US); - PG 15548 cotype id. (BM, G-DEL, P, US; acc. to photogr. in F also in PG); - Goeldi PG 6979, cotype id., (BM, P, S, U, US). Anajaz, Ducke RB. 17764 (K, S, U). Gurupa, Ducke PG 16704 (BM).

FRENCH GUIANA, Mélinon s.n. coll. 1863, type of *V. melinonii* Beckmann in P, (BM, K, NY, P); - coll. 1842 and 1861 (G-DEL, GH, K, L, NY, P, US, W); - 176 (L) (all Mélinon coll. from Maroni). Benoist 464 (P); Wachenheim s.n. (BM, K, P, US); Leprieur 255 (L, P); Aublet s.n. type of species and genus, (BM, LINN, herb. Denaiffe acc. to photogr. in Lanjouw et Uittien l.c.); Martin s.n. (BM).

SURINAM: Zanderij I, tree 18, B.W. 392, 458, 1382, 4048, 6057 (L, U).

-, B.W. 360 (K, U, US); -, Woodherb. Sur. 47 (U); Sectie O tree 740 B.W. 1133, 1361 (U); Watramiri, tree 1528 B.W. 1967 (U); Vahlberg Weg tree 4, B.W. 5458 (U); Maréchalcr. B.W. 5770 (U).

**E c o l o g y:** On upland. Fl.: Nov.-Mar. Fr.: Apr.

**Vernacular names:** BRAZIL, Para: Quaruba; Copayè (Correa l.c.). FRENCH GUIANA, Bois Cruzeau (Benoist 1931). SURINAM: Kwana Kwarrie, Was-wasie kwarrie, Gwanna Kwarrie (Negro English), Itéballi koréro (Arowaccan Indian); Pfeiffer l.c. gives a large number of vernacular and trade-names.

27. *Vochysia grandis* Mart., Nova Gen. I p. 146 t. 88; D.C. 1828 p. 27; A. Dietr. 1831 p. 110; Spach 1835 p. 323; D. Dietr. 1839 p. 23; Warm. 1875 p. 74; - 1889 p. 24; Ducke 1915 p. 43; - 1922 p. 193; - 1933 p. 44; - 1935 p. 51; - 1938 p. 32; Correa 1931 p. 323 (wood, uses). *Vochisia grandis* Mart. var. *genuina* Briq. 1910 p. 386. *Cucullaria grandis* Spreng. 1827 p. 9.

Large tree, entirely glabrous except for the sparsely pilose inflorescence and the young branchlets. Branchlets obtusely quadrangular, fine ribs running down from the stipules on the young parts: cortex exfoliating. Stipules about 0.1 cm long, deltoid, thick. Leaves opposite or in tri- to pentamerous whorls. Petioles 2-4 cm long, black, striate. Blade 12-14 × 4-5 (3-6) cm, thin, elliptic or oblong, sometimes subspatulate or obovate; base acute; apex rounded or obtuse, slightly retuse. Nervation prominent on both sides, reticulate. Lateral nerves numerous, strictly parallel, straight, thin, running into a subundulate marginal nerve at 0.1-0.2 cm from the flat margin. Inflorescence terminal and axillary, cylindrical and multiflorous Cincinni 2-5 flowered. Peduncles 0.3-0.5 cm long, pedicels varying in length with order from 0.3-0.7 (rarely 1.2) cm, both about 0.1 cm wide. Flower-bud straight, about 0.8 cm long, apex rounded. Spur recurved, at 0.7 × 0.1 cm. Petals almost equal, length 1/2-1/4 of that of the stamen, oblong; apex rounded or subtruncate. Apex of the stamen obtuse; filament as long as the anther. Staminodes 0.05-0.10 cm, ovate-cordate. Style cylindrical. Stigma lateral, two-lobed, at 0.15 × 0.08 cm.

**T y p e:** Martius near Coary and Ega in M, the present author saw only the duplicate in G-DEL.

**D i s t r i b u t i o n:** Along R. Negro and R. Solimoes and tributaries.

BRAZIL, A m a z o n a s: Martins s.n. type (G-DEL); Ega, Poeppig 2708 (1708) (BM, G-BOIS, L, OXF, P, US, W; photogr. of B-specimen in F). Sao Paulo de Olivenca, Ducke RB 23807 (G-BOIS, K, P, S, U, US); id., id., 642 (US); Rio Cury-curyary Ducke RB 23808 (RB, U, US); Sao Gabriel Ducke RB. 23495 (G-BOIS, K, P, RB, S, U, US).

**E c o l o g y:** In upland forests. Fl.: Oct.-Dec.

**Vernacular names:** (same region), Cedro Rana (Ducke 1922); Coariuva, Cuaruba, Quariuba, Quaruba sec. Correa (1931).

var. *uaupensis* (Spruce) Warm. in Flora Bras. XIII, II p. 75.  
*Vochysia uaupensis* Spruce mss.

Branchlets slender, subacutely angled at the top. Petioles shorter, 1.0-1.5 cm. Pedicels extremely long and slender: at  $1.5 \times 0.05$  cm; apex of the flower-buds acute, petals about half as long as the stamen.

Type: Spruce 2657 in K.

Distribution: BRAZIL, Amazonas: Rio Uaupès near Panurè, Spruce 2657 (BM, BR, C, G-BOIS, GH, K, NY, OXF, P, W).

Ecology: On upland in "caatingas and caapoceiras". Fl.: Oct.-Jan.

var. *douvillei* Briq. 1919 p. 386.

Type: Douville at Bahia in?. Not seen by the present author. According to Briquet: Larger leaves (at  $17 \times 6$  cm), shorter petioles (at 1.5 cm) and larger flowers (1.1-1.2 cm long) Geographically isolated.

28. *Vochysia catingae* Ducke in Arch. Inst. Biol. Veg. IV 1938 p. 33.

Small tree, entirely glabrous. Adult branchlets subterete, greyish; young branchlets strongly contrasting: shining and black. Cortex exfoliating? Stipules lanceolate, about 0.1 cm long. Leaves in trimerous whorls, rarely opposite on a few nodes. Petioles 1.5-5.0  $\times$  0.15-0.20 cm. Blade 8-15  $\times$  4-7 cm, thick and strong, obovate-oblong or oblong; base obtuse, sub-acute or rounded; apex truncate or rounded, retuse. Nervation inconspicuous above, slightly conspicuous beneath, nowhere prominent. Lateral nerves numerous, strictly parallel, angle with the midrib about 70', running into a marginal nerve at 0.1-0.2 cm from the flat margin. Inflorescence terminal and axillary, subcylindrical, laxiflorous; cincinni 1-3 flowered. Peduncles and pedicels at 0.8 and 1.2 cm resp., 0.05-0.08 cm wide, together with the rhachis black and shining. Flower-bud 1.3-1.6  $\times$  0.15 cm, straight or subrecurved; apex obtuse, glabrous or with some scattered hairs. Spur straight, about  $1.0 \times 0.1$  cm, often making an angle of 90' with the pedicel. Petals subequal, oblong, rounded, length  $1/2$ - $3/4$  of that of the stamen. Anther about  $2\frac{1}{2}$  times longer than the filament, slender, linear, obtuse. Staminodes about 0.1 cm long. Style cylindrical. Stigma terminal, orbicular, about  $0.05 \times 0.05$  cm.

Type: Ducke 34651 in RB. (RB specimen not seen).

Distribution: BRAZIL, Amazonas: Rio Curucuryary, trib. Rio Negro, Ducke RB. 34651 type, (G-DEL, K, U, US).

Ecology: In Rio Negro catingas (Parklandscape). Fl.: Feb.

29. *Vochysia parviflora* Spruce ex Warm. in Flora Bras. XIII, II p. 75 t. XIV.

Tree of medium size. Branchlets firm, quadrangular, characterised by the fine ribs running down from the leaf-bases, each rib connecting two stipules of succeeding whorls; cortex not exfoliating, with some scattered hairs. Stipules deltoid, about 0.05 cm long, pilose. Leaves in alternating tetramerous whorls. Petioles 1.5-2.0 cm long, sparsely puberulous, shining, striate. Blade 10-12 × 3-4 cm, elliptic-obovate or obovate; base cuneate; apex acuminate, complicate and reflexed; glabrous above; slightly puberulous, especially on the nervation, beneath. Midrib, marginal and lateral nerves impressed or flat above, prominent beneath, slightly discolor. 12-15 Major lateral nerves, mutual distance about 0.8 cm, angle with the midrib about 60°, slightly bent upwards and ending in the subundulate marginal nerve at about 0.2 cm from the — strongly revolute — margin. Veins obsolete. Inflorescence terminal and axillary, the terminal ones branched, the separate branchlets bearing large numbers of one-flowered cincinni, slightly pilose. Flower-bud 0.5-0.7 cm long, terete, subrecurved, apex obtuse. Spur 0.3-0.4 cm long; apex subincrassate; base slightly constricted. Petals unequal, oblong, rounded: centre one about 0.2 cm long. Anther linear, about 0.4 cm long; filament about 0.2 cm long; apex rounded. Staminodes deltoid, obtuse, 0.03-0.05 cm long. Style cylindrical, apex later on subincrassate. Stigma terminal, subcapitate, about 0.03 × 0.03 cm.

Type: Spruce 1974 in K.

Distribution: BRAZIL, Amazonas: Rio Negro, inter Barcellos and S. Isabel, Spruce 1974 type (BM, C, G-BOIS, GH, K, NY, OXF, P, W).

Ecology: "In "Gapo" at foot of the Serra de Castanheiro" (Spruce on label). Fl.: Dec.

30. *Vochysia tetraphylla* (G. F. W. Meyer) D.C., Prod. III p. 27; A. Dietr. 1831 p. 104; D. Dietr. 1839 p. 23; Warm. 1875 p. 76; Pulle 1906 p. 250; Benoist 1915 p. 246; - 1919 p. 319; - 1931 p. 165; Record and Mell 1924 p. 367 (wood, uses); Wiesner 1928 p. 1243 (uses); Graham 1933 p. 171 (wood); Ducke 1938 p. 33; A. C. Smith 1945 p. 296 (habitat). *Vochysia tetraphylla* Stone and Freeman 1914 p. 26 (anat., uses.) *Cucullaria tetraphylla* G. F. W. Meyer 1818 p. 12; Roem. et Sch. 1822 p. 51; E. Meyer 1825 p. 813, Spreng. 1825 p. 16.

*Vochysia arcuata* Garcke 1849 p. 58 according to Benoist 1915 and Pulle 1906 also belongs to this species. Type: Kegel 684 and 943 in GOET not seen by the present author.

Branchlets terete, subtetragonic just below the nodes, glabrous except for the sparsely brownish pilose nodes, shining, cortex in most cases not exfoliating. Stipules 0.1 cm long, deltoid, pilose.

Leaves in tetramerous, rarely trimerous whorls. Petioles 0.2-0.6 (1.0) cm long, striate, slightly pilose. Young leaves sparsely puberulous beneath. Blade 12-16 (6-20) × 4-6 (3-7) cm, glabrous, shining above, dull beneath; base rounded, almost cordate; apex acuminate. Major lateral nerves (9-14) on 1.0-1.5 cm mutual distance, angle with the midrib about 70°, as veins on both sides subprominent; straight and subparallel up to 0.5-1.0 cm from the flat margin, irregularly anastomosing. No marginal nerve. Inflorescence terminal and axillary, the terminal thyrse often branched; thyrses elongate-pyramidate or cylindrical, sparsely puberulous. Cincinni 1-2, rarely 3-flowered. Flower-bud slender, cylindrical, about 1.0 × 0.1-0.2 cm, subrecurved, apex acute or obtuse. Spur straight or slightly incurved, angle with the pedicel less than 30°; 0.5-0.7 cm long, slightly attenuate. Petals unequal, oblong; apex rounded and ciliate, about half as long as the stamen, anther 1½-2 times longer than the filament, oblong. Staminodes deltoid, about 0.05 cm long. Style slightly widened towards the apex. Stigma terminal, round, about 0.05 × 0.05 cm. Immature capsules irregularly verruculose-rugulose.

Type: Rodschied s.n. in ?; not seen by the present author.

Distribution: Very common in Guiana.

FRENCH GUIANA: Numerous collections, of which Sagot 823 and the Mélinon collections are in many herbaria.

SURINAM: Numerous collections, e.g. Sloane 291 in BM coll. about 1688.

BRIT. GUIANA: Numerous collections, e.g.: Ri. Schomburgk 511 in many herbaria.

VENEZUELA, Bolivar: (Guiana) Rio Caroni, Cardona 1194 (US); - 40 (US); No location: Stevens s.n. (NY).

BRAZIL, Amazonas: Ilha Agarany, Rio Branco, Kuhlmann RB 3129 (K, U, US). No location: Glocker 456 (BM).

Ecology: On riverbanks in rain forests. Fl.: Mainly from Aug.-Jan., but reports from every month. Fr.: Mar.-Aug.

Vernacular names: BRIT. GUIANA: Iteballi, Itaballi, Etaballi, Etaeparry, Etaiballi (Arowaccan). SURINAM: Kwarie, Kwarie wiwiri, Watrakwarie, Warra kwarrie (Negro English); Schokkie (Caribbean); Itaballi, Etaballi (Arowaccan); Pisi.

31. *Vochysia mapuerae* Huber ex Ducke in Arch. Jar. Bot. Rio I 1915 p. 44, Ducke 1913 p. 171 nomen nudum; - 1933 p. 45; - 1938 p. 32.

The present author saw only one of the two known specimens, only with fruits. So he is unable to give a description of the flowers or of the inflorescence, neither is he able to judge affinities. Judging from the vegetative characters this may be a proper species, it is not certain to which subsection it belongs, but it might be allied to *V. tetraphylla*.

Ultimate branchlets slender, about 0.3 cm wide. Cortex not

exfoliating but scaling away in tiny fragments, sparsely puberulous. Stipules smaller than 0.1 cm, subulate. Leaves in tetramerous whorls. Petioles about 1.0 cm long, striate, subsericeous. Blade 8-10 × 3-4 cm, oblong or elliptic-obovate; base obtusely cuneate; apex obtuse or rounded, retuse; upper side dull, glabrous, veins inconspicuous; lower side also dull but greyish-golden subsericeous and veins sub-distinctly reticulate. Lateral nerves curved upwards and ending in the flat margin not prominent on either side, 8 major ones, slightly nigrescent and so discolor. Marginal nerve absent. Inflorescence terminal, rhachis sparsely puberulous. Fruit a normal Vochysia-capsule: ovoid, about 4 × 1.3 cm, verruculose, nigrescent, dull. Each peduncle bears only one capsule. Sec. Ducke: Petals 0.2 cm long, ciliate and anther ciliate on lateral margins.

Type: Ducke PG 9048 in PG, not seen by the present author.

Distribution: BRAZIL, Para: Along Rio Acapù, Ducke PG 15699 (US). The type specimen comes also from a tributary of the Rio Trombetas: the Rio Mapuera. Fr.: Feb.

### Subsection B II. LUTESCENTES Warm.

Warm. in Flora Bras. XIII, II p. 60 sub titulo series.

Mostly medium-sized trees, rarely shrubs or undershrubs. Cortex of the branchlets never exfoliating, in some cases slightly scaling away, yellowish or brownish, in a few cases purpurescent, blackish or glaucous pruinose. Adult branchlets glabrous, subterete or obtusely angled. Stipules mostly deltoid, rarely entirely absent. Petioles nearly always with a subincrassate base. Adult blade glabrous on both sides, lower side of the midrib in one or two cases subpuberulous. Inflorescence glabrous or subpuberulous. Young parts of the rhachis sharply angled. Peduncles and pedicels yellow or yellowish-brown in most cases. Flower-bud 1.2-2.5 × 0.2-0.4 cm. Spur shorter than the fourth calyx-lobe apex often subincrassate. Smaller calyxlobes ciliate and often subpuberulous. Petals and stamen ciliate or one of them glabrous. Petals rarely as long as the whole stamen. Filament glabrous, 0.1-0.5 cm long. Staminodes glabrous, 0.05-0.20 cm long. Style cylindrical or subincrassate towards the apex. Stigma terminal and small.

Distribution: Tropical Latin America.

### Key to the species.

1. a. Leaves opposite . . . . . 2  
 b. Leaves in tri- or polymerous whorls. . . . . 8

2. *a.* Petals absent. Blade elliptic-orbicular, 4-5 × 3-4 cm, margin strongly revolute . . . . . 53. *V. apopetala* Ule.  
*b.* Petals present. Margins of the blade flat or subrevolute . 3
3. *a.* Apex and base of the blade plicate 43. *V. complicata* Ducke.  
*b.* Apex and base of the blade flat . . . . . 4
4. *a.* Spur straight or only slightly curved . . . . . 5  
*b.* Spur incurved, apex against the pedicel. Network of the nervation with regular narrow meshes. Apex of flowerbud rounded . . . . . 49. *V. emarginata* (Vahl) Poir.
5. *a.* Apex of the leaf obtuse, acute or acuminate . . . . . 6  
*b.* Apex of the leaf truncate or rounded, retuse. Petioles 2-3 cm long . . . . . 45. *V. speciosa* Warm.
6. *a.* Angle between the spur and the pedicel 60-90'. . . . . 7  
*b.* Angle between the spur and the pedicel less than 30'. . . . .  
. . . . . *subsect. B VI. V. cayennensis* Warm. (84)
7. *a.* Three petals, length of the centre one 1/2-2/3 of that of the stamen . . . . . 40. *V. tabascana* Sprague.  
*b.* One petal, shorter than half the stamen . . . . .  
. . . . . 54. *V. pacifica* Cuatrecasas
8. *a.* Leaves in trimerous whorls . . . . . 9  
*b.* Leaves in tetra- to hexamerous whorls. . . . . 27
9. *a.* Petioles 0.1-0.2 cm long. Leaves 3-4 cm long, about 1-2 times longer than wide. Stem and leaves mostly glaucous-pruinose. Undershrubs . . . . . 10  
*b.* Petioles longer than 0.3 cm. Leaves 4-16 cm long, about 2-5 times longer than wide. Never glaucous-pruinose. Real shrubs or trees. . . . . 12
10. *a.* Leaves obovate or elliptic, nervation inconspicuous above 11  
*b.* Leaves orbicular. Apex rounded and emarginate. Nervation visible above . . . . . 51. *V. rotundifolia* Mart.
11. *a.* Leaves elliptic, apex mucronate, acute-obtuse . . . . .  
. . . . . 50. *V. pygmaea* Bongard.  
*b.* Leaves obovate, apex truncate . . . 52. *V. martiana* Stafl.
12. *a.* Margins of the stamen glabrous. . . . . 13  
*b.* Margins of the stamen ciliate . . . . . 14
13. *a.* Apex of the leaf obtuse, leaves mostly in tetramerous whorls . . . . . 38. *V. hondurensis* Sprague.  
*b.* Leaves long-acuminate 39. *V. guatemalensis* J. D. Smith.
14. *a.* Petioles 1.8-3.0 cm long . . . . . 15  
*b.* Petioles 0.4-1.8 cm long . . . . . 19
15. *a.* Flower-bud nearly 0.4 cm wide, subrecurved to nearly falcate recurved . . . . . 16  
*b.* Flower-bud about 0.2 cm wide, straight or subrecurved . 17

16. *a.* Spur strongly incurved; more than 3 times longer than the petioles, which are 2-3 cm long . . . 48. **V. magnifica** Warm.  
*b.* Spur straight or subrecurved, blade about three times longer than the petioles, which are 2.5-4.0 cm long . . . . . 37. **V. glazioviana** Warm.
17. *a.* Spur about 0.1 cm wide, cylindrical. Flower-bud acuminate; marginal nerve present . . . . . 18  
*b.* Spur about 0.2 cm wide, bag-shaped and slightly inflated. Flower-bud obtuse or rounded. Marginal nerve absent . . . . . 41. **V. aurea** Stapf.
18. *a.* Spur incurved, apex of the leaf acute or acuminate . . . . . 36. **V. bifalcata** Warm.  
*b.* Spur straight or subrecurved. Apex of the leaf truncate, nervation inconspicuous above . . . . . *subsect. B I, V. catingae* Ducke (28)
19. *a.* Marginal nerves present . . . . . 20  
*b.* Lateral nerves ending in the margin or anastomosing arcuately . . . . . 22
20. *a.* Spur incurved. Leaves 8-15 × 2.5-3.5 cm . . . . . 36. **V. bifalcata** Warm.  
*b.* Spur straight or subincurved . . . . . 21
21. *a.* Lateral nerves prominent beneath . . . . . *subsect. B III, V. schwackeana* Warm. var. *glabra* Stapf.  
*b.* Lateral nerves not prominent and scarcely distinguishable in the reticulate nervation. . . . . 33. **V. saldanhana** Warm.
22. *a.* Margin of the leaf flat . . . . . 23  
*b.* Margin of the leaf strongly revolute. . . . . 44. **V. revoluta** Ducke.
23. *a.* Spur incurved, apex against the pedicel. Nervation with regular, narrow meshes (Leaves mostly opposite) . . . . . 49. **V. emarginata** (Vahl) Poir.  
*b.* Spur less incurved. . . . . 24
24. *a.* Flower-bud about 0.2 cm wide . . . . . 25  
*b.* Flower-bud about 0.4 cm wide. Leaves firmly leathery, thick . . . . . 47. **V. thyrsoides** Pohl.
25. *a.* Spur about 0.1 cm wide, never inflated . . . . . 26  
*b.* Spur about 0.2 cm wide, bag-shaped and slightly inflated. Leaf-base abruptly contracted towards a 1.2-2.0 cm long petiole. Leaves elliptic . . . . . 41. **V. aurea** Stapf.
26. *a.* Leaves generally spatulate, base slowly narrowing towards the petiole. Leaves mostly in polymorphous whorls . . . . . 46. **V. tucanorum** Mart.  
*b.* Leaves elliptic-oblong, 14-18 × 5-7 cm, base abruptly con-

- tracted . . . . . 42. *V. macrophylla* Stafli.
27. *a.* Marginal nerve present. . . . . 28  
*b.* Lateral nerves ending in the margin or arcuately anastomosing . . . . . 31
28. *a.* Petioles 1.5-3.0 cm long. Apex of the leaf truncate-rotundate . . . . . 32. *V. oppugnata* (Vellozo) Warm.  
*b.* Not this combination of characters . . . . . 29
29. *a.* Apex of the leaf rounded or obtuse, blade oblong or spatulate . . . . . 30  
*b.* Apex and base of the leaf acuminate, mucronate. Petioles 0.6-1.7 cm long. Blade lanceolate . . . . .  
*subsect. B III, V. schwackeana* Warm. var. *glabra* Stafli. (57)
30. *a.* Base of the leaf rounded or obtuse. Flower-bud straight. . . . . 34. *V. oblongifolia* Warm.  
*b.* Base of the leaf acute. Flower-bud recurved . . . . .  
*subsect. B VI, V. spathulata* Warm. (89)
31. *a.* Petioles 0.3-1.2, rarely 1.4 cm long . . . . . 32  
*b.* Petioles 1.5-4.0 cm long . . . . . 35
32. *a.* Flower-bud 1.0-1.7 × 0.2 cm . . . . . 33  
*b.* Flower-bud 2.0-2.5 × 0.4 cm. Leaves firmly leathery, thick . . . . . 47. *V. thyrsoides* Pohl.
33. *a.* Petioles longer than 0.8 cm. Petals ciliate . . . . . 34  
*b.* Leaves subdistinctly petioled, 17-19 × 5-6 cm. Petals glabrous . . . . . 35. *V. riedeliana* Stafli.
34. *a.* Stamen ciliate. Leaves generally spatulate . . . . . 46. *V. tucanorum* Mart.  
*b.* Stamen glabrous. Leaves oblanceolate-oblong . . . . . 38. *V. hondurensis* Sprague.
35. *a.* Spur incurved. Flower-bud 1.5-2.0 × 0.4-0.5 cm. Petals as long as the stamen . . . . . 48. *V. magnifica* Warm.  
*b.* Not this combination of characters . . . . . 36
36. *a.* Flower-bud 0.8-1.3 cm long. Petioles 1.5-2.5 cm long . . . . . 38. *V. hondurensis* Sprague.  
*b.* Flower-bud 2.0-2.5 cm long. Blade about three times longer than the petioles, which are 2.5-4.0 cm long. Petals subpilose on the back. . . . . 37. *V. glaziouviana* Warm.

32. *Vochysia oppugnata* (Vellozo) Warm. in *Flora Bras.* XIII, II p. 87 t. XVI 1; Warm. 1889 p. 26; Wille 1882 p. 180 seq. (anat.); Petersen 1896 p. 316 fig. 170 A; Glaziou 1905 p. 32; Andrade et Vecchi 1916 p. 121; Correa 1931 p. 366 (wood, use). *Strukeria oppugnata* Vellozo 1790 t. 20 et 1880 p. 7 *Vochysia tucanorum* Mart. var. *hexaphylla* Mart. 1824 p. 143; D.C. 1828 p. 27. *Vochysia vahlii*

*Pohl ex Ettingshausen* 1861 p. 186. *Vochysia fluminensis* Warm. in sched.

Glabrous. Branchlets obtusely angled at the top, each angle corresponding to a stipule; older parts subterete. Stipules lighter coloured, thick, about  $0.1 \times 0.1$  cm, dropping late. Leaves mostly in tetramerous whorls, rarely opposite or in polymerous whorls. Petioles 1.5-3.0 cm long. Blade oblong or spatulate-oblong,  $8-14 \times 2-6$  cm; apex truncate or subrotundate, emarginate or obcordate; base cuneate. Nervation reticulate, concolor with the blade, sub-prominent on both sides. Lateral nerves subparallel, 15-25 major ones, angle with the midrib 70-80', straight, ending in an undulate marginal nerve at about 0.2 cm from the margin. A second, inconspicuous and much thinner marginal nerve runs at 0.1 cm from the - subrevolute - margin. Inflorescence terminal, large, densiflorous. Peduncles 1.0-1.3 cm, pedicels 0.8-1.8 cm long and slightly incrassate towards the top. Flower-bud  $1.3-2.2 \times 0.3$  cm, recurved, acute. Spur straight, subincurved or slightly S-shaped, making an angle of less than 45' with the pedicel,  $1.0 \times 0.1$  cm; apex slightly incrassate. Petals unequal, linear-oblong, glabrous, apex rounded or obtuse, centre one somewhat shorter than the stamen. Filament about 0.4 cm long; anther glabrous except for the ciliate margin, apex rounded, base without a sterile part. Staminodes about 0.15 cm long, acute. Style subcylindrical.

Type: Vellozo mentions no type. Lectotype: Glaziou 671 in C.

Distribution: Numerous collections from the immediate vicinity of the town of Rio de Janeiro, especially from the Corcovado mountains. e.g.: Schuech s.n. (Pohl herb. Bras. 3993 in W) (BR, G-DEL, W) (type of *V. vahlii* Pohl ex Ettingshausen named by Pohl 1831 p. 31 *V. emarginata* Vahl); Glaziou 671, lectotype, (BR, C, K, P); - 3954 (C, K, P); - 10733 (C, G-DEL, K, P, US); Gardner 5449 (BM, G-BOIS, G-DEL, GH, K, NY, OXF, P, US, W).

Ecology: In coastal forests on atlantic slopes near Rio de Janeiro. Fl.: Oct.-Mar.

Vernacular names: Rabo de Arara, Rabo de Tucano; Urucuca (Warm. 1875).

33. *Vochysia saldanhana* Warm. in: Vid. Med. Nat. For. 1889 p. 26. Glaziou 1905 p. 33. *Vochisia stenophylla* Briq. 1919 p. 387.

Glabrous except for the greyish puberulous lower surface of the young leaves and the pilose stipules. Older branchlets terete, dark brown, dull. Stipules ovate thick, lighter coloured than the cortex, about 0.1 cm long. Leaves in trimerous whorls. Petioles 0.7-1.0 (1.2) cm long, slender. Blade  $4.0-6.5 \times 0.7-2.0$  cm, subpergamentaceous; apex and base nearly similar, acute or acuminate; subnitid on both surfaces. Nervation distinctly reticulate beneath, subdistinct above.

Lateral nerves numerous, subparallel, angle with the midrib 70-80', straight, ending in a subundulate marginal nerve at about 0.1 cm from the flat margin. Inflorescence terminal, glabrous except for the ciliate smaller calyx-lobes. Cincinni 1- or rarely 2-flowered. Peduncles and pedicels 0.4-0.6 and 0.8-1.0 cm long resp. and about 0.05 cm wide. Flower-bud 1.1-1.3 × 0.2 cm, straight or recurved, clavate, apex acute. Spur subincurved, 0.5-0.6 × 0.1 cm, making an angle of about 90' with the pedicel. Petals glabrous, unequal, apex obtusely denticulate, not ciliate. Stamen clavate, glabrous except for a marginal row of hairs on the anther, fertile part about 0.8 cm long. Staminodes about 0.1 cm long, triangular. Style sub-clavate.

Type: Glaziou 6874 in C.

Distribution: BRAZIL, Rio de Janeiro: Glaziou 6874 type (BR, C, K, P); - 6875 cotype (C, P); - 7608 (C, P); - 16763, cotype, (BR, K, P, and PG acc. to photogr. in F); - 3955 cotype (C, P); - 13807 cotype (C, G-DEL, K, P) (also type of *V. stenophylla* Briq. in G-DEL); Occhioni RB 23493 (RB, U, S); Kuhlmann 519 (RB, U); Binot 41 (BR).

Ecology: On coastal mountains near Rio de Janeiro. Fl.: Nov.-Feb.  
Vernacular names: Canella Santa, Muricy (Rio).

### 34. *Vochysia oblongifolia* Warm. in Flora Bras. XIII, II p. 84.

Large tree. Glabrous except for the axillary buds, the nodes of the branchlets and the sparsely puberulous inflorescence. Branchlets obtusely angled, light brown. Stipules thick, about 0.1 cm long, lighter coloured. Leaves in tetramerous whorls. Petioles 0.4-0.5 cm long, base incrassate. Blade oblong or subspatulate-oblong 8-15 × 3-4 cm, apex obtuse, rounded or shortly and broadly acuminate; base rounded or obtuse. Nervation reticulate, slightly prominent on both sides. Lateral nerves numerous, straight, angle with the midrib 70-90', ending in a slightly undulate marginal nerve at about 0.2 cm from the subrevolute margin. A second, tiny marginal nerve runs at about 0.05 cm from the margin. Inflorescence terminal, cincinni 3 (-1) flowered. Peduncles and pedicels 0.4-1.0 cm long. Flower-bud about 1.5 × 0.2 cm, straight, acute. Spur straight or incurved, 0.5-0.9 × 0.05 cm; apex incrassate and lighter coloured. Petals unequal, oblong, glabrous; length of the centre one about 2/3 of that of the stamen. Stamen with a 0.1 cm long, glabrous, filament; anther glabrous except for the ciliate margin, linear, sterile part about 0.1 cm long. Staminodes about 0.1 cm long, elliptic, apiculate. Style cylindrical. Stigma subcapitate.

Type: Gardner 995 in K.

Distribution: BRAZIL, Pernambuco: Gardner 995, type, (BM, GH, K, NY, OXF, P, S, US, W) (Along the coast near Catuca).

**Ecology:** Unknown, but collected "in the woods" near Catuca in the zone of the coastal forests. Fl. Nov.

**Observation:** The specimen Dux d'Abrantes s.n. in C. marked *V. oblongifolia* belongs to *V. spathulata* Warm.

**35. *Vochysia riedeliana* Staffl. nov. spec.**

Sectio Ciliantha Staffl., subsectio Lutescentes Warm. Ramuli adulti subteretes, tenuiter costati, glaberrimi. Stipulae 0.20-0.25 cm longae, crassae, caducae vel persistentes. Folia 4-verticillata. Petiolus 0.5-2.0 cm longus. Lamina magna, spathulata, basi sensim attenuata, glaberrima. Costa marginalis abest. Cincinni 2-5 flori. Alabastra 1.2-1.5 cm longa, subrecurva. Calcar incurvum, dimidia alabastri longitudine. Petala glaberrima, obovata. Stamen clavatum, glabrum, margine ciliatum.

Branchlets subterete, with conspicuous, sharp and tiny ribs running down from the stipules, brown, glabrous on adult parts, slightly adpressed pilose on the young parts. Stipules 0.20-0.25 cm long, thick, dropping late or not at all, subpilose, yellowish, subulate. Leaves in tetramerous whorls. Blade gradually narrowing towards the 0.5-2.0 cm long and 0.2-0.3 cm wide glabrous petiole. Blade 15-20 × 5-7 cm, spatulate, subcoriaceous or subchartaceous, glabrous, apex rounded and retuse or emarginate. Nervation slightly prominent on both surfaces. Lateral nerves at 1.0-1.5 cm mutual distance, angle with the midrib 70-80°, straight, irregularly anastomosing at 0.5 cm from the margin. No marginal nerve. Margin subrevolute. Inflorescence terminal, slightly ferruginous-puberulous. Cincinni 2-5 flowered. Peduncles and pedicels 0.6-1.0 and 0.4-1.5 cm long. resp. Flower-bud 1.2-1.5 × 0.3 cm, cylindrical, subrecurved, slightly puberulous, apex obtuse or rounded. Spur 0.6-0.7 × 0.1 cm, incurved, angle with the pedicel 0-30°. Petals obovate, unequal, entirely glabrous, apex rounded. Stamen glabrous except for the ciliate margins of the loculi, clavate, apex rotundate-obtuse; anther with a 0.1-0.3 cm long sterile part gradually narrowing towards the strap-shaped, 0.3-0.4 cm long filament. Staminodes about 0.04 cm long, orbicular, apiculate. Style subincrassate towards the apex. Stigma flat, diam. 0.04-0.06 cm.

**Type:** Kuhlmann 63 in U.

**Distribution:** BRAZIL, Espirito Santo: Rio Doce, Kuhlmann 63 type (RB, U). Goyaz: Aldea de Salinas, Weddel 2067 (P). Bahia: Blanchet s.n. (W, BM). **Locality unknown:** Riedel s.n. (S, US).

**Ecology:** Unknown. Fl. Mar. Fr. June.

**36. *Vochysia bifalcata* Warm. in Flora Bras. XIII, II p. 84; Wille 1882 p. 180 seq. (anat.); Malme 1900 p. 48 Glaziou 1905 p. 32.**

Glabrous except for some hairs on the inflorescence. Ultimate branchlets slender, about 0.3 cm wide, terete. Stipules none or rudimentary. Leaves in trimerous whorls. Petiole 1.0-1.7 cm long. Blade 8-11 (-15)  $\times$  2.5-3.5 cm, lanceolate-oblong, subnitid; apex and base nearly similar, acute or acuminate, sometimes plicate. Nervation subprominent on both surfaces, reticulate. Lateral nerves numerous, straight, thin, angle with the midrib about 70', running into a slightly undulate marginal nerve at 0.1 cm from the flat margin. Inflorescence terminal and almost entirely yellow. Peduncles and pedicels at 1.5 cm long. Flower-bud bifalcate, nearly falcate-recurved, 1.5-2.0  $\times$  0.2-0.3 cm, acuminate. Spur falcate-incurved, mostly about 1.0  $\times$  0.1 cm. Petals subequal, obovate-oblong, glabrous, length of centre one 1/2-2/3 of that of the stamen. Stamen glabrous or with some marginal hairs, clavate, apex obtuse; fertile part of the anther about 0.7 cm long, sterile part as long as the filament (about 0.3 cm). Staminodes about 0.05 cm long, delicate. Stigma subcapitate, 0.05  $\times$  0.05 cm.

Type: Glaziou 3952 in C.

Distribution: BRAZIL, Rio de Janeiro: Route de Nova Friburgo, Glaziou 3952 type (C, K, P). Parana: Icarehy, Dusen 11429, (BM, G-DEL, GH, K, NY, S, US). Sao Paulo: Serra do Mar. Mosen 3402 (C, K, S). Locality unknown: Riedel s.n. (K, OXF, P).

Ecology: Unknown, collected in the zone of the coastal rain forests. Fl. Jan.-Mar. Fr. juv.: Mar.

37. *Vochysia glazioviana* Warm. in Flora Bras. XIII, II p. 86. Glaziou 1905 p. 32.

Glabrous. Ultimate branchlets firm, blackish, rugulose, terete. Stipules 0.15 cm long, thick, persistent. Leaves in tri- or tetramerous whorls. Petioles 2.5-4.0 cm long. Blade 9-11  $\times$  3-5 cm, elliptic or elliptic-oblong, rigidly coriaceous; upper surface shining; apex rounded and retuse, base cuneate. Nervation completely visible only on the lower side, not prominent on either surface. Lateral nerves numerous, angle with the midrib 70-80', subparallel, arcuately anastomosing at 0.2-0.3 cm from the subrevolute margin. No marginal nerve. Inflorescence terminal, pauciflorous, small. Cincinni 1-3 flowered. Peduncles and pedicels firm, about 0.15 cm wide at the base. Pedicels incrassate towards the apex. Flower-bud recurved, subclavate, obtuse, 2.0-2.5  $\times$  0.4-0.6 cm. Spur straight or slightly recurved, making an angle of 40-80' with the pedicel, about 1  $\times$  0.1-0.2 cm, apex subincrassate. Petals as long as the stamen, linear-subspathulate, subchartaceous, with some scattered hairs on the back. Staminodes 0.2-0.3  $\times$  0.05-0.10 cm, oblong, acute. Style incrassate towards the apex. Stigma capitate.

Type: Glaziou 3953 in C.

Distribution: BRAZIL, Rio de Janeiro: Nova Friburgo, Glaziou 3953, type, (C, P; B acc. to fotogr. in F). Serra Orgaos, Gardner 5705 (BM, K, OXF, W).

Ecology: Unknown, but collected in the zone of the coastal rain forests. Fl.: Mar.

Observation: This species may belong to this subsection because of the characters mentioned above. Some parts of the flower however are unknown, so its place is still uncertain.

38. *Vochysia hondurensis* Sprague in Kew Bull. 1922 p. 183. Standley 1928 p. 229; - 1931 p. 245; - 1937a p. 592; - 1937b p. 265; Yuncker 1940 p. 300; Lundell 1945 p. 271 (description of the wood by Record and Mell 1924 p. 367 of a specimen wrongly cited as *V. guatemalensis*). *Vochya hondurensis* Standley 1924 p. 303.

Large tree. Upper side of the base of the midrib greyish-tomentose, stipules and axillary buds pilose; inflorescence and sometimes branchlets also slightly puberulous. Younger branchlets quadrangular, each angle corresponding with a leaf-base and accentuated by two small ribs running down from the stipules. Older branchlets subterete. Stipules conspicuous, subulate, persistent, 0.1-0.2 cm long. Leaves in tetra-, rarely trimerous whorls. Young leaves practically glabrous. Petiole 1.5-2.5 cm long, terete, greyish-tomentose between the decurrent margins of the blade. Blade 6-15 × 2-5 cm, mostly about 3 times longer than wide, obovate-oblong, apex and base dissimilar; apex obtuse or slightly obtusely acuminate, often subretuse; base gradually cuneate. Lateral nerves slightly bent upwards, ending in the margin or anastomosing, on both surfaces subprominent, 10-13 major ones. No marginal nerve. Inflorescence terminal and axillary, densiflorous. Cincinni 2-5 flowered. Peduncles and pedicels about 0.4-0.8 × 0.05-0.10 cm. Flower-bud 0.8-1.1 × 0.1-0.2 cm, strongly recurved, obtuse or subapiculate. Spur 0.5-0.7 × 0.05 cm, straight or slightly curved, subconical or subcylindrical. Petals suborbicular or subelliptic, 0.4-0.5 × 0.3-0.4 cm, unequal, apex ciliate otherwise glabrous; centre one about half as long as the stamen. Stamen glabrous apex obtuse; fertile part of anther about 0.6 cm, sterile part as long as the filament (0.1-0.2 cm). Staminodes 0.10-0.15 cm long. Stigma orbicular, about 0.05 cm diam.

Type: Campbell 19 in K. (British Honduras, Belize).

Distribution: Mostly on the Caribbean coastal plains and mountain-slopes of Central America.

BRITISH HONDURAS: Campbell 19, type (K; NY s.n.); Lundell 4135 (F); Gentle 3326 (NY); - 2637 (F, K, NY, US); Schipp 158 (BM, G-DEL, GH, K, NY, S, US); Pelly 64 (IFI); Peck 912 (GH, K); Stevenson 3 (F, US); Hummel s.n. (K); Stevenson s.n. (IFI).

REP. HONDURAS. Dept. Atlantida: Hottle 97 (F); Yuncker c.s. 8275 (F, G-DEL, GH, K, NY, S, US). Dept. Conan: Whitford and Stadtmiller 14 (US).

GUATEMALA. Galusser 14 (F, US); Whitford and Stadtmiller 45 (US) Lundell 3448 (F, GH, K, NY, S, US).

MEXICO, Oaxaca: Ubero, Ll. Williams 9467 (F, G-DEL, K, P, S, U, US, W); in G-DEL and US also under same number from Vera Cruz).

COSTA RICA. Pittier 11238 (G-BOIS, US, W).

Ecology: From 0-1000 m. in C. American rain forests on indicated plains and slopes. Fl.: Apr.-Jun., rarely Nov.; Fr.: Jun.-Sep.

Vernacular names: BR. HONDURAS: White Yemeri, White Mahogany, Sanpedrano, San Juan. COSTA RICA: Palo Chanco; Tskirik, Sirbi (sec. Standley 1937 a.) GUATEMALA San Juan.

Observation: In many herbaria confusion exists between this species and the next one; a confusion which accounts for the doubts expressed by Record and Hess 1944 p. 552 as to the specific character of the differences between these species. However these differences are true specific (shape of leaves, dimension of flowers etc.) and the confusion arose in consequence of several wrong determinations of widespread specimens. The species are also geographically distinctly separated, this species is tropical, the other one subtropical.

var. *parvifolia* Staf. nov. var.

Folia minora, 3-verticillata. Alabastra apiculata, minora.

Leaves smaller, 6-8 × 1.5-2.2 cm, in trimerous whorls. Flowers smaller: 0.6-0.7 × 0.1 cm, apiculate.

Type: Gentle 2479 in F.

Distribution: BR. HONDURAS El Cayo district, Vaca, Gentle 2479 (F, K, NY).

Ecology: "On hillside" in rain forest region. Fl.: Apr.

Vernacular name: Yemeri.

39. *Vochysia guatemalensis* J. D. Smith in Bot. Gaz. XII, 1887 p. 131, - 1888 p. 299 t. 23; - 1889 I p. 4, III p. 8, VI p. 3, VII p. 3; Goyena 1909 p. 225. *Vochya guatemalensis* Standley 1924 p. 302. (Record and Meil 1924 p. 367 describe a specimen belonging to *V. hondurensis*).

Glabrous except for the subpuberulous inflorescence, axillary buds, stipules and axils. Branchlets brownish, angled, ribs running down from the stipules, intercostal sides of older branchlets concave. Stipules 0.1-0.4 cm long, persistent. Leaves mostly in trimerous whorls, but sometimes scattered, opposite or in polymerous whorls. Petioles (1.5-) 2.5-3.0 cm long, rugulose. Blade 9-14 × 3-5 cm, lanceolate-oblong, glabrous; apex and base nearly similar, acuminate or acute, apex sometimes mucronulate. Lateral nerves subparallel, slightly bent upwards and irregularly anastomosing or ending in the margin, subprominent on both surfaces, angle with the midrib about

70'. Veins reticulate, not prominent, subconspicuous. No marginal nerve. Inflorescence terminal and axillary, densiflorous, subpuberulous, cylindrical. Cincinni 3-4 flowered. Peduncles and pedicels 0.5-1.0 and 0.5-1.5 cm long resp. and about 0.1 cm wide. Flower-buds slender, straight or subrecurved, acuminate or subacute, 1.0-1.8 × 0.2 cm, glabrous except for the ciliate and sparsely pilose smaller calyx-lobes. Spur straight or subrecurved, rarely subincurved, about 0.6 cm long, base and apex subincrassate; angle with the pedicel larger than 45'. Petals unequal, the first one about half as long as the stamen; apex truncate and ciliate, blade glabrous. Stamen linear, glabrous, obtuse; anther with a 0.3 cm long sterile part gradually narrowing towards the ca. 0.4 cm long filament. Staminodes flask-shaped, ovate, 0.10-0.15 cm long, apex dark brown. Style cylindrical. Stigma orbicular, 0.05 × 0.05 cm.

Type: Von Tuerckheim 943 in GH (Guatemala, Alta Vera Paz).

Distribution: Caribbean side of C. American mountains.

GUATEMALA, Dept. Alta Vera Paz: Pansamala, Tuerckheim 943, type (G-BOIS, GH, K, NY, P, US). Sasis, Helmrich 1570 (GH, K, NY, US). Finca Sepacuite, Cook and Griggs 619 (US); - 591 (US).

HONDURAS, Dept. Comayagua: Edwards p. 303 (F).

MEXICO, Mairet de la Chaudefont (no loc.) s.n. (G-DEL).

Ecology: In wet mountain-forests 1000-2000 m. Fl.: Apr.-June. See Standley and Steyermark 1945 p. 276 sub *V. hondurensis*.

Observation: See obs. under previous species.

Vernacular names: GUATEMALA: Ruan Chap.

40. *Vochysia tabascana* Sprague in Kew Bull. 1922 p. 183.  
*Vochysia parviflora* Villada (non Spruce ex Warm.) 1903 p. 681.  
*Vochysia tabascana* Standley 1924 p. 302; - 1926 p. 1668.

Tree of medium size. Glabrous except for the stipules, the axillary buds and some parts of the inflorescence. Branchlets purplish-brown, older ones terete. Stipules persistent, about 0.1 cm long. Leaves mostly opposite. Petioles 1-2 cm long, shining, striate. Blade 6-11 × 2-5 cm, elliptic or ovate-elliptic; apex obtuse, base obtusely cuneate. Lateral nerves on both surfaces slightly prominent, thin, 8-10 major ones, angle with the midrib 50-65', bent upwards and ending in the margin or anastomosing irregularly. No marginal nerve. Margin flat. Inflorescence terminal, subpuberulous. Cincinni 2-3 flowered. Peduncles and pedicels 0.4-0.6 and 0.6-1.5 cm long resp. and 0.05-0.10 cm wide. Flower-bud 1.0-1.3 × 0.2 cm, subrecurved, obtuse. Spur straight or subrecurved, angle with the pedicel 60-90', 0.5-0.7 cm long, base slightly incrassate. Petals suborbicular, subequal, ciliate at the top and pilose on the back, centre one about 1/2-2/3 times longer than the stamen. Stamen glabrous, apex obtuse, fertile

part of anther about 0.5 cm long, sterile cuneate 0.2 cm long base gradually narrowing towards the 0.2 cm long filament. Staminodes 0.1 cm long. Stigma flat, diam. 0.05 cm.

Type: *Rovirosa* 792 in K.

Distribution: Mexico, T a b a s c o: Between Atasta and La Tejeria, *Rovirosa* 792, type, also type of *V. parviflora* Vill. (K). Achotal, Balancan Matuda 3077 (F, K, NY). O a x a c a: Ubero, Ll. Williams 9399 (NY, US).

Ecology: In Oaxaca in rain forest, (Swietenia-Cedrela belt acc. to Ll. Williams in litt.). In humid tropical zone. Fl.: Apr.-May.

#### 41. *Vochysia aurea* Staf. nov. spec.

Sectio *Ciliantha* Staf., subsectio *Lutescentes* Warm. Arbor. Ramuli novelli obtuse angulati cum costibus tenuibus. Folia 3-verticillata. Petiolus supra glaber, 1.5-2.0 cm longus. Lamina elliptica vel elliptico-oblonga, rotundata et retusa, nervibus lateralibus majoribus 7-10, costa marginale nulli, cincinni 2-4 flori. Calcar rectum, amplum. Petala elliptica vel oblonga, ciliata. Anthera margine ciliata.

Tree, 30 m high, glabrous except for the sparsely puberulous base of the petioles, the stipules, the lower side of the younger leaves, the inflorescences and the pilose margins of the anther. Young parts of the branchlets obtusely angled, angles corresponding to the petioles and lined by subconspicuous ribs running down from the stipules. Stipules persistent in this specimen. Leaves in trimerous whorls. Young blades subpubescent along the nervation of the lower side. Petioles 1.5-2.0 cm long, glabrous between the decurrent margins of the blade. Blade 10-13 × 5-7 cm, 2-2½ times longer than wide, elliptic or elliptic-oblong; apex rounded and retuse; base acute. Lateral nerves slightly bent upwards, vanishing in the network of veins or irregularly anastomosing, subprominent on both sides, 7-10 major ones, angle with the midrib about 60°. No marginal nerve. Inflorescence terminal, elongate-pyramidate. Cincinni 2-4 flowered. Peduncles and pedicels each 0.4-0.8 cm long. Flower-bud 0.9-1.3 × 0.2 cm, straight or slightly recurved, obtuse. Spur 0.6-0.7 cm long, about as wide as the flower-bud, straight, angle with the pedicel 60-90°. Petals elliptic or oblong. Centre one 0.6-0.7 × 0.25-0.40 cm, glabrous except for the ciliate margin. Apex of the anther obtuse, filament about 0.2 cm long. Staminodes about 0.1 cm long, apiculate. Stigma orbicular, diam. about 0.05 cm. Capsule unknown.

Type: A. F. Skutch 4295 in S.

Distribution: COSTA RICA, prov. S a n J o s é: Vicinity of El General, 610 m., A. F. Skutch 4295 type (K, NY, S, US).

Ecology: Fl. Apr. Collected in the zone of tall and heavy forests of southern Pacific Costa Rica. (see Skutch 1945).

Vernacular name: Mayo.

42. *Vochysia macrophylla* Staf. nov. spec.

Sectio Ciliantha Staf., subsectio Lutescentes Warm. Arbor. Stipulae caducae vel persistentes. Folia 3-verticillata. Petioli circa 1.5 cm longi. Lamina magna, elliptico-oblonga, basi abrupte in petiolum contracta. Costa marginalis abest. Cincinni 1-2 flori. Alabastra recurva, obtusa. Calcar subincurvum. Petala  $1/3-1/2$  longitudinis staminis, subciliata. Stamen margine ciliatum.

Tree of medium size. Young parts of the branchlets angled, angles rounded, corresponding to the leafbases and lined by thin ribs, running down from the stipules. Older branchlets subterete, but lines persistent in this specimen. Stipules persistent or dropping late, about 0.1 cm long. Leaves in trimerous whorls. Petioles about 1.5 cm long, sparsely puberulous. Blade elliptic-oblong, 14-18 × 5-7 cm, shining and glabrous above, subnitid and slightly puberulous - especially on the nervation - beneath; apex obtuse or obtuse-apiculate; base cuneate. Nervation reticulate, lateral nerves making an angle of about 70' with the midrib, bent upwards, ending in the margin or anastomosing, subprominent only on the lower side. No marginal nerve, margin subrevolute. Inflorescence terminal. Cincinni 1-2 flowered. Rhachis subaureous-puberulous. Peduncles about 0.3 cm, pedicels about 1.0 cm long. Flower-bud 1.0-1.3 × 0.2 cm, subrecurved, obtuse; flowers lemon-yellow. Spur 0.7-0.9 cm long, subincurved. Petals about  $1/3-1/2$  as long as the stamen, subciliate at the top, very thin. Stamen glabrous except for the ciliate margin of the thecae, clavate, filament about 0.15 cm long, apex obtuse, sterile part of the anther cuneate, ciliate and about 0.2 cm long. Staminodes ovate, 0.15-0.20 cm long. Style cylindrical. Capsule 4.5 × 1.5 cm, oblong.

Type: Archer 1889 in US.

Distribution: COLOMBIA, Intendencia del Choco: Quibdo, Rio Atrato, Archer 1889 type (NY, US).

Ecology: 60 m. Fl. Apr.-May. In the zone with abundant rainfall and luxuriant rain forest along the Pacific.

Vernacular names: Palo Santo.

43. *Vochysia complicata* Ducke in Bull. Mus. Hist. Nat. Par. Sér. II, IV 1932 p. 738; Ducke 1933 p. 45; - 1935 p. 51; - 1938 p. 34.

Glabrous tree. Branchlets quadrangulate; young parts blackish; adult parts brownish, shining. Stipules 0.10-0.15 cm long. Leaves opposite; petioles 1-2 cm long, shining, striate. Blade oblong or elliptic-oblong 9-15 × 3-6 cm, thick and leathery; nervation on both sides reticulate and very slightly prominent; apex and base plicate, resp. acuminate and cuneate. Lateral nerves numerous, angle

with the midrib 60-70', straight, ending in a distinct marginal nerve at about 0.1 cm from the - flat - margin. Inflorescence terminal, subpyramidal-cylindrical, sometimes subcorymbose. Cincinni 1-5, mostly 3-flowered. Peduncles about  $1.0 \times 0.1$  cm, pedicels  $0.5-0.8 \times 0.1$  cm. Flower bud  $1.5-1.8 \times 0.3-0.4$  cm, straight or very slightly recurved, apex obtuse. Spur relatively short: 0.4-0.6 cm long, in-curved almost along the pedicel, attenuate. Petals irregular, ciliate, apex obtuse, centre one about  $0.3 \times 0.2$  cm, lateral ones 0.1-0.2 cm long. Filament about 0.1 cm, anther about 1.5 cm long. Anther oblong, base rounded or almost biauriculate, margin ciliate, back pilose on the marginal zones. Stamines somewhat irregular, acute, about 0.1 cm long. Style cylindrical. Stigma orbicular. Capsule unknown.

**Type:** Ducke 23498 in RB (RB-specimen not seen).

**Distribution:** BRAZIL, Amazonas: Manaus, Ducke RB. 23498 type (G-BOIS, K, P, S, U, US); - - RB 23813 (G-BOIS, K, NY, P, RB, S, U, US); - - 54 first coll. (F, K, NY, S, US), second coll. (US); Santa Isabel, Rio Negro, Ducke 23812 (K, US).

**Ecology:** "Upland forest tree along black water creeks" Ducke 1938. Fl.: Oct.-Dec.

**Observation:** This species and the next two are related to the *Micranthae* because of the blackish cortex. They share with that subsection the Hylaeon distribution, but have been placed with the *Lutescentes* e.g. because of the ciliate petals and stamen. They have not been placed at the beginning of that subsection because of the ciliate petals.

**44. *Vochysia revoluta* Ducke in Arch. Inst. Biol. Veg. II 1935 p. 51, Ducke 1938 p. 34.**

Large tree. Ultimate branchlets glabrous, subterete, greyish. Stipules about 0.15 cm long, glabrous, subulate. Leaves in trimerous whorls. Petioles about 1.2-1.6 cm long, black. Blade 5-8  $\times$  2.5-4.5 cm, obovate, thick and leathery, subnitid, greenish above, brownish beneath; base cuneate; apex rounded and retuse-emarginate. Nervation reticulate, slightly prominent on both surfaces. Major lateral nerves 6-8, straight, arcuately anastomosing at 0.3-0.4 cm from the margin. No marginal nerve. Margin strongly revolute. Inflorescence terminal, sparsely ferrugineous-pilose. Cincinni 2-3 (1-5) flowered. Peduncles 0.3-0.6, pedicels 0.3-1.0 cm long, 0.10-0.15 cm wide. Flower-bud about  $1.5-2.0 \times 0.2-0.3$  cm, straight or subrecurved, cylindrical, apex subacute. Spur in bud stretched along the pedicel, subincurved, 0.5-0.7 cm long. Petals irregular, ciliate and pilose on the back; centre one about 0.2-0.3 cm, lateral ones about 0.1-0.2 cm long. Ventral side of the stamen pilose, anther linear, about four times as long as the filament. Stamines deltoid, acute, about 0.1 cm long. Style cylindrical. Stigma orbicular.

Type: Ducke RB 24155 in RB.

Distribution: BRAZIL, Amazonas: Manaus, Ducke RB 24155 type (K, NY, P, RB, U, US); - - 93 (RB 34646) (F, G-DEL, K, NY, P, S, U, US; US also sec. coll.).

Ecology: "In humid upland forest" Ducke 1938. Fl.: Nov.

Observation: See obs. under *V. complicata*, no. 43.

45. *Vochysia speciosa* Warm. in Flora Bras. XIII, II p. 79; Benoist 1931 p. 165.

Glabrous except for the upper side of the petioles. Branchlets quadrangular, brownish or purpurescent, sides flat, angles corresponding to the - circa 0.2 cm long - stipules and lighter coloured. Leaves opposite. Petioles 0.2-0.3 cm long, terete, concolor with the cortex, margins of the blade running down on the upper side, uniting at half length and enclosing a lanuginose channel. Blade obovate or oblong-obovate, 9-15 × 5-7 cm, firmly chartaceous, upper side shining, apex truncate or rounded, base obtuse. Nervation slightly prominent on both surfaces; lateral nerves thin, subparallel, angle with the midrib 60-80°, 10-15 major ones, straight, but bending upwards near the margin, anastomosing. Marginal nerve absent. Veins reticulate. Inflorescence terminal. Cincinni 2-5 flowered. Peduncles and pedicels each about 1.0-1.5 × 0.05-0.10 cm. Flower-bud recurved, cylindrical, acute, 1.5-1.8 × 0.2 cm. Spur recurved, slightly attenuate, 0.7-0.9 cm long. Petals unequal, subciliate at the rounded apex, about half as long as the stamen. Ventral side of the stamen pilose, back glabrous, filament about 0.2 cm long. Staminodes glabrous, about 0.1 cm long. Style cylindrical.

Type: Poiteau in LE, this specimen has not been seen by the present author.

Distribution: FRENCH GUIANA: Poiteau s.n., type, (G-DEL, K, P, W). Martin s.n. (BM); Leprieur s.n. (G-DEL, K, L, P, US). Perrottet s.n. (P); anon. in herb Zuccharini s.n. (L).

Observation: See obs. under no. 43, *V. complicata*.

46. *Vochysia tucanorum* Mart., Nov. Gen. I p. 142 t. 85 (including var. *vulgaris* Mart. and var. *macrostachya* Mart. but not including var. *hexaphylla* Mart. and var. *fastigiata* Mart.); D.C. 1828 p. 27; A. Dietr. 1831 p. 108; Spach 1835 p. 322; D. Dietr. 1839 p. 23; Schnizlein 1843-1870 IV t. 260; Warm. 1867 p. 34; - 1875 p. 89 t. 16 II; - 1889 p. 27; - 1892 p. 434; Petersen 1896 p. 316 fig. 170 F-L; Malme 1900 p. 49; - 1905 p. 10; Glaziou 1905 p. 32; Pulle 1906 p. 250; Record and Mell 1924 p. 367 (uses). *Cucullaria tucanorum* Sprengel 1827 p. 9. *Vochysia elongata* Pohl 1831 p. 25 t. 116 (Including var. *nitida* Pohl, var. *opaca* Pohl and var. *ternata*

*Pohl* all l.c.); A. Dietr. 1831 p. 106; D. Dietr. 1839 p. 22; Walpers 1843 p. 69. *Vochysia tucanorum* Mart. var. *elongata* Warm. 1875 p. 90; Malme 1900 p. 49. *Vochysia tucanorum* Mart. var. *microphylla* Warm. 1875 p. 90. *Vochysia opaca* Pohl mss, Warm. 1875 p. 91.

Glabrous except for the greyish-tomentose stipules and axillary buds. Branchlets slender, slightly angled; ribs running down from the stipules but often obsolete in the lower parts of the internodes. Stipules subulate or deltoid-acute, about 0.05 cm long. Leaves in poly-often tetramerous whorls. Petioles short, rarely surpassing 1 cm. Blade polymorphous, but generally spatulate, variable in shape and dimensions, often 6-8 × 1.5-2.0 cm, but variability ranging from 3-15 × 1.5-4.0 cm, apex obtuse, rounded or subtruncate, retuse or emarginate; base always gradually narrowing. Nervation slightly prominent above, only discolor beneath, reticulate. Lateral nerves making an angle of 50-60° with the midrib, mutual distance often 0.6-1.0 cm, subparallel, arcuately anastomosing. No marginal nerve. Inflorescence terminal, densiflorous. Cincinni 2-4 flowered, sometimes in whorls. Peduncles and pedicels about 0.5-1.0 × 0.05 cm. Flower-bud 1.0-1.7 × 0.2 cm, recurved, mostly obtuse. Spur straight or incurved, cylindrical, apex incrassate, 0.8-1.1 × 0.1 cm. Petals unequal, oblong or spatulate-oblong, apex rounded or subtruncate, ciliate, centre one 1/2-2/3 times as long as the stamen. Stamen glabrous except for the margin of the fertile part of the anther, filament about 0.2 cm long, apex obtuse, sterile basal part of the anther cuneate and as long as the filament. Staminodes 0.10-0.15 cm long. Style subclavate. Stigma subtrilobed, 0.05-0.10 cm diam. Capsule subnitid, about 2.0 × 0.8 cm.

Type: Martius 1179, original specimen not seen, probably in M.

Distribution: S. E. Brazil and N. Paraguay.

BRAZIL, Minas Geraes: Numerous collections, e.g.: Pohl 2061 in W, type of *V. elongata* Pohl, s.n. in BR, and G-BOIS. S a o P a u l o: Numerous collections e.g.: Martius 1179, type, (BM, BR, G-BOIS, G-DEL s.n., K, L, NY, OXF, P, S, W); Burchell 4571 type of var. *microphylla* Warm, (BR, GH, K, L, NY, OXF, P). Rio de Janeiro: Claussen diff. coll. (BM, G-DEL, NY, P, W); Curran 684 (GH, US); Dusen 1915 (S, US, W); Glaziou 16764 (BR, G-DEL, NY, P, US, W) (all in Nova Friburgo); Ouro Preto Glaziou 14694 (K, P). Parana: Jaguariahyva, Dusen diff. coll. (BM, BR, G-DEL, GH, K, NY, S, US). Matto Grosso: St. Anna da Chapada, Malme 1676 B (S); - - s.n. (S); - Robert 361 (BM, K) G o y a z: Rio San Marcos Pohl (BR 783; Oxf. s.n.; W 785); Burchell 6165 (K). Obs.: In almost all herbaria mentioned there are a few specimens without further indication of locality, mainly collected by travellers in districts mentioned above.

PARAGUAY, S. Amanbay, Rojas 10217 (BM, G-DEL, K, P, W); Upper R. Apa Hassler 8139 (BM, G-BOIS, G-DEL, K, P, W).

SURINAM, Wullschlaegel 446 (BR). Dubious locality.

**E c o l o g y:** Tree of the campos (In "cerrado", "capao" and "capoeira"). Fl.: Nov.-Jul. Fr. Apr.-Sept.

**V e r n a c u l a r n a m e s:** BRAZIL, M i n a s: Cangirana, Caixetta, Vinheiro do mato, Pao Doce, Cachoeira do Campo, Congonha; Resineira (sec. Hilaire ex Warm. 1889). S a o P a u l o: Pao de Tucano, Pao Doce, Cinzeiro, Congonha; Caixetto (sec. Lund in Warm. 1867) M a t t o G r o s s o: Cambara.

**O b s e r v a t i o n:** This species is one of the most common *Vochysia* species of S. E. Brazil. It shows a certain polymorphism of the leaves and this is the reason, that a number of varieties has been distinguished by various authors. However, it is impossible to find sharp delimitations of these varieties, they gradually shift from one to the other. I do not feel justified to accept varieties, which are only parts of a fluid series of forms.

var. *fastigiata* Mart., Nov. Gen. I p. 142; D.C. 1828 p. 27; A. Dietr. 1831 p. 108. *Vochysia fastigiata* Warm. 1875 p. 91. *Vochysia fastigiata* Briquet 1919 p. 387.

Densely branched shrublet. Branchlets very slender: 0.1-0.2 cm wide, angled, often pseudo-dichotomously „fastigate”. Leaves about 2.5-3.0 × 1.0 cm. Flower-bud straight, spur stretched along the back of the fourth calyx-lobe. (Only young buds are present). Petals glabrous. Probably a monstrosity.

**T y p e:** Sello in L. (Martius' original specimen is unknown, perhaps in B, the L-specimen is the lectotype).

**D i s t r i b u t i o n:** BRAZIL, S a o P a u l o: Cubatao, Sello s.n. (BM, G-BOIS, G-DEL, K, L, NY, P, US).

**E c o l o g y:** Unknown.

**O b s e r v a t i o n:** This variety is probably a monstrosity caused by a savanna-fire or any other agent, indicated by its fastigate habitus. It stands apart, there being no intermediate form connecting it with other specimens. I only provisionally accept this variety.

47. *Vochysia thyrsoides* Pohl, Plant. Bras. II p. 24 t. 115; A. Dietr. 1831 p. 107; D. Dietr. 1839 p. 22; Walpers 1843 p. 69; Warm. 1867 p. 36; - 1875 p. 88 t. 15 II; - 1889 p. 25; - 1892 p. 434; Glaziou 1905 p. 32; Silveira 1921 p. 165 (analysis of resin, uses). *Vochysia cuneata* Pohl 1831 p. 26 t. 117; A. Dietr. 1831 p. 106; D. Dietr. 1839 p. 22. Walp. 1840 p. 69. *Vochysia thyrsoides* Pohl var. *cuneata* Warm. 1875 p. 89. *Vochysia macropoda* Zucc. in sched.

Small tree. Glabrous except for the young parts. Adult branchlets subterete, shining, brownish-red. Young branchlets slightly puberulous, angled. Stipules about 0.1 cm long, dropping late. Leaves in tri- to penta- mostly tetramerous whorls. Petiole 0.4-1.4 × 0.2-0.3 cm. Young leaves with a ferruginous-greyish pubescent costa, lamina slightly adpressed pilose beneath. Adult blade oblong, elliptic-oblong, obovate or elongate-oblong, 6-16 × 4-5 cm, mostly two or three times longer than wide, rigidly coriaceous, shining above,

nearly dull beneath; apex rounded and emarginate; base cuneate. Nervation very slightly prominent on both surfaces, reticulate. Lateral nerves straight, arcuately anastomosing at 0.3-0.5 cm from the margin. No marginal nerve. Margin flat or subrevolute. Inflorescence terminal, densiflorous, subpyramidate. Cincinni mostly 3-5 flowered, at 6 cm long, patent with a sharp angle. Peduncles and pedicels angled, 1-2 × 0.1-0.2 cm. Flower-bud straight or subrecurved, subnitid, obtuse, about 2.0 × 0.4 cm. Spur 0.7-0.9 × 0.2 cm, apex incrassate and often discolor, straight, subincurved or S-shaped. Petals glabrous, linear-oblong; apex rounded and sometimes subciliate, unequal, centre one nearly as long as the stamen. Stamen glabrous except for the pilose margin; filament about 0.2 cm long; anther consisting of an acute 0.2 cm long apex, a linear-oblong fertile and a cuneate 0.2 cm long sterile part. Staminodes 0.10-0.15 cm long. Style subcylindrical. Stigma subcapitate, 0.1 × 0.1 cm. Capsule shining, about 2.5 × 1.5 cm.

Type: Pohl 653 in W (Minas near Camascho).

■ Distribution: Eastern Brazil. BRAZIL, Minas Geraes: Numerous collections, represented in many herbaria, e.g.: Camascho, Pohl (653 in W) type (BR, W); Rio Paranahyba Pohl (652 in W) type of *V. cuneata* Pohl (BR, OXF, S, W); Glaziou 13806 (BR, C, G-DEL, K, P, W); - 14693 (G-DEL, K, P, US); - 20299 (BM, C, K, P); Claussen s.n. (sometimes 435) (BM, BR, G-BOIS, G-DEL, GH, K, W). Bahia: Many Blanchet collections: e.g. 3411 (BM, BR, C, G-BOIS, G-DEL, K, NY, P, W); 3569 (G-DEL, P); 1453 (BM); 258 (G-DEL, P). Goyaz: Fazenda Sobradinha, Glaziou 20692 (BR, C, G-DEL, K, P); Serra Pyreneos Ule s.n. (P). Ceara: Gardner 1596 (BM, BR, G-BOIS, GH, K, L, NY, OXF, P, S, US, W). No locality: e.g.: Sello s.n. (BM, G-DEL, K, NY) (distr. sub *V. macropoda* Zucc.)

Ecology: In mountainous country in the region of the campos. Fl.: Aug.-Dec. Fr. juv.: Oct.-Apr.

Vernacular names: Minas: Gomma arabica, Cachoeiro do campo, Araripe. Goyaz: Pao de Vinho, Gomeira, Gomma arabica.

Observation: A gradual shift of form is to be observed between the specimens which Pohl named *V. cuneata* and those which he named *V. thyrsoidea* when later collections are taken into account. No reason is to be found even for the distinction of a variety.

48. *Vochysia magnifica* Warm. in Flora Bras. XIII, II p. 85; Malme 1900 p. 49; Glaziou 1905 p. 32.

Glabrous tree. Branchlets subterete or obtusely angled, firm, dark coloured. Stipules about 0.1 cm long. Leaves in tri- rarely pentamerous whorls. Petioles 2-3 cm long. Blade 12-16 × 3.5-4.5 cm, oblong, oblong-lanceolate or elliptic-oblong; nervation slightly prominent on both sides, reticulate; apex and base subsimilar, acute or obtuse, rarely apex rounded. Major lateral nerves widely separated, bending upwards at about 0.5 cm from the - flat - margin, irregularly

anastomosing or vanishing in the margin, angle with the midrib 50s60'. No marginal nerve. Inflorescence terminal and axillary, subaxilliflorous, cylindrical. Cincinni 1-4 flowered; peduncles 1.0-1.5 × 0.1 cm; pedicels 0.5-1.5 × 0.1 cm. Flower-bud 1.5-2.0 × 0.4-0.5 cm, subrecurved or stronger, cylindrical, obtuse or rounded. Spout about 1 cm long, 0.1-0.2 cm wide, incurved, apex subglobose. Petals unequal, linear-oblong, apex obtuse and subciliate, otherwise glabrous. Stamen subclavate, cells lined with cilia; filament about 0.2 cm long, anther with a circa 0.2 cm long sterile basal part. Staminodes irregular, at 0.2 × 0.1 cm, acuminate. Style subclavate. Stigma subcapitate, subtrilobed, about 0.2 × 0.2 cm.

Type: Regnell III 531 (14-11-1874) in S. Serra de Caldas, Minas.

Distribution: S. E. Brazil. BRAZIL, Sao Paulo, Serra Caracol, Mosen 1269, (S); Hoehne 28696 (F, NY) (cult.) Rio de Janeiro: Serra Orgaos, Petropolis, Glaziou 11949 (BR, C, G-DEL, K, P, U); Id. Theresopolis, Glaziou 11948 (BR, C, G-DEL, K, P, US). Parana: Jaguariahya, Dusen 290a (BM, G-DEL, GH, NY, S, US); - 8017 (BR, G-DEL, GH, K, S, US); R. Ivahy, Tessmann 153 (RB). Minas Geraes: Serra Caldas, Regnell III 531, 14-11-1874 type (C, P, S); - - - 18-7-1847 (BR, K, P, S); - - - 18-4-1866 (GH, S, U, US, W). Serra Goncolo Regnell III 531 (NB) coll. 1875 (S, US); Uberaba, Regnell s.n. 1845 coll. (US); Widgren s.n. (BR, C, K, P, S, US).

Ecology: In eastern (coastal) parts of the Campo-region. Exact habitat unknown. Fl.: Mar.-May, Nov. sec. Malme l.c.

Vernacular names: Rio de Janeiro: Pao Novo sec. Glaziou l.c.

49. *Vochysia emarginata* (Vahl) Poir., *Encycl.* VIII 1808 p. 682; D.C. 1828 p. 26; A. Dietr. 1831 p. 105; Warm. 1867 p. 37; - 1875 p. 80; - 1889 p. 25; Wille 1882 p. 180 seq. (anat.); Glaziou 1905 p. 32; Usteri 1911 p. 197; Correa 1931 p. 361 (uses). *Vochysia Vandelli* 1788 fig. 1; Roemer 1796 p. 69 t. 6 fig. 1. *Cucullaria emarginata* Vahl 1804 p. 5; Roemer et Schultes 1817 p. 36; - 1822 p. 52; Spreng. 1825 p. 16. *Vochysia alpestris* Mart. 1824 p. 145 t. 87; D.C. 1828 p. 27; A. Dietr. 1831 p. 110; Spach 1835 p. 323; D. Dietr. 1839 p. 23; Steudel 1840 p. 779; Schnizlein 1843 IV t. 260. *Cucullaria alpestris* Spreng. 1827 p. 9. (Is not *V. emarginata* in Pohl 1831 p. 31, which is *V. oppugnata*).

Glabrous. Stipules 0.05-0.10 cm long. Leaves opposite, rarely in trimerous whorls. Petioles about 1 cm long and 0.1 cm wide, black. Blade 4-12 × 2.5-5.5 cm, elliptic, apex rounded or obtuse, retuse; base cuneate. Nervation reticulate, very slightly prominent on both sides, often discolor beneath. Lateral nerves making an angle of 60-70' with the midrib, 10-15 major ones, arcuately anastomosing. No marginal nerve. Margin subrevolute. Inflorescence terminal and

axillary, laxiflorous, glabrous or with some scattered hairs. Rhachis sometimes slightly purpurescent. Cincinni 2-4 flowered. Peduncles at 1, pedicels at 2 cm long. Flower-bud straight or subcurved, subclavate, apex rounded or obtuse, slightly ferruginous-puberulous at the base, 1.0-1.5 × 0.2-0.3 cm. Spur 0.7-1.0 cm long, incurved. Petals unequal, linear-oblong; apex rounded and ciliate, centre one as long as the stamen. Stamen clavate, filament about 0.1-0.2 cm, anther glabrous except for the ciliate margin of the cells, apex rounded. Staminodes deltoid, obtuse, 0.05-0.10 cm long. Style incrassate towards the apex. Stigma flat, about 0.1 cm diam.

Type: Velloso de Miranda in herb. Vahl. in C.

Distribution: BRAZIL, Minas Geraes: Martius s.n. (C, G-DEL); Riedel (93, 94) (BR, G-DEL); Williams and Assis 6905 (GH); Glaziou 16765 (BR, C, G-DEL, K, P, W); Bunbury s.n., type of *V. alpestris* Mart. (BR); Schwacke 13604 (RB, U); - 14506 (RB, U); Oliveira in herb. Schwacke 14443 (RB, U); Warming 42a (C); Glaziou 14692 (C, K, P), - 12666 (BM, C, G-DEL, K, P); - 14691 (C, K, P, S); Damazio RB 57631 (RB, U); - 352 (G-DEL, RB, U); Schwacke 14414 (RB, U); Pohl s.n. (BR); Claussen s.n. (BM, G-DEL, P); Hilaire B, 1389 and 433 (P); Miers herb. 2412 (BM, prob. coll. by Claussen). G O Y A Z: Glaziou 20693a (C, P). No locality: Velloso de Miranda s.n. type (C in herb. Vahl ded. de Jussieu, photogr. in GH; P. in herb. Jussieu ded. Vandelli); Glaziou 19156 (BR, C, K, P); Martius 1180 (BR, G-DEL, P, W); Riedel s.n. (GH, OXF, P, G-BOIS, K); Sello s.n. (BM, G-BOIS, G-DEL, K, NY, US); Schuech s.n. (F, W).

Ecology: On serras in the region of the campos. Fl.: Mar.-Jun., Fr. juv.: Jun., Fr.: Nov.

Vernacular names: Minas Geraes: Cohonga, Caixeta, Pau de vinho preto, all according to Correa l.c.

Observation 1: The tracing of the type met with some difficulties. Vahl l.c. refers to *Vochya Vandelli* (l.c.). Vandelli however mentions no type, but it is known that he described material from Velloso de Miranda (Urban 1906). De Jussieu acquired some specimens and sent one to Vahl, who described it as *Cucullaria emarginata*.

Observation 2: According to Link 1820 and Roemer et Schultes 1822 a Humboldt specimen of the Willdenow herbarium belongs to this species. Desfontaines had given it (in sched.) the name *Cucullaria lutea*. Later on it is named *Vochysia fontanesii* Zucc. ex Schomb. 1848 p. 1190. It seems to me unlikely that this Humboldt specimen could belong to *V. emarginata*, because of the fact, that the present area of this species is entirely southern Brazilian.

50. *Vochysia pygmaea* Bongard in Mém. Acad. Petersb. Sér. VI, Sc. Nat. III, part II 1839 p. 7 t. 4; Warm. 1875 p. 83.

Undershrub, about 60 cm high, glabrous. Stem and lower side of the leaves sometimes slightly glaucous-pruinose. Stipules subulate, about 0.1 cm long. Leaves in trimerous whorls, internodes about 1 cm long; petioles about 0.2 cm long. Blade about 3.0 × 1.5 cm, elliptic or elliptic-obovate, rigidly coriaceous; nervation inconspi-

cuous above, reticulate beneath; apex and base similar: acute or obtuse, apex mucronulate. Lateral nerves making an angle of about 60° with the midrib, arcuately anastomosing at about 0.1-0.2 cm from the - flat - margin, not distinctly separated from the veins. No marginal nerve. Inflorescence terminal, laxiflorous, elongate-pyramidate. Cincinni 2-3 flowered. Peduncles and pedicels 0.3-1.0 cm long. Flower-bud making an angle of about 120° with the pedicel, recurved, acute or acuminate, about 1.3-1.7 × 0.2 cm. Spur making an angle of 90-150° with the fourth calyx-lobe, straight or subincurved, about 0.7 × 0.1 cm, slightly constricted at the base, subconical. Petals linear, centre one as long as the stamen and twice as long as the lateral ones. Stamen clavate, glabrous, apex obtuse or subacute, base cuneate, filament 0.3-0.4 cm long. Staminodes about 0.15 cm long, acuminate. Style cylindrical. Stigma irregular, terminal or partly lateral. Capsule one per peduncle, oblong, rugulose, shining, blackish; apex and base truncate.

Type: Riedel s.n. in LE (This specimen not seen by pres. author).

Distribution: BRAZIL, Minas Geraes: Serra da Lapa, Riedel s.n., type (OXF, P, C-fragm.); Serra Cipó, Occhioni RB 44195 (RB); - Barreto 1002 and Brade 14457 (RB).

Ecology: On a siliceous Serra, above 300 m. in the region of the Campos. Fl.: Oct.-Apr. Fr.: Apr.

51. *Vochysia rotundifolia* Mart., Nov. Gen. I p. 140 t. 83; D.C. 1828 p. 27; A. Dietr. 1831 p. 106; Sprach 1835 p. 322; D. Dietr. 1839 p. 23; Warm. 1875 p. 82; - 1889 p. 25 (Pohl 1831 p. 30 is *V. elliptica* Mart.) *Cucullaria rotundifolia* Spreng. 1827 p. 9; *Vochysia nettoana* Taub. ex Glaziou 1905 p. 33 nomen nudum. *Vochysia cuiabensis* Liais 1872 p. 601 (prob.).

Undershrub. Glabrous. Stem, rhachis and lower side of the leaves glaucous-pruinose. Stem subterete, blackish under "bloom". Stipules about 0.1 cm long, probably persistent. Leaves in trimerous whorls, internodes 2.5-5.0 cm. Petioles about 0.1 cm long. Lamina orbicular or sometimes broadly ovate, 3-4 × 3-4 cm, rigidly coriaceous; dull and yellowish-green above, darker beneath; apex and base similar, rounded and emarginate. Nervation reticulate, subprominent above, not prominent but slightly discolor beneath. Lateral nerves subparallel, angle with the midrib about 70°, anastomosing at about 0.2 cm from the margin. No marginal nerve. Margin subrevolute or flat. Inflorescence terminal, laxiflorous, elongate-pyramidate. Cincinni 2-4 flowered, elegant. Peduncles about 1.0 cm, pedicels about 0.8-1.5 cm long. Flower-bud straight or very slightly recurved, obtuse, 1.7-2.2 × 0.2-0.3 cm, shining. Spur straight or subincurved,

0.7-0.9 × 0.1 cm, subcylindrical. Petals unequal, linear-oblong, apex obtuse and minutely ciliate, centre one as long as the stamen and almost twice as long as the lateral ones. Stamen glabrous or with some ventral hairs; anther: linear, obtuse, base gradually narrowing towards the 0.3-0.4 cm long filament. Staminodes very thin, about 0.15 × 0.05 cm. Style slightly incrassate towards the apex. Stigma capitate.

Type: Martius in Minas Geraes in M prob. (Not seen by the present author).

Distribution: BRAZIL, Minas Geraes: Diamantina, Glaziou 19157 type of *V. nettoana* Taub. ex Glaziou n.n., (C, P).

Ecology: In mountainous campos. Fl.: Mar.-Apr.

Observation 1: Mostly specimens named *V. rotundifolia* in different herbaria appear to be specimens on *V. elliptica* Mart., e.g. because of the tomentose ovary and calyx.

Observation 2: *V. cuiabensis* Liais is probably identical with this species. Liais mentions no type, but describes it as a *Vochysia elliptica* like plant with glabrous calyx and ovary, which is a neat definition of *V. rotundifolia*.

## 52. *Vochysia martiana* Staf. nov. spec.

Sectio Ciliantha Staf., subsectio Lutescentes Warm. Suffrutex circa 60 cm. Glaberrima. Caulis teres ut pagina inferior foliorum glauco-pruinosa. Stipulae absunt. Folia 3-verticillata. Petioli 0.2 × 0.2 cm. Lamina obovata, parva, apice truncata et retusa, basi cuneato-obtusa. Nervi non prominentes. Costa marginalis abest. Alabastra subacuta. Calcar rectum. Petala lineares, ciliata, dorso subpilosa, 2/3 longitudinis staminis.

Undershrub about 60 cm high. Glabrous. Stem and lower-surface of the leaves glaucous-pruinose. Stem terete, striate, Stipules none. Leaves in trimerous whorls, internodes 2-3 cm long, petioles 0.2 × 0.2 cm, rugulose. Blade obovate, about 3.0 × 2.2 cm, thickly coriaceous, yellowish green, dull; nervation except for the midrib inconspicuous; apex truncate and retuse, base cuneate-obtuse. Lateral nerves arcuate, angle with the midrib 45-50°. No marginal nerve. Margin flat. Inflorescence terminal, laxiflorous, elongate-pyramidate, peduncles and pedicels about 1.0 cm long, shining. Cincinni 2-4 flowered. Flower-bud glabrous except for the ciliate calyx-lobes, or with some scattered hairs, 1.4-1.6 × 0.2-0.3 cm, straight or subrecurved, subacute. Spur making an angle of about 90° with the fourth calyx-lobe, 0.3-0.4 × 0.1-0.2 cm, straight. Petals linear, apex rounded, ciliate and slightly ferruginous-pilose on the back; centre one about 2/3 times as long as the stamen. Stamen glabrous except for the ciliation on the inside of the margin, filament

about 0.4 cm long; anther linear-obtuse. Staminodes about 0.1 cm long. Style cylindrical. Stigma diam. 0.05 cm.

Type: Barreto 7108 in F (no 918541).

Distribution: BRAZIL, Minas Geraes: Serra Cipó, Santa Luzia, Barreto 7108, type, (F).

Ecology: In stony campo. Fl. Jan.

53. *Vochysia apopetala* Ule in Notizbl. Berl. VI 1925 p. 311.

Small tree. Glabrous except for the slightly ferruginous puberulous inflorescence and the subpilose smaller calyx-lobes. Branchlets subterete, brownish, shining, cortex scaling off slightly. Stipules lanceolate, glabrous or with some hairs at the apex, brownish, dropping late or persistent(?), 0.1-0.2 cm long. Leaves opposite, rarely in trimerous whorls. Petioles 0.6-0.8 cm long. Blade elliptic-orbicular, 4-6 × 3-4 cm, thick, firm and shining; nervation reticulate, subprominent on both surfaces, lateral nerves prominent above, in herb. rufescent or brownish above and lighter coloured beneath; apex rounded or subtruncate and emarginate, base broadly cuneate. Lateral nerves making an angle of about 60° with the midrib, about 7 major ones, bending upwards and anastomosing. No marginal nerve. Margin strongly revolute. Inflorescence terminal, subcorymbose, about as long as wide. Cincinni 1-flowered. Bracts conspicuous, persistent or dropping late, lanceolate-acute, 0.3-0.4 × 0.08-0.10 cm, ciliate, hairs ferruginous and somewhat twisted. Peduncles about 0.5 cm long, firm. Pedicels 0.5-1.0 cm long. Flower-bud straight or subrecurved, 1.5-2.0 × 0.15-0.20 cm, acute or obtuse, cylindrical. Spur straight or subrecurved, angle with the pedicel 90-120°, cylindrical, 0.8-1.0 × 0.1 cm. Petals none. Stamen linear or subclavate, margin of the sterile basal part ciliate, filament about 0.5 cm long, anther about 1.5 cm long, obtuse, base cuneate. Staminodes about 0.15 × 0.05 cm, lingulate, obtuse. Style cylindrical. Stigma capitate, diam. about 0.05 cm.

Type: Ule 8626 in U (lectotype, Ule's original specimen has probably been the Berlin one).

Distribution: VENEZUELA Guiana: Near Roraima ridge, Ule 8626, type, (G-DEL, K, L, U) (PG acc. to photogr. in F).

Ecology: In subtropical rain forest 1900 m. (see Ule 1914, p. 48) Fl.: Jan.

54. *Vochysia pacifica* Cuatrecasas in Rev. Acad. Col. VI. 1946 p. 548.

This species has not been seen by the present author. It has been placed provisionally in this subsection because of the glabrous ovary,

the large flowers, the subciliate petal and the glabrous leaves. The stamen is probably glabrous.

Medium sized tree. Stipules about 0.3 cm long. Petioles 0.2-0.3 cm long. Leaves opposite, glabrous, broadly obovate or obovate-elliptic, 10-17 × 7-11 cm, leaf-base rounded, apex broadly obtuse and emarginate; lateral nerves prominent, reddish, 12-14 major ones. Inflorescence terminal and axillary, subpuberulous. Fourth calyx-lobe about 1.8 cm long; spur recurved, 0.5-0.9 cm long. Only petal ovate, 0.3 cm long, slightly ciliate, ovary glabrous.

Type: Cuatrecasas 17468 in BOG or COL prob.

Distribution: COLOMBIA, Dept. Del Valle, Pacific coast, Rio Cajambre. Cuatrecasas 17468 not seen.

Ecology: Collected in the coastal zone with luxuriant rainforest. Fl.: May.

### Subsection B III. DISCOLORES *Stafl.* nov. subsect.

Sectio *Cilantha* *Stafl.* *Ramuli* non decorticantes. *Ramuli* juveniles et inflorescentia canescenti-ferrugineo-pilosi. *Folia* verticillata. *Lamina* subtus ferrugineo-tomentella, indumento canescente vel pro parte caduco. *Petala* glaberrima. *Stamen* glaber, margine ciliatum. *Staminodia* glaberrima, parva. *Stigma* terminale, parvum.

Trees or shrubs. Young parts of the branchlets canescent ferruginous pilose; adult parts greyish puberulous or almost glabrous, terete. Cortex not exfoliating. Leaves in tetra- or pentamerous whorls. Indumentum on petioles same as on cortex. Lower surface of the blades, particularly of young leaves densely ferruginous tomentellous, indumentum later on canescent or partly disappearing. Veins reticulate. Lateral nerves making an angle of 60-80° with the midrib, prominent only on the lower side. Inflorescence terminal, canescent ferruginous puberulous in particular around the axils of the cincinni. Flower-bud 1.5-2.0 × 0.2-0.3 cm. Spur shorter than the fourth calyx-lobe, incurved or straight, cylindrical, apex incrassate. Petals glabrous. Stamen glabrous except for one row of cilia on the margin of the anther. Filament about 0.3-0.5 cm long. Staminodes glabrous, about 0.1 cm long, without a filament. Stigma terminal and small.

Distribution: States of Rio de Janeiro and Minas Geraes.

### Key to the species.

1. *a.* Apex of the leaves rounded and emarginate, indumentum completely covering the lower surface: ferruginous tomentose later

- on canescent . . . . . 55. *V. discolor* Warm.  
*b.* Apex of the leaves acute or acuminate, indumentum incom-  
 pletely covering the lower surface . . . . . 2  
 2. *a.* Flower-bud obtuse, at most subacute, about  $1.5 \times 0.2-0.3$  cm.  
 Blade  $14-16 \times 4-5$  cm 56. *V. gummifera* Mart. ex Warm.  
*b.* Flower-bud acute or acuminate,  $1.5-2.0 \times 0.2$  cm. Blades on  
 flowering branchlets  $5-7 \times 1.5-2.0$  cm. . . . .  
 . . . . . 57. *V. schwackeana* Warm.

55. *Vochysia discolor* Warm. in Flora Bras. XIII, II p. 81.

Shrub. Young parts of the branchlets angled, angles corresponding to the leaf-bases and lined by fine ribs running down from the stipules. Stipules deltoid, about 0.1 cm long, canescent. Leaves in tetramerous whorls. Petioles 0.3-1.0 cm long, base incrassate. Blade  $6-11 \times 3.5-5.0$  cm, obovate or oblong-obovate, rigidly coriaceous; apex rounded and emarginate; base cuneate. Upper surface of the blade pilose, hairs greyish or slightly brownish, regularly scattered and slightly adpressed, later on partly deciduous. Nervation not prominent. Network of veins with small meshes, giving the upper surface a minutely rugulose aspect but hidden in the indumentum beneath. Lateral nerves making an angle of about  $70^\circ$  with the midrib, straight, arcuately anastomosing. No marginal nerve. Margin often revolute. Inflorescence laxiflorous. Cincinni 2-4 flowered. Peduncles and pedicels firm, glabrescent, angled, about  $1.0-1.5 \times 0.15$  cm. Flower-bud glabrous except for the ciliate smaller calyx-lobes, about  $2.0 \times 0.3$  cm, subclavate, obtuse. Spur making an angle of  $60-90^\circ$  with the pedicel,  $0.6-0.8 \times 0.1-0.2$  cm, incurved. Petals unequal, spatulate-oblong, apex obtuse; centre one nearly as long as the stamen. Filament  $0.3-0.4 \times 0.1$  cm, anther subclavate, obtuse. Staminodes suborbicular, rounded. Style cylindrical, slightly constricted below the flat stigma. Capsule acc. to Warming 2.5-3.0 cm long, shining, rugulose, glabrous.

Type: Riedel s.n. Serra da Lapa prob. in LE, this specimen not seen by the present author.

Distribution: BRAZIL, Minas Geraes: Serra da Lapa, Riedel s.n., type (G-BOIS, GH, K, NY, OXF, P); Diamantina, Gardner 4555 (BM); - Barreto 9568 (F); - - 9484 (F); Hilaire s.n. (F, K, P).

Ecology: Elevated Campos. Fl.: Nov.

56. *Vochysia gummifera* Mart. ex Warm. in Flora Bras. XIII, II p. 82.

Tree of medium size, rendering a yellowish resin. Young branchlets angled, angles rounded, corresponding to the bases of the leaves.

Stipules deltoid, about 0.1 cm long. Leaves in tetra- or pentamerous whorls. Petioles 1.5-2.0 cm long, base incrassate. Blade 12-16 × 3-5 cm. lanceolate-oblong, firm, glabrous and subnitid above; apex acuminate or acute, mucronate; base acute. Lateral nerves numerous (more than 25), parallel, straight, angle with the midrib about 80', joining a slightly undulate marginal nerve at about 0.1-0.2 cm from the flat margin. Veins subconspicuous. Inflorescence cylindrical. Cincinni 1-3 flowered. Peduncles 0.4-0.5 × 0.05-0.08 cm; pedicels 1.0-1.5 × 0.05-0.08 cm. Flower-bud cylindrical, obtuse or subacute, subnitid, about 1.5 × 0.25 cm. Spur about 0.5 × 0.07 cm, incurved, cylindrical, angle with the pedicel less than 90', apex very slightly incrassate. Petals subequal, obovate or cuneate, very thin, length 1/2-2/3 of that of the stamen. Filament and sterile basal part of the anther together about 0.5 cm long, anther obtuse, subclavate. Staminodes irregularly lingulate. Style subclavate. Stigma flat.

Type: Peckolt 345 in BR.

Distribution: BRAZIL, Rio de Janeiro: Canta Gallo, Peckolt 345, type, (BR). Minas Geraes: Carangola Distr. Fazenda da Grama, Mexia 4317 (BM, G-DEL, GH, K, NY, P, S, U, US).

Ecology: (Mexia) On West facing steep slope, 930 m. Fl.: Feb.

Observation: The species has been described after a sterile specimen (Peckolt 345). The description of the flowers given in this treatment is based upon the GH specimen of Mexia 4317.

57. *Vochysia schwackeana* Warm. in Vid. Med. Nat. For. 1889 p. 25. Glaziou 1905 p. 33. *Vochysia goeldii* Huber 1898 p. 382.

Stipules lanceolate, smaller than 0.1 cm. Leaves in tetra- or pentamerous whorls. Petioles 1.0-1.7 × 0.10-0.15 cm, base not or slightly incrassate. Young leaves densely ferruginous tomentose on the upper side of the midrib and on the lower side of all nerves. Blade 5-7 × 1.5-2.0 cm, lanceolate, coriaceous-chartaceous; apex and base similar, acute or acuminate, apex sometimes mucronulate. Upper surface glabrous except for the midrib. Indumentum on the lower surface mainly along the nervation. Lateral nerves making an angle of 60-70' with the midrib, slightly bent upwards, running into an undulate marginal nerve at about 0.1-0.2 cm from the flat margin. Veins subprominent beneath. Inflorescence densiflorous. Cincinni 2-5 flowered. Peduncles about 0.5 × 0.05, pedicels 0.5-1.0 × 0.05 cm. Flower-bud cylindrical, straight, 1.5-2.0 × 0.2 cm, acute or acuminate. Young spur stretched along the fourth calyx-lobe, later on patent, incurved or straight, cylindrical, mostly about 0.5 cm long. Petals oblong, subequal, rounded, length of the centre one about 2/3 of that of the stamen. Filament about 0.4 × 0.05 cm.

anther linear, acute. Staminodes irregular, mostly obtuse. Style sub-clavate. Stigma capitate, diam. about 0.05 cm.

Type: Glaziou 6872 in C.

Distribution: BRAZIL, Rio de Janeiro: Theresopolis, Glaziou 6872, type (BR, C, GH, F, K, NY, P, RB, S, US, W); - Goeldi 333, type of *V. goeldii* Huber, (BM, K, P, RB, S, U, US; PG according to photograph in F); Itatiaya, Campos Porto 1869 (RB). Minas Geraes: Vicosa, Kuhlmann RB 57590 (RB, U).

Ecology: Inland mountains near Rio. Fl.: Jan.-Jun.

Vernacular names: Rio: Canella Santa; Muricy (Huber, l.c.).

var. **glabra** Staf. nov. var.

Folia glabra, nervo medio in foliis junioribus subtus leviter puberulo excepto. Nodi ramulorum sparse cano-puberuli. Petioli glabri.

Leaves glabrous, except for the sparsely puberulous lower side of the midrib in young leaves. Branchlets sparsely greyish puberulous at the nodes. Petioles glabrous.

Type: Brade 15097 in U.

Distribution: BRAZIL, Rio de Janeiro: Itatiaya, Brade 15097, type, fl. Febr. (RB, U).

Subsection B IV: **CHRYSOPHYLLAE** Staf. nov. subsect.

Sectio Ciliantha Staf. Ramuli novelli et folia subtus cano-flavescenti sericea. Ramuli decorticantes. Folia opposita. Petala ciliata et pilosa. Stamen glaberrimum. Staminodia glaberrima, parva. Stigma terminale, parvum.

Young parts of the branchlets and lower surface of the leaves yellow-greyish sericeous. Cortex exfoliating, nigrescent. Leaves opposite. Inflorescence terminal, subsericeous. Rhachis angled. Spur shorter than the fourth calyx-lobe, incurved. Petals ciliate, pilose on the centre of the back. Stamen glabrous. Staminodes glabrous, about 0.05 cm long, filament subdistinct. Stigma terminal, small.

Distribution: Upper Rio Negro.

58. **Vochysia calophylla** Spruce ex Warm. in Flora Bras. XIII, II p. 98 t. XVIII fig. 1; Petersen 1896 p. 316, fig. 170 B-E; Ducke 1938 p. 36.

Tree. Angles of the branchlets corresponding to the stipules and accentuated by small ribs. Stipules subulate, about 0.1 cm long. Petioles 0.6-1.0 × 0.1-0.2 cm, rugulose, puberulous. Blade 5-8 ×

2-3 cm, elliptic, oblanceolate or suboblong; apex variable from acute and mucronate to obtusely rounded and retuse; base acute; upper surface glabrous, nervation nowhere prominent, lateral nerves scarcely visible, golden yellow; lower surface sericeous, insertion of the hairs on the lateral nerves slightly different from those on the lamina and so contrasting. Lateral nerves numerous, parallel, angle with the midrib about 80-90', straight or slightly curved, ending in a marginal nerve at 0.05-0.10 cm from the flat margin. Inflorescence small, pauciflorous. Cincinni 1-flowered; peduncles about 0.5 × 0.05 cm, pedicels about 1 cm long. Flower-bud cylindrical, obtuse, 1.5-2.0 × 0.2 cm, sericeous. Spur about 0.8 cm long, elongate-conical, apex not incrassate, base about 0.15 cm, apex about 0.05 cm wide angle with the pedicel 0-30'. Petals subequal, centre one about half as long as the stamen. Stamen linear, filament about 0.2 cm long and very slender; anther with an acute apex, base asymmetrical owing to the different length of the cells. Staminodes lingulate, apex rotundate-obtuse. Style almost cylindrical. Stigma flat, diam. about 0.05-0.10 cm. Capsule unknown.

**Type:** Spruce 3538 in K.

**Distribution:** VENEZUELA, *A m a z o n a s*: Along the Guainia River above the mouth of the Casiquiare. Spruce 3538, type (BM, BR, G-BOIS, GH, K, NY, P, W). BRAZIL, *A m a z o n a s*: Upper Rio Negro near Venezuelan boundary: Cucuh along Igarapè Macacury, Ducke RB 34652 (G-DEL, K, P, RB, S, U, US).

**Ecology:** In periodically inundated forests along black water creeks. Fl.: Aug.-Sep.

#### Subsection B V: MEGALANTHAE StafI. nov. subsect.

*Sectio Ciliantha* StafI. *Ramuli adulti teretes, glaberrimi, non decorticantes. Stipulae persistentes vel caducae. Folia glaberrima, 4-verticillata. Costa marginalis abest. Alabastra magna. Petala tria, crassa, ciliata et dorso ferrugineo-villosiuscula. Stamen villosum; filamentum brevissimum vel nullum. Staminodia magna: 0.2-0.6 cm longa, glaberrima. Stigma terminale, capitatum, magnum.*

Trees of medium or large size. Older parts of the branchlets terete; cortex not exfoliating. Stipules persistent or dropping late, mostly deltoid. Leaves in tetramerous whorls, glabrous above, lower surface glabrous, or puberulous along the nervation. No marginal nerve. Veins differentiated into two networks with differently sized meshes. Inflorescence terminal, sparsely pilose. Flower-bud 1.5-3.5 cm long. Spur never longer than the fourth calyx-lobe, straight or slightly incurved. Petals thickly membranaceous or subchartaceous, ciliate and ferrugineous villose on the back. Stamen villose on both

sides, apex conspicuous: 0.2-0.4 cm long, often apiculate; filament very short: 0.0-0.1 cm, rarely 0.2 cm long. Staminodes mostly large, 0.2-0.6 cm long, often flask-shaped, glabrous, no distinct filament. Style cylindrical, glabrous. Stigma terminal, capitate, relatively large.

*Distribution*: Colombia, Venezuela, one species in Bolivia.

*Ecology*: In subtropical mountain forests.

### Key to the species.

1. *a.* Spur shorter and narrower than the flower-bud. Filament distinct although extremely short. . . . . 2
- b.* Spur as long and as wide as the flower-bud. Filament nearly obsolete . . . . . 63. *V. gigantea* StafI.
2. *a.* Spur in the produced part of the back of the fourth calyxlobe. Internodes directly below the inflorescences ribbed . . . 3
- b.* Spur making an angle of about 150' with the fourth calyxlobe. Internodes directly below the inflorescences not ribbed . . 4
3. *a.* Lateral nerves acutely prominent beneath. Spur large and wide; length  $\frac{3}{5}$  of that of the calyx, width 0.3-0.4 cm . . . . . 59. *V. megalantha* StafI.
- b.* Lateral nerves subprominent beneath. Spur cylindrical, about 0.15 cm wide, length variable . . . 60. *V. duquei* Pilger.
4. *a.* Petals as long as the stamen. Entire back of the stamen villose . . . . . 61. *V. aurantiaca* StafI.
- b.* Length of the central petal  $\frac{1}{2}$ - $\frac{2}{3}$  of that of the stamen. Back of the stamen partly glabrous . . . 62. *V. caesia* StafI.

#### 59. *Vochysia megalantha* StafI. nov. spec.

Seccio Ciliantha StafI., subsectio Megalanthae StafI. Internodia tenuiter costata. Petioli circa 1.0 cm longi. Lamina elliptico-obovata supra glabra, nervibus supra non prominentibus, subtus hirsutis, tenuiter sed acute prominentibus. Inflorescentia pauciflora. Cincinni 1-flori. Alabastra recurva, sub angulo circa 180' a calcari patentia, magna. Calcar  $\frac{1}{2}$ - $\frac{3}{5}$  longitudinis alabastri, crassum, sub angulo sub 45' a pedicello patens. Petala lanceolata, acuta. Petalum intermedium stamen aequans. Staminodia 0.5 cm longa.

Branchlets, stipules and petioles ferrugineous puberulous. Branchlets terete, dull, with sharp and fine ribs running down from the stipules. Stipules about 0.2 cm long. Petiole about 1.0 × 0.2-0.3 cm, base incrassate. Blade elliptical-obovate, 10-13 × 4-5 cm, apex rounded, base cuneate-acute. Only the wider meshes of the nervation of the upper surface are conspicuous and very slightly prominent. Lower surface ferrugineous hirsute on the midrib and the lateral

nerves; network of veins differentiated into a subprominent sparsely puberulous one with wide meshes and a not prominent glabrous one with small meshes. Lateral nerves parallel, straight or slightly curved, angle with the midrib 70-80', irregularly anastomosing, sharply prominent on the lower side. Margin subrevolute. Inflorescence terminal, pauciflorous, sparsely ferruginous hirtellous or puberulous particularly near the axils of the cincinni. Cincinni 1-flowered. Peduncles and pedicels together about 2.5 cm long. Flower-bud recurved, angle with the spur about 180', firm, 2.5-3.5 × 0.5-0.7 cm long and 0.5-0.7 cm wide, subcarinate, obtuse, sparsely puberulous. Spur large, wide, length about 1/2-3/5 of that of the fourth calyx-lobe, 0.3-0.4 cm wide, angle with the pedicel less than 45'. Petals unequal; centre one somewhat longer than the stamen. Stamen linear; filament about 0.1 × 0.1 cm, anther subapiculate-obtuse, apex about 0.3-0.4 cm long, base cuneate. Staminodes lanceolate-acute, 0.5 cm long. Diameter of the stigma about 0.15 cm. Capsule unknown.

Type: Triana 3783 in G-DEL.

Distribution: COLOMBIA, Cauca: Portachuelo, Triana 3783, type, (BM sub 6071, G-DEL, K, P, W).

Ecology: 1700 m. Fl.: Jul.

60. *Vochysia duquei* Pilger in Burret in Notizbl. Berl. XIII, 1937 p. 498.

Medium sized tree. Young parts of the branchlets blackish, glabrous, dull or subnitid, lined with ribs running down from the stipules; older parts brownish. Stipules subulate, 0.10-0.15 cm long. Petioles 0.5-1.0 (1.5) cm long, base subincrassate. Blade elliptic, spatulate or obovate, 6-9 × 2-3 cm; apex rounded and retuse or emarginate; base gradually narrowing towards the petiole. Only the wider meshes of the nervation are visible on the upper surface. Lower surface glabrous, lateral nerves and wider meshes not or slightly prominent, smaller meshes not prominent. Lateral nerves regular, straight or slightly curved, ending in the margin or irregularly and subconspicuously anastomosing, angle with the midrib about 70', sometimes subpuberulous. Inflorescence terminal, densiflorous, cylindrical. Cincinni 1-flowered. Rhachis angled. Peduncles and pedicels together about 1.5-2.5 cm long. Flower-bud cylindrical, straight or subrecurved, obtuse, sparsely puberulous, 1.5-2.5 × 0.3-0.4 cm. Spur slightly incurved, cylindrical, angle with the pedicel 0-30', 0.5-1.5 × 0.1-0.2 cm, apex subincrassate, sometimes discolor. Petals oblanceolate-acute, centre one as long as the stamen. Filament 0.0-0.1 cm long; anther linear-obtuse, apex 0.2 cm long. Staminodes

0.2-0.5 cm long, linear-acute. Diameter of the stigma 0.10-0.15 cm. Capsule  $3.5 \times 1.3$  cm in one specimen, verruculose, subnitid.

Type: Duque 55 in US (lectotype, original specimen of Duque 55 probably in B).

Distribution: COLOMBIA, Cauca: Cali, Duque 55, type (US). Santander: Ocana, Schlimm 678, (G-DEL, K, P). Cundinamarca: Bogota, Purdie s.n. (GH, K, P). No locality: Mutis 1608 (US). VENEZUELA, Merida: Between La Azulita and La Carbonera, Steyermark 56054, (F, U). Occ. Fed. District: Between Caracas and La Guaira, Lasser 1145 (US).

Ecology: In mountain forests near 1000 m. Fl.: Feb.-Aug.

Vernacular names: COLOMBIA, Cauca: Arracachoo. (Flor Amarillo Serrano sec. Pilger l.c.).

### 61. *Vochysia aurantiaca* Staf. nov. spec.

Sectio Ciliantha Staf. subsectio Megalanthae Staf. Ramuli teretes, internodia superiora obtuse tetragona sed haud costata. Petioli circa 1.5-2.0 cm longi. Lamina elliptico-oblonga. Nervi supra prominentes, subtus subprominentes. Cincinni 2-flori. Alabastra subrecurva,  $2-3 \times 0.5$  cm. Calcar rectum vel subincurvum, circa 1 cm longum, sub angulo circa  $150^\circ$  a alabastro patens. Petalum intermedium stamen aequans. Stamen totum villosum. Filamentum circa 0.1 cm longum.

Large tree ("one hundred feet or more"), entirely glabrous except for some parts of the inflorescence and the flower. Branchlets terete, shining, purplish brown, youngest internodes of the sterile branchlets obtusely quadrangular but without any ribs. Stipules smaller than 0.1 cm. Petioles  $1.5-2.0 \times 0.2$  cm, striate, base subincrassate. Blade elliptic or elliptico-oblong,  $12-15 \times 4-6$  cm, apex rounded or rotundate-obtuse; base cuneate-acute. Nervation distinctly prominent above, not or sub-prominent beneath. Lateral nerves thin, slightly curved, angle with the midrib about  $70^\circ$ , ending in the margin or inconspicuously anastomosing. Wider meshes of the veins subprominent above, smaller ones very slightly prominent. Margin flat. Inflorescence terminal, subpyramidate-cylindrical, laxiflorous, with some minute hairs. Rhachis subterete. Cincinni 2-flowered. Peduncles  $1.0-1.5 \times 0.15$  cm, firm, striate, base subincrassate; pedicels  $1.0 \times 0.10-0.15$  cm, firm, striate. Flowers orange red. Flower-bud,  $2-3 \times 0.5$  cm, subrecurved, obtuse and subpuberulous. Spur straight or subincurved, about  $1.0 \times 0.2$  cm, making an angle of about  $150^\circ$  with the rest of the bud and an angle of  $30-60^\circ$  with the pedicel; apex subglobose-incrassate. Petals lanceolate or oblanceolate, acute, pilose on the entire back, centre one as long as the stamen. Stamen pilose on the whole surface, anther apiculate, linear-oblong,

abruptly narrowing towards the 0.1 cm long filament. Staminodes 0.5-0.6 cm long, caudate. Stigma subcapitate, diam. about 0.1 cm. Capsule unknown.

Type: H. H. Smith 1877 in NY.

Distribution: COLOMBIA, Magdalena: Santa Marta near Valparaiso, H. H. Smith 1877 type (BM, BR, G-DEL, GH, K, L, NY, P, S, U, US).

Ecology: In mountainforests, 1000-2000 m. Fl.: Mar.-Jun.

## 62. *Vochysia caesia* Stapf. nov. spec.

Sectio Ciliantha Stapf., subsectio Megalanthae Stapf. Ramuli teretes, ecostati, subpruinosi. Stipulae persistentes. Petioli 0.8-1.5 cm longi. Lamina elliptica, subnitida. Nervi laterales supra subprominentes, subtus non prominentes. Inflorescentia laxiflora. Cincinni 2-flori. Alabastra recta vel subrecurva, 1.5-1.8 × 0.3 cm. Calcar rectum vel S-forme, sub angulo 150' a alabastro patens, 0.6 × 0.15 cm. Petala lingulata, subciliata, extus subpilosa. Petalum intermedium 1/2-2/3 longitudinis staminis. Filamentum 0.1 × 0.1 cm. Anthera margine et ventro villosa, dorso glabra. Staminodia 0.20-0.25 cm longa.

"Tree of 80-100 feet". Glabrous except for the stipules and the inflorescence. Branchlets terete or subterete (no ribs), greyish-blueish, very slightly pruinose and partly shining, firm. Petioles 0.8-1.5 cm long, base scarcely incrassate. Blade elliptic, 7-10 × 3.5-5.0 cm, subnitid, brownish above, greenish beneath; apex obtuse or obtuse-rotundate, base cuneate-acute. Lateral nerves subprominent above, not prominent beneath, slightly curved upwards, ending in the margin or inconspicuously and irregularly anastomosing, angle with the midrib about 60', 5-8 major ones. Wider meshes of veins subprominent above, not prominent beneath. Margin flat. Inflorescence terminal, laxiflorous, slightly brownish-puberulous. Rhachis firm, carinate. Cincinni mostly 2-flowered. Peduncles 0.8-1.2 × 0.15 cm, pedicels 1.0 × 0.15 cm. Flowers yellow. Flower-bud straight or very slightly recurved, 1.5-1.8 × 0.3 cm, obtuse, glabrous except for the ciliate and slightly puberulous smaller calyx-lobes. Spur straight or slightly S-shaped, making an angle of about 150' with the fourth calyx-lobe, especially in the young buds, short and thin (0.6 × 0.15 cm) apex obtuse and not or slightly incrassate. Petals lingulate, obtuse, slightly ciliate and sparsely pilose on the back, unequal, length of centre one 1/2-2/3 of that of the stamen. Filament 0.1 × 0.1 cm, anther linear, apex 0.2 cm long, obtusely subapiculate, indumentum characteristic: margins and inside villose,

but centre of the dorsal field glabrous. Staminodes 0.20-0.25 cm long, flask-shaped caudate. Capsule unknown.

Type: Pearce s.n. in K.

Distribution: BOLIVIA, C u n d i n a m a r c a (?) Moro, Pearce s.n. (coll. 1866) (BM, K).

Ecology: 1300-2000 m. Fl.: Jan.

### 63. *Vochysia gigantea* Stafl. nov. spec.

Sectio Ciliantha Stafl., subsectio Megalanthae Stafl. Ramuli teretes, ecostati, subnitidi. Petioli 1.3-2.0 cm longi. Lamina elliptico-spathulata vel subobovata, basi sensim in petiolo attenuata; nervi subprominentes. Cincinni 2-flori. Alabastra recta vel subrecurva, 1.5-1.8 × 0.3-0.4 cm. Calcar alabastrum aequans, incurvum, 1.3-1.6 × 0.3-0.4 cm. Petalum intermedium staminis longitudine. Anthera villosa. Filamentum perbreve. Staminodia 0.1-0.2 cm longa.

Large tree, 40-50 m., trunk diam. 3-4 m. Glabrous except for some parts of the inflorescence and the flower. Branchlets terete, no ribs, brownish, subnitid, firm. Stipules thick, about 0.1 cm long, apex sometimes slightly pilose. Petioles 1.3-2.0 cm long, shining, base not incrassate. Blade elliptic-spatulate or subobovate, in type-specimen about 12.5 × 5 cm (only few leaves available); apex rounded and slightly retuse, base very gradually narrowing towards the petiole. Lateral nerves and wider meshes of the veins slightly prominent above, slightly or not prominent beneath; smaller meshes of the veins not prominent, mainly visible beneath. Lateral nerves thin, straight, irregularly anastomosing or ending in the margin, angle with the midrib about 60', near the apex 45-60'. Margin flat. Inflorescence terminal, very slightly brownish puberulous. Rhachis firm, terete, Cincinni 2-flowered. Peduncles about 1.0 × 0.1 cm, pedicels 1.0-1.5 × 0.1 cm. Flower-bud firm, 1.5-1.8 × 0.3-0.4 cm, straight or very slightly recurved, subcylindrical, rounded, slightly brownish pilose. Spur making an angle of 0-30' with the pedicel, as long as the fourth calyx-lobe or somewhat shorter, 1.3-1.6 cm long, as wide as the bud, incurved, apex rotundate-obtuse, not incrassate. Flowers yellow. Petals unequal, elongate-elliptic, obtuse or rounded, centre one as long as the stamen. Anther apiculate, oblong, base truncate, filament nearly obsolete: shorter than 0.05 cm. Staminodes deltoid, acuminate, about 0.1-0.2 cm long. Diam. of stigma 0.15-0.18 cm. Capsule unknown.

Type: Lawrance 275 in NY.

Distribution: COLOMBIA, B o y a c a: Mt. Chapon, Lawrance 275, type (G-DEL, F, NY, S, US).

Ecology: 1200 m. Fl.: June.

## Subsection B VI: FERRUGINEAE Warm.

Warm. in Flora Bras. XIII, II p. 62 sub titulo series.

Trees. Young leaves beneath and young parts of the branchlets mostly ferrugineous-pilose, later on often glabrescent. Cortex brownish or blackish, never exfoliating. Leaves nearly always opposite. Petioles often striate, base mostly subincrassate. Marginal nerve if present subundulate. Margin entire or subundulate. Inflorescence terminal and often also axillary, mostly ferrugineous puberulous, particularly on the young parts. Petals ciliate, pilose on the back. Stamen pilose. Staminodes nearly always ciliate, 0.05-0.20 cm long.

Distribution: Mainly Hylaeon species, a small number has an Atlantic coastal distribution.

## Key to the species.

1. *a.* Spur longer than the flower-bud . . . . . 2
- b.* Spur as long as or shorter than the flower-bud . . . . . 5
2. *a.* Leaves glabrous or nearly glabrous beneath, branchlets glabrous, blade small, petioles shorter than 1.0 cm. Stigma terminal . . . . . 3
- b.* Leaves pilose beneath, especially the young ones, branchlets pilose . . . . . 4
3. *a.* Major petal as long as the stamen, twice as long as the lateral ones . . . . . 80. **V. javitensis** Staffl.
- b.* Major petal about half as long as the stamen, about  $\frac{4}{3}$  times longer than the lateral ones. . . . . 83. **V. angustifolia** Ducke.
4. *a.* Leaves large, up to  $20 \times 9$  cm, conspicuously discolor owing to the ferrugineous tomentum beneath . . . . . 76. **V. splendens** Spruce ex Warm.
- b.* Leaves  $8-12 \times 3-5$  cm, opposite or in trimerous whorls, pilose mainly on the nervation, acuminate . . . . . 66. **V. floribunda** Mart.
5. *a.* Marginal nerve absent, lateral nerves ending in the margin or anastomosing irregularly . . . . . 6
- b.* Marginal nerve present. . . . . 18
6. *a.* Flowers large, up to  $2.5 \times 0.4$  cm, lateral nerves making an angle of  $70-80^\circ$  with the midrib, straight. . . . . 7
- b.* Flowers 0.6-1.5 cm long, lateral nerves making an angle of  $40-60^\circ$  or when making an angle of about  $70^\circ$ , curved . . . . . 8
7. *a.* Leaves opposite. Groups of persistent bracts in the inflores-

- cences. Blade oblong. Lateral nerves sharply prominent below. . . . . 88. *V. dasyantha* Warm.
- b.* Leaves in tetra- or trimerous whorls. No groups of persistent bracts. Blade spatulate or elliptic. Lateral nerves not or slightly prominent. . . . . 90. *V. selloi* Warm.
8. *a.* Spur recurved, apex touching the back of the calyx. Leaves beneath, branchlets, petioles and inflorescences densely tomentose. . . . . 64. *V. ferruginea* Mart.
- b.* Spur straight or slightly curved . . . . . 9
9. *a.* Base of the leaf acute, sometimes obtuse, but then blade nearly glabrous . . . . . 10
- b.* Base of the leaf obcordate-rotundate. Blade lanceolate-ovate, puberulous or tomentellous beneath . . . . . 85. *V. pyramidalis* Mart.
10. *a.* One petal. Leaves 9-14 × 3-6 cm, lateral nerves curved, angle with the midrib about 70°; leaves nearly glabrous, dull. . . . . 91. *V. schomburgkii* Warm.
- b.* Three petals. Leaves smaller, lateral nerves making an angle of 40-60° with the midrib . . . . . 11
11. *a.* Stigma lateral, diameter about 0.1 cm. Flower-buds 0.6-0.9 cm long . . . . . 12
- b.* Stigma terminal and relatively small, sometimes partly lateral, but then small too. . . . . 13
12. *a.* Adult leaves nearly glabrous beneath, at most subpuberulous. Centre petal half as long as the stamen . . . . . 68. *V. calamana* Stapf.
- b.* Adult leaves subsericeous beneath. Centre petal as long as the stamen . . . 65. *V. tomentosa* (G. F. W. Meyer) D.C.
13. *a.* Centre petal nearly as long as the stamen, twice as long as the lateral ones . . . . . 14
- b.* Length of central petal 1/2-1/5 of that of the stamen, petals subequal. (see also 84, *V. cayennensis* Warm.) . . . . 17
14. *a.* Lateral nerves prominent beneath. Venal network with wide meshes. Apex of the leaf abruptly acuminate. Leaves tomentose or puberulous beneath. . . . . 15
- b.* Lateral nerves subprominent beneath. Apex of the leaf subabruptly or gradually acuminate. Adult leaves always glabrous beneath. . . . . 16
15. *a.* Leaves canescent ferruginous tomentose beneath. Blade 2-3 times longer than wide, base abruptly contracted. . . . . 87. *V. rectiflora* Warm.
- b.* Leaves only puberulous beneath. Blade about four times longer

- than wide, base acute . . . 87. *V. rectiflora* Warm. var.  
. . . . . *glabrescens* Warm.
16. *a.* Leaves rigidly coriaceous, blade lanceolate-oblong or lanceo-  
late, about five times longer than wide 86. *V. acuminata*  
. . . . . Bongard ssp. *quadrangulata* (Warm.) StafI.  
*b.* Leaves normal, blade mostly elliptic-oblong, about four times  
longer than wide . . . . . 86. *V. acuminata* Bongard  
. . . . . ssp. *laurifolia* (Warm.) StafI.
17. *a.* Lower surface of young leaves completely covered with a short  
ferruginous tomentum. Petals half as long as the stamen . .  
. . . . . 82. *V. sprucei* Warm.  
*b.* Young leaves scarcely pilose beneath. Length of the petals  
about  $\frac{1}{5}$  of that of the stamen. . . . . 81. *V. assua* StafI.
18. *a.* Leaves in tri- or tetramerous, rarely hexamerous whorls 19  
*b.* Leaves opposite . . . . . 22
19. *a.* Lateral nerves sharply prominent beneath, stigma lateral 20  
*b.* Lateral nerves not prominent beneath. Stigma terminal . .  
. . . . . 89. *V. spathulata* Warm.
20. *a.* Leaves broadly obovate, 1-2 times longer than wide. Length  
of the centre petal about  $\frac{2}{3}$  of that of the stamen . . . .  
. . . . . 73. *V. braceliniae* Standley.  
*b.* Blade 3-4 times longer than wide . . . . . 21
21. *a.* Leaves elliptic, about 3 times longer than wide. Length of the  
centre petal about  $\frac{3}{4}$  of that of the stamen . . . . .  
. . . . . 72. *V. magna* StafI.  
*b.* Leaves spatulate, about four times longer than wide. Centre  
petal about as long as the stamen . . . . .  
. . . . . 74. *V. lomatophylla* Standley.
22. *a.* Lateral nerves making an angle of 70-90' with the midrib 23  
*b.* Lateral nerves making an angle of 40-60' with the midrib 24
23. *a.* Cortex exfoliating, blade 5-8  $\times$  2-3 cm. Leaves greyish  
flavescent beneath. Three petals. . . . .  
. . . . . Subsection B IV: 58. *V. calophylla* Spruce ex Warm.  
*b.* Cortex not exfoliating. Spectacular: Blade 15-40  $\times$  6-14 cm,  
rufous-ferruginous tomentellous beneath. One petal. Flower-  
bud 2-4  $\times$  0.3-0.4 cm . . . . . 92. *V. eximia* Ducke.
24. *a.* Spur not wider than the adult flower-bud . . . . . 25  
*b.* Spur in adult flowers considerably wider than the flower-bud,  
straight. Cincinni and flowers patent. Petals smaller than  
0.3 cm . . . . . 78. *V. densiflora* Spruce ex Warm.
25. *a.* Spur never touching the back of the fourth calyx-lobe 26  
*b.* Spur strongly recurved and often touching the back of the  
calyx. Total plant, except for the upper surface of the leaves

- ferrugineous tomentose. . . . . 64. **V. ferruginea Mart.**
26. *a.* Spur slightly or moderately curved . . . . . 27  
*b.* Spur incurved, apex touching the pedicel . . . . . 35
27. *a.* Apex of the leaf two-lobed obcordate or broadly truncate-retuse. Spur straight, making an angle of 0-30' with the pedicel . . . . . 71. **V. biloba Ducke.**  
*b.* Apex of the leaf acuminate, apiculate, acute or obtuse . . . . . 28
28. *a.* Apex of the leaf abruptly acuminate. Apex about 1 cm long (Several leaves should be examined, the apex is easily damaged). . . . . 29  
*b.* Apex of the leaf obtuse or shortly and broadly apiculate . . . . . 31
29. *a.* Length of the spur 1/2-1/3 of that of the bud; spur bag-shaped, in young flowers sometimes wider than the bud. Leaves up to 25 × 9 cm . . . . . 79. **V. saccata Stafl.**  
*b.* Length of the spur about 3/4 of that of the bud. Spur slender, leaves often with impressed points above. . . . . 30
30. *a.* Stigma smaller than the diameter of the style, orbicular. Lateral petals spatulate, about 0.2 cm wide . . . . . 75. **V. inundata Ducke.**  
*b.* Stigma large, about 0.10 × 0.08 cm, three-lobed. Lateral petals elliptic, about 0.3-0.4 cm wide . . . . . 70. **V. boliviana Rusby.**
31. *a.* Lateral nerves slightly or distinctly but not sharply prominent . . . . . 32  
*b.* Lateral nerves sharply prominent beneath, angle with the midrib 40-50'. Spur making an angle of 60-90' with the pedicel. Centre petal longer than the stamen 77. **V. costata Warm.**
32. *a.* Leaves tomentellous beneath. flower-bud strongly recurved, together with the spur U-shaped. Length of the centre petal about 2/3 of that of the stamen. . . . . 33  
*b.* Adult leaves glabrous or subpuberulous beneath. Flower-bud straight or subrecurved. Centre petal as long as the stamen 34
33. *a.* 8-15 Major lateral nerves. Apex of the leaf at most shortly acuminate. . . . . 67. **V. vismiifolia Spruce ex Warm.**  
*b.* About 25 major lateral nerves. Leaves acuminate with an apex of 0.6-1.0 cm . . . . . 67. **V. vismiifolia Spruce ex Warm. var. densissima (Pilger) Stafl.**
34. *a.* Stigma lateral, about 0.15 × 0.08 cm, slightly three-lobed. Petioles 1.5-2.5 cm long. Apex of the leaf acute or shortly acuminate. . . . . 69. **V. maxima Ducke.**  
*b.* Stigma terminal, flat, diameter 0.03-0.05 cm. Petioles 0.6-0.9 cm long. Apex of the leaf mostly obtuse and retuse . . . . . 80. **V. javitensis Stafl.**

35. a. Leaves abruptly long acuminate, 12-14 cm long on the flowering branchlets. About 20 lateral nerves. Cincinni 1-2 flowered . . . . . 94. *V. majuscula* Pilger.  
 b. Leaves truncate-rotundate, about 8-11 cm long. 10-15 Lateral nerves. Cincinni 2-4 flowered . . . . .  
 . . . . . 93. *V. punctata* Spruce ex Warm.

64. *Vochysia ferruginea* Mart., Nova Gen. I p. 151 t. 92; D.C. 1828 p. 28; A. Dietr. 1831 p. 113; D. Dietr. 1839 p. 23; Warm 1875 p. 92; - 1889 p. 27; Hemsley 1888 p. 65; Glaziou 1905 p. 32; Spruce 1908 p. 158 (ecol.); Ducke 1915 p. 45; - 1922 p. 194; - 1938 p. 35; Pittier 1917 p. 237; Standley 1928 p. 229; - 1937a p. 592; Bouillenne 1930 p. 99 (habitat); Le Cointe 1934 p. 117, 386; Ll. Williams 1947 p. 31, 34 (ecol). *Cucullaria ferruginea* Spreng. 1827 p. 9. *Vochya ferruginea* Standley 1924 p. 302.

*V. ferruginea* in Pohl 1831 p. 31 is *V. pyramidalis* Mart.

*V. tomentosa* in Seemann 1852 p. 120 is *V. ferruginea* Mart.

Tree of medium size. Branchlets, petioles, stipules, leaves beneath and inflorescence densely ferruginous tomentose. Branchlets obtusely quadrangular, tomentum on older parts sometimes disappearing. Leaves opposite. Petioles 0.5-0.8 × 0.2-0.3 cm. Blade 9-16 × 3-5 cm, ovate, elliptic, elliptic-oblong or lanceolate, rarely obovate-oblong; apex acuminate and mucronate; base abruptly contracted towards the petiole, mostly obtuse; upper surface glabrous; tomentum on the lower surface mainly concentrated on the nervation and causing a contrast in colour between the blade itself and the nervation. Lateral nerves only prominent beneath, those near the apex making an angle of 40-50', the lower ones making an angle of 50-60' with the midrib, straight, near the margin bending towards a marginal nerve that runs exactly along the margin. Veins inconspicuous above, prominent beneath, major ones subparallel and obliquely transversal. Margin subrevolute. Inflorescence terminal and axillary, elongate-cylindrical, multiflorous. Cincinni 1-5 flowered. Peduncles and pedicels each 0.2-0.4 × 0.05-0.10 cm. Flower-bud straight or subrecurved, 0.6-1.0 × 0.1-0.2 cm, obtuse, subpuberulous. Spur strongly recurved, as long as or slightly shorter than the fourth calyx-lobe, apex incrassate. Centre petal as long as the stamen, elliptic, somewhat wider than the linear-spatulate lateral ones. Filament 0.2-0.3 cm long; anther 0.4-0.5 cm long, apex obtuse, base abruptly contracted. Staminodes linear-elliptic, obtuse, about 0.1 cm long. Style cylindrical. Stigma lateral, diameter about 0.05 cm. Capsule about 2.5 × 0.8 cm, rugulose, black, oblong or oblong-obovate, apex obtuse.

Type: Martius at Coary s.n., probably in M, duplicates in K and L.  
Distribution: Hylaea and Southern part of Central America.

NICARAGUA: Englesing 250, (GH, F, K, NY).

COSTA RICA: Valerio 893, (F); Lankester s.n. (F); Barbour 1043 (F); Skutch 2508 (K, NY, S, US).

PANAMA CANAL ZONE AND STATE: Numerous collections, e.g.: Seemann 636, (BM, K); Andersson coll. 1852 (S, US) (not Rio de Janeiro).

COLOMBIA, Norte de Santander: Cuatrecasas 13230 (US). Choco: Archer 1917 (NY); Triana 3785 (BM sub 6071; G-DEL, K, P, W). No locality: Linden 1174, (G-BOIS, G-DEL, OXF, P) Mutis 1613 (F, G-DEL, K, S, US); Mutis 1612 (US).

VENEZUELA, Amazonas: Ll. Williams 15078, (F, US); - 15167 (F, US), Spruce 3208 (BM, BR, G-BOIS, GH, K, NY, OXF, P, W); - 3182 (K, P, S, W).

BRITISH GUIANA: Smith 2807 (G-DEL, K, NY, S, U, US); - 2511 (G-DEL, K, NY, S, U, US); Myers 5701 (K), Schomburgk s.n. frag. (K).

PERU, San Martin: Ule 6431 (G-DEL, K, L); Klug 3260 (F, G-DEL, GH, K, NY, S, US).

BRAZIL, Amazonas: Coary, Martius s.n. type, (K, L); Krukoff VII 8163 (BR, F, G-DEL, K, NY, P, S, U, US); Ducke RB 23811 (G-BOIS, K, P, S, U, US); - 1062 (K, US); - PG 12393 (BM). Para: Spruce s.n. (BM, C, F sub 952, G-BOIS, GH, K, NY, OXF, P sub 952, S, W); Ducke PG 11382 (BM, G-DEL). Maranhao: Krukoff 11521 (G-DEL, NY, U, US); Ducke PG 394 (BM); Don 137 (BR). Matto Grosso: (Northern part) Kuhlmann RB 17768 (G-BOIS, K, P, RB, S, U, US).

Ecology: Mostly in tropical rain forest. In the savannas of Lower Amazonia in woods along rivulets; in Upper and Central Amazonia reported from upland as well as from regularly flooded woods. Fl.: In Central America mainly Jan.-Jun., in the Amazon basin mainly from Sept.-Dec. but there are reports from every month.

Vernacular Names: NICARAGUA: Yemerí. COSTA RICA: Chanchó colorado. PANAMA: Tecla. COLOMBIA: Palo santo; VENEZUELA: Saladillo, Pèse. BRAZIL: (Coary) Iutai mirim; Cedro Rana (sec. Ducke).

65. *Vochysia tomentosa* (G. F. W. Meyer) D.C., Prod. III p. 26; A. Dietr. 1831 p. 104; D. Dietr. 1839 p. 22; Warm. 1867 p. 40, 45; - 1875 p. 94; Glaziou 1905 p. 32; Benoist 1915 p. 247; - 1919 p. 319; - 1931 p. 166 (anat.) Pfeiffer 1926 p. 346 (wood, uses). *Cucullaria excelsa* Vahl (non Willd.) 1804 p. 4; König 1806 p. 185; Roemer et Schultes 1817 p. 36. *Cucullaria tomentosa* G. F. W. Meyer 1818 p. 13; Roemer et Schultes 1822 p. 51; Sprengel 1825 p. 16. *V. tomentosa* in Seemann 1852 p. 120 is *V. ferruginea* Mart.

Tree of medium size, pilose on most parts, except for the stipules and the upper surface of the leaves. Young parts of the branchlets obtusely quadrangular; greyish, ferruginous or cinnamomeous tomentellous or subsericeous; older parts glabrous. Stipules linear-lanceolate, greyish, dropping late, 0.1-0.3 cm long. Leaves opposite. Petioles subsericeous, 0.3-0.5 cm long, slender, base not incrasate. Blade elliptic, mostly 6-8 × 2-3 cm; apex acute or acuminate,

mucronate; base acute; veins in- and lateral nerves subconspicuous above; lower surface brownish tomentose or subsericeous, lateral nerves prominent, veins subprominent. Lateral nerves straight or slightly curved, 9-13 major ones, angle with the midrib 50-60', anastomosing or ending in the margin. No marginal nerve. Inflorescence terminal and axillary, subdensiflorous, cylindrical. Spur 0.5-0.6 cm long, subconical, straight or slightly S-shaped, angle with the pedicel about 30'. Petals equal, as long as the stamen, centre one elliptic-oblong; lateral ones linear, back subpilose. Back of the stamen glabrous; anther linear, obtuse, gradually narrowing towards the strap-shaped, 0.2 cm long filament. Staminodes linear-oblong, rotundate-truncate, about  $0.08 \times 0.02$  cm. Style clavate. Stigma lateral, thick, almost quadrangular,  $0.1 \times 0.1$  cm. Capsule oblong, glabrous, subverruculose, one per peduncle, wings sulcate near the apex, about  $3.5 \times 1.0$  cm.

Type: Richard s.n. in C (In herb. Vahl.)

Distribution: GUIANA. BRITISH GUIANA: Hancock s.n. (K). SURINAM: Numerous collections, in particular by the Forestry Bureau (Boschwezen, B.W. in index of collectors' numbers). FRENCH GUIANA: Numerous collections especially by Mélinon and Sagot. Richard s.n. type, (C, G-DC, P). BRAZIL, Para: Tapajoz, Boa Vista, Capucho 464 (F).

Ecology: Probably mostly in rain forest, but also reported from the coastal tree savannas.

Vernacular names: SURINAM, Ieteballi (Arowaccan); Kwarie Hoedoe, Wana Kwarie, Kwarric, (Negro English); according to Pfeiffer also inter alia: Echte Kwarie of Witte Kwarie (Surinam Dutch). BRAZIL, Para: Cedrorana.

Observation: Willdenow (1797) used the name *Cucullaria excelsa* as an alternative for *Vochy guianensis* Aubl. Vahl (1804) wrongly assumed the same identity for his specimen (Richard s.n. in C). Meyer (1818) noticed the mistake and proposed the name *Cucullaria tomentosa*.

66. *Vochysia floribunda* Mart., Nova Gen. I p. 149 t. 91; D.C. 1828 p. 29; A. Dietr. 1831 p. 112; Spach 1835 p. 324, D. Dietr. 1839 p. 23; Warm. 1875 p. 93; Ducke 1922 p. 194; - 1938 p. 35. *Cucullaria floribunda* Spreng. 1827 p. 9.

Tree of medium or large size. Branchlets tomentellous, glabrescent, angled or angulate-sulcate towards the top; otherwise terete. Terete parts often still tomentellous. The dropping of the tomentum seems to be variable, the colour may be ferruginous, golden-brownish, fulvous or subcinnameous. Stipules 0.3-0.4 cm long, lanceolate, persistent or dropping late. Leaves in trimerous whorls or opposite. Petioles  $0.3-0.4 \times 0.2$  cm, tomentellous or subsericeous, base in-crassate, often curved and inconspicuous between the lobes of the orbiculate base of the leaf. Blade 8-12 (7-14)  $\times$  3-5 cm, oblong;

apex acuminate, top 1.0-1.5 cm long, mucronate; base rounded or obcordate. Upper surface of the leaf glabrous, lateral and marginal nerves slightly impressed, veins inconspicuous; lower surface tomentellous or puberulous, lateral and marginal nerves prominent, veins subprominent. 10-15 Major lateral nerves, angle with the midrib 50-60'. Marginal nerve undulate, running at 0.1 cm from the flat margin. Inflorescence terminal and axillary, densiflorous, ferruginous tomentose or hirtous. Cincinni 3-1 flowered. Peduncles 0.4-0.6 cm, pedicels 0.4-1.0 cm long, slender. Flower-bud straight, obtuse, about 0.5-0.6 × 0.1-0.2 cm. Spur subconical, straight or very slightly recurved, 0.5-0.7 cm long, angle with the fourth calyx-lobe 135-180'. Petals equal, as long as the stamen. Stamen pilose, in particular on the margins and the ventral side; anther obtuse, about 3 times longer than the filament. Staminodes about 0.05 cm long, slightly pilose. Style cylindrical. Stigma lateral, orbicular, diameter 0.05 cm. Capsule 3-4 × 1.0-1.4 cm, obovoid, verruculose, wings not sulcate.

Type: Martius s.n. Original specimen prob. in M, not seen by the present author.

Distribution: Southern Amazonia. BRAZIL, Amazonas: Ega (Teffe) along R. Solimoes, Martius s.n. type (K, L). R. Tonantins, Ducke RB, 20575 (S, U); - - 647 (US). Para: Rio Tapajoz, Bastos 27 (RB, U); - Margabal, Ducke RB 13694, (K, S, U); - - PG 16768 (K, P, US). Mato Grosso: Upper Machado River, Tabajara, Krukoff 1418 (BM, G-DEL, K, NY, P, S, U).

Ecology: In periodically flooded jungle (On "varzea") Fl.: Oct.-Feb. Fr.: Feb.

Vernacular names: BRAZIL, Amazonas: Quaruba.

67. *Vochysia vismiifolia* Spruce ex Warm. sub *V. vismiaefolia* in Flora Bras. XIII, II p. 99. *Vochysia vismiaefolia* Spruce ex Warm. l.c.; Huber 1910 p. 188; Ducke 1915 p. 45; - 1922 p. 194; - 1938 p. 35; Lecointe 1934 p. 387 (wood, uses).

Tree of medium or large size. Most parts tomentellous or sub-sericeous, indumentum ferruginous, sometimes cinnamomeous, often canescent. Older branchlets and upper surface of the leaves glabrous. Stipules deltoid, 0.05-0.10 cm long. Leaves opposite. Petioles 0.8-1.2 cm long. Blade elliptic, 8-12 × 3-4 cm; apex acute, obtuse or shortly acuminate and obtuse-retuse; base acute. Nervation not prominent above, veins even inconspicuous. Lower surface of the leaf tomentellous, lateral and marginal nerves slightly prominent, veins subprominent, irregularly and obliquely transversal. 8-15 Major lateral nerves, angle with the midrib 50-60', straight, ending in a slightly undulate marginal nerve at about 0.1-0.2 cm from the

flat margin. Inflorescence terminal and axillary, slender, cylindrical, densiflorous. Cincinni 3-1 flowered. Peduncles 0.3-0.4 cm, pedicels 0.5-0.6 cm long, slender. Flower-bud 0.7-0.9 × 0.1-0.2 cm, puberulous, recurved, obtuse or rounded. Spur 0.5-0.7 cm long, subconical, recurved, making a distinct angle of 60-120° with the fourth calyx-lobe, base constricted, apex subincrassate. Petals unequal, oblong, apex rounded, length of the centre one about 2/3 of that of the stamen. Margins and filament of the stamen pilose, apex rounded, base of the anther gradually narrowing towards the 0.1 cm long filament. Staminodes about 0.1 cm long, linear-oblong, obtuse, margins with long brown cilia. Style cylindrical. Stigma lateral, small. Capsule obovoid-oblong, about 2.5 cm long, one per peduncle, nutans, verruculose, wings subsulcate.

Type: Spruce 1823 at Manaus, in K.

Distribution: Northern Amazonia. BRAZIL, Amazonas Manaus, Spruce 1823 type (BM, C, G-BOIS, GH, K, NY, OXF, P, W); - - s.n. (1285 in K and P) cotype (BM, C, G-BOIS, GH, K, NY, OXF, P, W); - Ducke 79 first coll. (K, NY, S, US), second coll. (US). Para: Belem Ducke PG 15660 (BM, G-DEL); - Huber PG 6980 (BM, G-DEL, P, US); Rio Trombetas, Ducke PG 8057 (BM); Faro, Ducke RB 13693 (U, S); Braganca, Ducke RB 17760 (RB, U); Breves, Ducke RB 17766 (K, RB, S, U, US).

VENEZUELA, Amazonas: Yavita, Ll. Williams 13977 (F, US); Sanariapo, Ll. Williams 16014 (F, US); Rio Canaracana, Cardona 345 (US).

Ecology: In savannas or in open, mostly secondary woods beyond reach of the seasonal floods. Fl.: Nov.-Feb. Fr.: Jul.

Vernacular names: VENEZUELA: Lacre montanero, Salado. BRAZIL: Quaruba vermelha (sec. Lecointe); Quaruba branca (sec. Ducke 1922).

Observation: In accordance with the "Rules" (see observation under *Salvertia convallariodora* on p. 422). I have adopted the spelling "*vismifolia*" The connecting vowel should be *i* not *ae*.

var. **densissima** (Pilger) Staf. nov. comb. (see p. 409 general section). *Vochysia densissima* Pilger 1931 p. 298.

Lateral nerves numerous, about 25, leaves acuminate with a longer top: 0.6-1.0 cm. Spur slightly recurved.

Type: Tessmann 4632 in B. Now probably burnt. No duplicates are known to the present author, he only saw a photograph of the Berlin specimen in the GH.

Distribution: PERU, Loreto: Maranon basin, Pongo de Manseriche, Tessmann 4632 (photograph in GH of B specimen).

Ecology: In never flooded forest. Fl.: Nov.

Observation: From the photograph and the description it seems, that the Tessmann specimen is closest related to *V. vismifolia*. The differences have been listed above, and are of a minor character. So I propose provisionally a new combination until further material will be available.

68. **Vochysia calamana** Staf. nov. spec.

Sectio *Ciliantha* Staf. subsectio *Ferrugineae* Warm. Petioli

1.0-1.3 cm longi. Folia opposita. Lamina elliptica, acuminata basi rotundata vel obtusa, novella supra cano-puberula, subtus ferrugineo-subsericea, adulta supra glabrescentia, subtus canescente-subsericea vel fere glabra. Nervi non prominentes. Costa marginalis sensu stricto abest, nervi laterales arcuatim anastomosantes. Inflorescentia multiflora. Cincinni 1-2 flori. Alabastra recta, obtusa, 0.7-1.0 × 0.10-0.15 cm. Calcar rectum vel parum incurvum, sub angulo 0-30' a pedicello patens, sepalo quarto brevior. Petalum intermedium stamine duplo minus. Stigma laterale, trilobum.

Tree of medium size. Young parts of the branchlets sparsely greyish-pilose; older parts glabrescent, subterete. Stipules pilose, about 0.1 cm long. Leaves opposite. Petioles 1.0-1.3 × 0.15 cm, slightly greyish pilose and glabrescent, base scarcely incrassate. Young leaves greyish-puberulous above, ferrugineous subsericeous beneath. Adult blade elliptic, 8-10 × 3-4 cm; apex acuminate, top 0.5-0.6 cm long; base rounded or obtuse. Upper surface of the leaf glabrescent, dull, with numerous small impressed points, nervation not prominent; lower surface canescent subsericeous, lateral nerves prominent, veins not prominent. Lateral nerves straight, 10-15 major ones, angle with the midrib 45-60', arcuately anastomosing at about 0.2-0.3 cm from the margin, these connections may give the impression of an undulate marginal nerve. General direction of the veins obliquely transversal. Inflorescence terminal and axillary, densiflorous. Cincinni 1-2 flowered. Peduncles 0.1-0.3 cm, pedicels 0.3-0.5 cm long. Flower-bud 0.7-1.0 (-1.3) × 0.10-0.15 cm, almost glabrous, straight, obtuse. Spur straight or slightly incurved, angle with the pedicel 0-30', obtuse, about 0.5 cm long. Petals unequal elliptic-spatulate, rounded, centre one about half as long as the stamen. Stamen with long brown hairs; anther linear, apex rounded, sterile base cuneate and about 0.1 cm long; filament strap-shaped about 0.1 cm long. Staminodes linear, about 0.1 cm long, margins with long cilia. Style incrassate towards the apex. Stigma lateral, three-lobed, about 0.08 cm wide. Capsule unknown.

Type: Krukoff 1299 in U.

Distribution: BRAZIL, Amazonas: Rio Madeira near Calama, Krukoff 1299 type (BM, G-DEL, K, NY, P, S, U). Para: anonymous collection in P.

Ecology: On terra firme. Fl.: Nov.-Dec.

69. *Vochysia maxima* Ducke in Bull. Mus. Hist. Nat. Par. Sér. II, IV 1932, p. 739; Ducke 1933 p. 44; - 1935 p. 51; - 1938 p. 33; Lecointe 1934 p. 117, 385 (uses).

Tree up to 60 m. Branchlets slender, obtusely angled, brownish-puberulous, glabrescent. Stipules persistent or dropping late, about 0.1 cm long, base incrassate, pilose. Leaves opposite, rarely a trimerous whorl on ultimate parts. Petioles 1.5-2.5 cm long, base scarcely incrassate. Young leaves glabrous above, ferrugineous sub-puberulous and glabrescent beneath. Blade of the adult leaf 9-12 × 2.5-3.5 cm, elliptic, thinly coriaceous; apex acute or acuminate, top about 0.5 cm long, obtuse and slightly retuse; base acute. Upper surface of the blade glabrous, lateral and marginal nerves slightly prominent, veins often partly impressed and owing to their darker colour giving an impression of hieroglyphs; lower surface glabrous or slightly greyish puberulous, nervation reticulate and subprominent. Lateral nerves subparallel, angle with the midrib about 50°, straight, ending in an undulate marginal nerve at about 0.2 cm from the flat margin. Inflorescence terminal and axillary, subpuberulous especially on the cincinni. Cincinni 1-2 flowered. Flower-bud about 1.0-1.2 × 0.15-0.20 cm, slightly recurved, apex obtuse. Flowers orange-yellow. Spur recurved, about 0.6-0.7 cm long. Petals unequal, centre one twice as long as the lateral ones, as long as the stamen, elliptic. Stamen pilose, in particular on the ventral side; anther linear-oblong, apex rotundate-obtuse, about four times longer than the filament. Staminodes about 0.1 cm long, irregular, glabrous (N.B.). Style subclavate. Stigma lateral, about 0.15 × 0.08 cm. Capsule unknown.

**Type:** Ducke PG 15595 in PG (The present author has not seen this specimen).

**Distribution:** Southern Lower Amazonia. BRAZIL: Para: Near Bren Branco along railway of Alcobaca, Ducke PG 15595 type, (BM, G-DEL, P, US). Serra Santarem Ducke RB 23806 (K, P, RB, S, U, US).

**Ecology:** "Forests on certain high clayey grounds". Fl.: Jan.

**Vernacular names:** BRAZIL, Para: Cedro rana; Quaruba (sec. Lecointe).

**Observation:** This is one of the few species of this subsection with glabrous staminodes. This could support Ducke (1933) who accentuates the relationship of the species with *V. grandis* Mart. (subsection B I *Micranthae*), but the pilose stamen and petals, together with the indumentum on the young vegetative parts are in accordance with the characters of the *Ferrugineae*. See also the obs. under *V. eximia* (no. 92).

70. ***Vochysia boliviana* Rusby** in Mém. Tor. Bot. Cl. III 1893 p. 7 (3).

Tree of medium size. Branchlets quadrangular, angles rounded, flanks sulcate, nodes subincrassate, only the young parts greyish tomentose. Stipules 0.3-0.5 cm long, subulate, greyish, base wide. Leaves opposite. Petioles 1.5 (-2.5) × 0.2-0.3 cm. Blade of the adult

leaves up to  $20 \times 8$  cm; apex abruptly acuminate, top about 1.0 cm long; base rounded or subcordate. Upper surface of the leaves glabrous, dull, midrib impressed, lateral nerves not or only slightly prominent but never impressed; veins inconspicuous, sometimes slightly impressed and partly darker coloured: impressed dark points. Hairs on the lower surface in particular along the nervation, nerves sharply prominent; veins subprominent, subparallel and regularly obliquely transversal. Lateral nerves parallel, 15-20 major ones, minor ones only near the base, straight but slightly bent upwards near the margin and joining a marginal nerve at about 0.1-0.2 cm from the margin. Inflorescence terminal and axillary, laxiflorous. Cincinni mostly 2-flowered. Peduncles 0.3-0.6 cm, pedicels 0.5-1.0 cm long. Flower-bud 1.0-1.5  $\times$  0.2-0.3 cm, acute or obtuse, straight or recurved. Spur subconical, angle with the pedicel 30-45', subincurved or straight, 0.8-0.9 cm long, base about 0.15 cm wide, apex slightly incrassate. Petals subequal, elliptic, obtuse, centre one as long as the stamen, about 0.4 cm wide, lateral ones somewhat shorter and about 0.3-0.4 cm wide. Stamen densely adpressed ferruginous tomentose on the back; anther linear, obtuse, base rounded and barbate; filament 0.1-0.2 cm long, strap-shaped. Staminodes linear, about 0.1 cm long, margins villose. Stigma lateral, three-lobed, about 0.1 cm wide. Capsule unknown.

*Type*: Bang 826 in NY.

*Distribution*: BOLIVIA, Songo, Bang 826, type (BM, G-BOIS, G-DEL, GH, K, NY, US, W); Mapiri region, San Antonio, Buchtien 1377 (US); Id. San Carlos, Buchtien 1701 (F, GH, NY, US); Moro Yungas Pearce s.n. (BM, K).

*Ecology*: In woods between 500 and 2000 m. Fl.: Nov.-Jan.

71. ***Vochysia biloba* Ducke** in Arch. Inst. Biol. Veg. II 1935 p. 52; Ducke 1938 p. 36.

Large tree. Branchlets quadrangular, flanks concave, angles obtuse, reddish-brown, glabrous or very slightly pilose. Stipules thick, deltoid, about 0.1 cm long, base 0.1-0.2 cm wide. Leaves opposite. Petioles 1.2-2.0  $\times$  0.3-0.5 cm, slightly tomentellous. Blade obovate or cuneate, 11-17  $\times$  5-9 cm, rigidly coriaceous; apex bilobed-obcordate or broadly truncate and emarginate-retuse; emargination at 2 cm deep and 4 cm wide; base rounded, obtuse or cuneate. Upper surface of the leaf glabrous, shining, veins inconspicuous, lateral nerves distinct, but not or only slightly impressed, midrib impressed; lower surface canescent ferruginous tomentose or puberulous, nerves sharply prominent, veins subconspicuous and obliquely transversal. Lateral nerves 16-19, parallel, angle with the midrib 45-60',

straight or slightly curved, ending in a marginal nerve at about 0.2 cm from the margin, except for the basal ones, which end in the margin itself. Margin not or slightly revolute. Inflorescence terminal and axillary, cylindrical, densiflorous, glabrous or minutely puberulous. Cincinni 3-5 flowered. Peduncles 0.3-0.5, pedicels 0.3-0.7 cm long. Flower-bud cylindrical, obtuse, 0.7-0.9 cm long, glabrous, shining, straight or recurved. Flowers orange-yellow. Spur 0.6-0.8 cm long, angle with the pedicel 0-30', straight, subconical. Petals unequal, elliptic, rounded or obtuse, ferrugineous villose on the back, length of the centre one  $1/2-2/3$  of that of the stamen. Stamen pilose on all sides; anther linear-oblong, apex rotundate retuse; filament about 0.1 cm long. Staminodes about 0.1 cm long. Apex of the style subincrassate. Stigma lateral, 0.08-0.10 cm diam. Capsule unknown.

Type: Ducke RB 24080 in RB.

Distribution: BRAZIL, Amazonas: Sao Paulo de Olivenca, Rio Solimoes, Ducke RB 24080 type (K, NY, P, RB, S, U, US); Basin of Rio Madeira, Humayta, Krukoff 7211 (BR, F, K, NY, S, U, US).

Ecology: In woods on terra firme. Fl.: Oct.-Nov.

## 72. *Vochysia magna* Staf. nov. spec.

Sectio *Ciliantha* Staf.; subsectio *Ferrugineae* Warm. Stipulae persistentes vel caducae. Folia 3-verticillata. Petioli 0.5-0.8 cm longi. Lamina elliptico-oblonga, 13-17 × 4.5-6.5 cm, acuminata. Nervi laterales subtus prominentes. Costa marginalis adest. Cincinni 1-2 flori. Alabastra 0.8-1.2 cm longa. Calcar rectum vel subincurvum, sub angulo 0-30' a pedicello patens. Petalum intermedium  $3/4$  staminis longitudinis; lateralia duplo majora. Stigma laterale.

Large tree (20-50 m). Branchlets brownish-black; young parts subpuberulous and angulate-sulcate, older parts glabrescent and subterete. Stipules 0.2-0.3 cm long, persistent or dropping late, subulate. Leaves in trimerous whorls, rarely opposite. Nodes slightly incrassate. Petioles 0.5-0.8 × 0.2-0.3 cm, pubescent. Blade of young leaves sparsely canescent ferrugineous puberulous above and brownish subsericeous beneath. Blade of adult leaves elliptic-oblong, 13-17 × 4.5-6.5 cm; apex acuminate, top 0.7-1.0 cm long; base obtuse or subrotundate. Upper surface of the blade glabrous, veins inconspicuous, nerves and midrib often slightly impressed; lower surface greyish-brownish pubescent, in particular along the nervation, nerves sharply prominent, veins subconspicuous. Lateral nerves straight, angle with the midrib about 60', 20-25 major ones, minor ones in between, ending in a marginal nerve at 0.1-0.2 cm from the flat or subrevolute margin. Inflorescence terminal and

axillary, densiflorous, slightly ferrugineous tomentose. Cincinni 1-2 flowered. Peduncles 0.3-0.4, pedicels 0.3-0.6 cm long, 0.05 cm wide. Flower-bud 0.8-1.2  $\times$  0.1-0.2 cm, straight or very slightly recurved, cylindrical, obtuse. Spur straight or subincurved, angle with the pedicel 0-30', 0.4-0.5 cm long. Petals unequal, length of the centre one about  $\frac{3}{4}$  of that of the stamen, about twice as long as the lateral ones, obovate, rounded. Margins and ventral side of the anther villose, apex obtuse; filament about 0.3 cm long, glabrous. Staminodes about 0.10-0.15 cm long. Style cylindrical. Stigma lateral, three-lobed, diameter surpassing width of the style. Capsule unknown.

Type: Lawrance 746 in G-DEL.

Distribution: COLOMBIA, Boyaca: Caviche region, Lawrance 746 type (F, G-DEL, K, S).

Ecology: 1300 m. in "high forested fronts". Fl.: Apr.

Vernacular names: COLOMBIA, Orcano.

73. *Vochysia braceliniae* Standley in Field. Mus. Bot. 22 1940 p. 149.

Tree of medium size. Branchlets obtusely quadrangular, light brown, glabrous, flanks concave, young parts only minutely puberulous. Stipules 0.1-0.2 cm long, deltoid. Leaves in tri- or tetramerous whorls. Petioles 0.4-0.7  $\times$  0.2-0.3 cm, black. Young leaves slightly greyish-brownish pilose beneath, in particular along the nervation. Adult blade obovate or broadly elliptic, 8-17  $\times$  5-10 cm, apex rounded or truncate-apiculate or truncate-emarginate and apiculate, top if present obtuse; base rounded or obtuse. Upper surface of the leaves dull, veins inconspicuous, nerves impressed; lower surface with sharply prominent nerves, veins not prominent and irregularly transversal, nervation sometimes slightly puberulous. Lateral nerves 15-18, straight, angle with the midrib 50-60', ending in a marginal nerve at 0.2-0.3 cm from the flat margin. Inflorescence terminal and axillary, densiflorous, elongate cylindrical, subpuberulous. Cincinni mostly 2-flowered. Peduncles mostly 0.2-0.3 cm long, pedicels 0.2-0.5 cm long and slightly incrassate towards the apex. Flower-bud 0.6-0.9  $\times$  0.1-0.2 cm, almost glabrous, subclavate, straight or subrecurved. Spur straight, cylindrical, stretched along the pedicel, about 0.5  $\times$  0.1 cm. Petals spatulate, margins except for the apex glabrous, length of the centre one about  $\frac{2}{3}$  of that of the stamen, 2 times that of the lateral ones. Stamen pilose, in particular along the margins; anther elliptic-oblong, obtuse, base abruptly contracted towards the 0.15 cm long filament. Staminodes about 0.05 cm long, villose around the apex. Style regularly in-

crassate towards the apex. Stigma lateral, diameter about 0.08 cm. Capsule unknown.

Type: Mexia 6081 in F.

Distribution: PERU, Loreto: Near Yurimaguas, Mexia 6081 type (BM, F, G-DEL, GH, K, NY, S, U, US).

Ecology: 180 m in woods. Fl.: Oct.

Observation: The type specimen of *V. retusa* Pilger (Schultze-Rhonhof 2479) has probably been burnt in Berlin and neither duplicate nor photograph are known to the present author. The description of Pilger (1939) agrees with that of *V. braceliniae* Standley (1940) but is rather incomplete. This incompleteness makes it impossible ever to determine a specimen as *V. retusa* by this description alone, one would always run it down to *V. braceliniae*. I propose therefore to ignore *V. retusa* until material from the type locality is available.

74. *Vochysia lomatophylla* Standley in Field Mus. Bot. 22 1940 p. 150. *Vochysia polyantha* Ducke 1945 p. 14.

Tree of medium or large size. Older parts of the branchlets glabrous, quadrangular; younger parts subpuberulous, nearly winged, angles of the wings obtuse, subpuberulous. Stipules about 0.2 cm long, puberulous, base wide, apex subulate. Leaves in tetramerous whorls. Petioles 0.4-0.6 × 0.3 cm, rugulose, black, greyish puberulous. Adult blade spatulate or obovate, 17-12 × 5-7 cm; apex rounded or obtuse, base extremely gradually narrowing towards the petiole, ultimate part somewhat rounded. Upper surface of the leaf dull, glabrous, nerves impressed, veins sub- or inconspicuous; lower surface sparsely greyish puberulous, in particular along the nervation, nerves prominent, veins subprominent, larger veins irregularly transversal, smaller ones reticulate. Lateral nerves 20-25, minor ones in between near the apex, angle with the midrib 50-60°, straight but near the apex curved upwards, ending in a marginal nerve at 0.1-0.2 cm from the margin. Margin entire or subundulate, subrevolute. Inflorescence axillary, densiflorous, greyish puberulous. Cincinni mostly 2-flowered. Peduncles about 0.5-0.8, pedicels 0.5-1.0 cm long, angled, 0.1 cm wide. Flower-bud cylindrical, subrecurved, obtuse, 1.0-1.5 × 0.2-0.3 cm. Spur cylindrical, angle with the pedicel 0-30°, 0.8-0.9 × 0.1 cm. Petals subequal, centre one as long as the stamen, elliptic, apex acute; lateral ones 0.6-0.7 cm long, apex rounded, oblong. Anther linear, apex rounded and incrassate, base cuneate; filament about 0.1 cm long, slender. Staminodes 0.10-0.15 × 0.03 cm. Style cylindrical. Stigma lateral, irregular suborbicular, diameter about 0.06 cm. Capsule unknown.

Type: Schunke 14 in F.

Distribution: PERU, Loreto: Gamitanacocha, Rio Mazan, Schunke 14, type (F, US); Argelia, Fox 76 (F, K).

BRAZIL, Amazonas: Rio Solimoes, Sao Paulo de Olivenca, Krukoff 8961 (BR, G-DEL, K, NY, S, U, US); Esperanza-Umarizal, Ducke 1280 type of *V. polyantha* Ducke (K, RB, U, US).

Ecology: On river banks. Fl.: Oct.-May.

Vernacular names: PERU: Timareo de Altura.

75. *Vochysia inundata* Ducke in Arch. Jar. Bot. Rio. III 1922 p. 194; Ducke 1938 p. 35 (Ducke 1915 p. 45 sub *V. aff. costata*).

Tree of medium size. Branchlets quadrangular or subterete, ferruginous tomentose, canescent and glabrescent. Stipules about 0.2 cm long, subulate, pilose. Leaves opposite. Petioles 0.5-1.0 × 0.2-0.3 cm. Blade obovate or elliptic, 8-13 (-21) × 4-6 (-9) cm; apex rounded, apiculate or acuminate; base obtuse, rounded or subcordate, sometimes plicate. Upper surface of the leaves glabrous, sometimes with numerous impressed small points independent of the nervation, veins subconspicuous, nerves and midrib slightly impressed; lower surface canescent ferruginous puberulous in particular on the nervation, nerves sharply prominent, veins reticulate, only some of the larger veins irregularly transversal. Lateral nerves straight, but near the apex bent upwards, angle with the midrib about 60°, minor ones only near the apex and base, ending in a marginal nerve at 0.1-0.2 cm from the subundulate, subrevolute margin. Inflorescence terminal and axillary, sublaxiflorous, subpuberulous. Cincinni 3-5 flowered, slender, peduncles 0.5-1.0, pedicels 0.5-1.5 cm long and 0.1 cm wide. Flower-bud 1-2 cm long, about 0.2 cm wide, obtuse, subrecurved or nearly straight. Spur making an angle of 0-45° with the pedicel, straight, slightly S-shaped or subincurved, 0.9-1.2 cm long, slightly attenuate. Petals spatulate, unequal, centre one as long as the stamen. Filament about 0.2 cm long, glabrous; anther pilose, apex rounded. Staminodes about 0.05 cm long. Style cylindrical. Stigma lateral, smaller than the diameter of the style, suborbicular. Capsule unknown.

Type: Ducke PG 10137 in PG.

Distribution: BRAZIL, Para: Belem, Ducke PG 10137 type (BM, PG acc. to photograph and fragment in F); - - RB 20577 (U); - - 1652 (K, US); Braganca, Ducke RB 17743 (G-BOIS, K, P, RB, S, U, US). Amazonas: Manaus, Ducke RB 23497 (K, S, US); - - 1158 (K, US).

Ecology: In swampy, periodically flooded forests. Fl.: Nov.-Mar.

Observation: *Vochysia inundata* Ducke var. *venosa* Ducke 1938 p. 35 has been raised to the rank of species: no 79, *V. saccata* Stapf.

76. *Vochysia splendens* Spruce ex Warm. in Flora Bras. XIII, II p. 101; Ducke 1938 p. 36; Ll. Williams 1947 p. 27 (ecol.) *Vochysia vismitifolia* Spruce ex Warm. var. *robusta* Ducke 1938 p. 35.

Tree of medium size. Canescent ferruginous tomentose except for the upper surface of the leaves and some parts of the flowers. Branchlets angled, angles rounded, flanks flat or sulcate. Stipules deltoid, about 0.2 cm long. Leaves opposite. Petioles 1.3-2.2 × 0.3-0.5 cm. Young leaves slightly greyish puberulous above. Blade of adult leaves up to 20 × 9 cm; elliptic, thick, rigidly coriaceous; apex rounded, sometimes subapiculate; base obtuse or acute. Upper surface of the leaves glabrous except for the midrib, veins inconspicuous, nerves neither prominent nor impressed; lower surface in particular of young leaves densely canescent ferruginous tomentose, nerves sharply prominent, veins subprominent. Lateral nerves curved upwards or nearly straight, angle with the midrib 60-70°, 20-30 major ones, minor ones often in between, ending in an undulate marginal nerve at about 0.1 cm from the subundulate flat margin. Larger veins irregularly obliquely transversal, smaller ones reticulate. Inflorescence terminal and axillary, multiflorous, cylindrical. Cincinni 1-5, mostly 2-flowered. Peduncles and pedicels each 0.3-0.6 cm long. Flower-bud characterised by the thick spur, which is longer than the fourth calyx-lobe; 0.5-0.7 × 0.2-0.3 cm, obtuse, straight or subrecurved. Flowers orange-yellow. Spur 0.6-0.9 cm long, subconical, recurved or straight. Petals unequal, centre one as long as the stamen. Margins of the anther pilose; filament 0.1-0.2 cm long, glabrous. Staminodes about 0.07 cm long. Style cylindrical. Stigma lateral, small. Capsule unknown.

Type: Spruce 2697 in K.

Distribution: Rio Negro basin. BRAZIL, Amazonas: Panuré on Rio Uaupes, Spruce 2697, type (BM, BR, G-BOIS, GH, K, NY, OXF, P, W); Rio Curucuryary, Ducke 335 (K, NY, S, US); - - RB. 23494 (G-BOIS, K, P, RB, S, U, US); - - RB. 34657 type of *V. vismiifolia* var. *robusta* Ducke, (G-DEL, P, K, S, U, US).

VENEZUELA, Amazonas: San Carlos, Ll. Williams 14522 (F, US).

Ecology: In rain forests, either riverine or beyond reach of seasonal floods, often on rocky soil. Fl.: Nov.-Feb.

Vernacular names: VENEZUELA: Tanari, Tanaré.

#### 77. *Vochysia costata* Warm. in Flora Bras. XIII, II p. 100.

Ferruginous tomentose in particular on the young parts, older parts glabrescent or with canescent hairs. Branchlets quadrangulate. Stipules subulate, 0.2 cm long. Leaves opposite. Petioles 1.0-1.5 × 0.2 cm. Young leaves above pilose on the nervation. Blade of adult leaves at 14 × 6 cm, elliptic; apex obtuse, shortly apiculate; base acute. Upper surface of the leaves with numerous impressed points, glabrous, nervation subconspicuous; lower surface loosely tomen-

tellous, nerves sharply prominent, veins subprominent. Lateral nerves making an angle of 40-50' with the midrib, 10-15 major ones, minor ones only near the apex, straight or slightly curved, ending in an undulate marginal nerve at about 0.1 cm from the flat and entire margin. Only the larger veins are irregularly transversal. Inflorescence terminal and axillary, laxiflorous. Cincinni mostly 2-flowered. Flower-bud subrecurved, obtuse, cylindrical, up to  $1.5 \times 0.2$  cm. Spur  $0.7-0.8 \times 0.1-0.2$  cm, subconical, straight or slightly recurved; apex subincrassate, angle with the pedicel 45-90'. Centre petal spatulate, as long as the stamen; lateral ones shorter, linear-oblong. Margin of the anther pilose, filament about 0.4 cm long. Staminodes about 0.05 cm long. Style subcylindrical. Stigma terminal, subcapitate. Capsule unknown.

**Type:** Schomburgk 974. Warming probably saw the Berlin and Paris specimens. Lectotype in P.

**Distribution:** BRITISH GUIANA: Schomburgk 974 type (BM, G-BOIS, G-DEL, P, W; in K sub "2 last set").

**78. *Vochysia densiflora* Spruce ex Warm.** in *Flora Bras. XIII*, II p. 101 t. XIX; Benoist 1915 p. 62; - 1931 p. 165.

Large tree. Young parts of the branchlets angulate-sulcate and ferruginous subsericeous; adult parts subterete, glabrous. Stipules deltoid, about 0.1 cm long. Leaves opposite. Petioles  $1.4-1.8 \times 0.2-0.4$  cm. Blade up to  $25 \times 9$  cm, obovate or oblong, rigidly coriaceous; apex rounded or abruptly apiculate; base acute or obtuse. Upper surface of the leaves glabrous, nervation not prominent, veins subconspicuous; lower surface of young blades ferruginous velutinous, of adult blades shortly adpressed greyish pilose, lateral and marginal nerves prominent. Lateral nerves straight, angle with the midrib 50-60', 10-15 major ones with subconspicuous minor ones in between, ending in a marginal nerve at about 0.1-0.3 cm from the flat and entire margin. Veins only partly obliquely transversal. Inflorescence terminal, greyish-brownish tomentose, densiflorous, shortly cylindrical. Cincinni 2-3 flowered, angle with the rhachis about 90'. Flower-bud  $1.5-2.0 \times 0.2-0.3$  cm, greyish pilose, straight, acute. Spur  $0.6-0.8 \times 0.3-0.5$  cm, inflated, subovoid, stretched along the pedicel. Centre petal about 0.3 cm long, linear, rounded; the lateral petals have the same shape and size as the staminodes: about 0.1 cm long, oblong, villose. Stamen linear, pilose on the whole surface, anther with a long sterile part gradually narrowing towards the 0.3 cm long filament. Style linear, triangular. Stigma substellate, small, partly lateral. Capsule up to  $4.0 \times 1.2$  cm, obovoid, verru-

culose, constricted in the lower third, wings acute and peculiary edged.

Type: Spruce 2627 in K.

Distribution: Mainly in Guiana. BRAZIL, Amazonas: Panuré ad Rio Uaupès, Spruce 2627 type (BM, BR, C, G-BOIS, GH, K, NY, OXF, P, US, W).

BRITISH GUIANA: Essequibo, Moraballi Creek, For. Dept. 3176 (K, NY); Demerara River, For. Dept. 3089 (K, NY).

SURINAM: Zanderij I tree 95, B.W. 1293 (U, US); - - 1442 (BR, U, US); - - 4093 (L, U); - - 6052 (L, U); - tree 52 B.W. 1551 (K, U); - Woodherb. Sur. III (U).

FRENCH GUIANA: Maroni, Mélinon (195 in P, 1480 in K) (BM, K, P, US); Wachenheim s.n. (K, NY, P).

Ecology: On type locality in "capoeira", in Br. Guiana in "forests on heavy loam". Fl.: Nov.-Apr. Fr.: Febr.-Apr.

Vernacular names: SURINAM: Wana Kwarie (Negro English); Iteballi (Arowaccan); Parapi Koware (Caribbean).

#### 79. *Vochysia saccata* Staf. nov. spec.

Sectio Ciliantha Staf., subsectio Ferrugineae Warm. Stipulae ad 0.5 cm longae, subulatae. Folia opposita. Petioli ad  $1.5 \times 0.4$  cm. Lamina ad  $25 \times 9$  cm, oblongo-subobovata vel oblonga, acuminata, basi rotundata, supra glabra, nervi lateralibus subtus acute prominentibus. Costa marginalis adest. Venae subparallae et transversae. Alabastra recta vel subcurvata, circa  $1.2 \times 0.2$  cm. Calcar saccatum, praesertim in floribus juvenilibus,  $1/2-1/3$  alabastri longitudine. Petalum intermedium stamen aequans, extus in medio pilosum. Stigma parvum, triangulare.

*Vochysia inundata* Ducke var. *venosa* Ducke 1938 p. 35.

Small tree. Branchlets, petioles, inflorescences and nervation on the lower surface of the leaves densely ferruginous tomentose, slightly canescent. Branchlets quadrangular sulcate, angles rounded. Stipules at 0.5 cm long and 0.3 cm wide at the base, subulate. Leaves opposite. Petioles up to  $1.5 \times 0.4$  cm. Adult blade up to  $25 \times 9$  cm, oblong-subobovate or oblong, rigidly coriaceous; apex abruptly acuminate, top 1.0-1.5 cm long; base rounded or obcordate. Upper surface of the leaves yellowish green, subnitid, glabrous, veins subconspicuous, nerves slightly impressed; nerves and veins on the lower surface accentuated by the tomentum, sharply prominent. Lateral nerves parallel, straight, 15-20 major ones, minor ones only near the apex and the base, ending in a marginal nerve at 0.1-0.2 cm from the subrevolute and entire margin. Veins subparallel, obliquely transversal. Inflorescence terminal and axillary, cylindrical. Cincinni mostly 2-flowered, angle with the rhachis 45-60'. Peduncles and

pedicels each at 1.0 cm long, Flower-bud straight or slightly curved, cylindrical, about  $1.2 \times 0.2$  cm. Spur in particular in the young flowers wider than the bud, cylindrical, bag-shaped, straight or subincurved, length mostly  $1/2-1/3$  of that of the fourth calyx-lobe. Petals spatulate-oblong, pilose on the central parts of the back, centre one as long as the stamen, obtuse or rounded, nearly twice as long as the lateral ones. Stamen pilose on the ventral surface, filament about 0.2 cm long, anther with a subglobose rounded apex and a truncate base. Staminodes about 0.1 cm long. Style cylindrical. Stigma small, triangular, partly lateral. Capsule unknown.

Type: Ducke RB 34654 in U.

Distribution: BRAZIL, Amazonas: Rio Curucuryary, affl. Rio Negro, Ducke RB. 34654 type (G-DEL, K, P, S, U, US).

Ecology: On river banks. Fl.: Nov.

Observation: I do not agree with Ducke (l.c.) that this specimen differs only in varietal characters from *V. inundata* Ducke. The shape and dimensions of the spur are entirely different, and so are the petals, the stamen, the indumentum of the leaves etc. It is to be preferred not to call the species *V. venosa*, in accordance with Ducke's varietal name, because of the facts that *V. venulosa* Warm. already exists and that *V. venosa* has been used as a nomen nudum by Martius (in sched.) on a label of a *V. ferruginea* specimen.

#### 80. *Vochysia javitensis* Stafl. nov. spec.

Sectio Ciliantha Stafl.; subsectio Ferrugineae Warm. Ramuli angulati, costati. Folia opposita. Petioli 0.6-0.9 cm longi. Lamina elliptica, apice obtusa, basi acuta, adulta subtus glabrescentia, nervis non prominentibus. Costa marginale subundulata, 0.1 cm a margine distante. Cincinni 1-2 flori. Alabastra recta vel subrecurva, circa 0.6 cm longa. Calcar 0.5-0.7 cm longum, rectum vel parum curvatum. Petalum intermedium staminis longitudine; lateralia duplo minora. Stigma terminale, parvum.

Tree of medium size. Young branchlets quadrangulate, adpressed brownish pilose, flanks mostly flat, angles acute and corresponding to the stipules. Stipules subulate, about 0.15 cm long. Leaves opposite. Petioles 0.6-0.9  $\times$  0.1-0.2 cm long, rugulose, base not in-crassate. Blade elliptic, 6-7  $\times$  2.5-3.2 cm; apex mostly obtuse and retuse; base acute. Upper surface of the leaves glabrous except for the sparsely pilose midrib, veins inconspicuous; lower surface of the young leaves greyish-brownish adpressed puberulous, later on partly glabrescent. Nervation not prominent on either side, reticulate. Lateral nerves straight, angle with the midrib about 60°, no division in major and minor ones, ending in a subundulate marginal nerve at about 0.1 cm from the flat margin. Inflorescence terminal, sublaxiflorous, slightly puberulous. Cincinni 1-2 flowered. Peduncles about

0.3, pedicels about 0.5 cm long. Flower-bud cylindrical, straight or subrecurved, obtuse, about  $0.6 \times 0.1$  cm. Spur as long as or longer than the fourth calyx-lobe:  $0.5-0.7 \times 0.1$  cm, straight, or slightly curved. Centre petal as long as the stamen, elliptic, acute, nearly twice as long as the lateral ones. Stamen clavate, filament about 0.1 cm long. Staminodes 0.05-0.10 cm long. Style cylindrical. Stigma terminal, flat, diameter 0.03-0.05 cm. Capsule unknown.

Type: Ll. Williams 14118 in F.

Distribution: VENEZUELA, Amazonas: Along Rio Temi, Yavita, Ll. Williams 14118 type (F).

Ecology: In low shrubby growth called "sabetas" of edaphical origin (fire) beyond reach of seasonal floods (see Ll. Williams 1947 p. 23). Fl.: Jan.

### 81. *Vochysia assua* Staf. nov. spec.

Sect. *Ciliantha* Staf.; subsectio *Ferrugineae* Warm. Folia opposita. Petioli 0.9-1.2 cm longi. Lamina elliptica vel elliptico-lanceolata, acuminata, basi obtusa, subtus subpuberula fere glabra, nervis non prominentibus. Costa marginalis abest. Cincinni 1-2 flori. Alabastra acuminata,  $1.3-1.7 \times 0.2$  cm. Calcar rectum, breve. Petala  $1/5$  longitudinis staminis. Stigma terminale, orbiculare, parvum.

Large tree. Branchlets slender, obtusely quadrangular, later on subterete, slightly greyish-brown pubescent. Stipules deltoid-subulate, 0.05-0.10 cm long. Leaves opposite. Petioles 0.9-1.2  $\times$  0.1 cm. Blade elliptic or elliptic-lanceolate, 7-10  $\times$  2.5-3.5 cm (only ultimate branchlets seen), thinly coriaceous; acuminate, top about 1.0 cm long; base obtuse. Upper surface of the leaves dull, glabrous, nervation subconspicuous; lower surface of the young leaves slightly puberulous in particular along the midrib, nervation reticulate, not or scarcely prominent. Lateral nerves thin, subparallel, angle with the midrib about 70', arcuately anastomosing; no marginal nerve. Margin flat. Inflorescence terminal, laxiflorous, greyish-brownish pubescent. Cincinni 1-2 flowered. Peduncles and pedicels each 0.2-0.4 cm long, slender. Flower-bud straight or slightly recurved, cylindrical, acuminate,  $1.3-1.7 \times 0.2$  cm. Spur straight, short: 0.3-0.4 cm long, angle with the pedicel 45-90'. Petals ciliate, length of the centre one about  $1/5$  of that of the stamen, suborbicular, rounded; lateral ones smaller, oblong. Anther linear, densely villose on the margins and the back, apex obtuse, base subabruptly narrowed towards a 0.1-0.2 cm long filament. Staminodes obtuse, about 0.05 cm long. Style cylindrical. Stigma terminal, orbicular, diameter about 0.05 cm. Capsule unknown.

Type: Ducke RB 34649 in U.

Distribution: BRAZIL, Amazonas: Parintins near Lake José Assu, Ducke RB 34649 type (G-DEL, K, P, S, U, US).

Ecology: In wood on terra firme. Fl.: Dec.

Observation: Distributed by Ducke sub *V. maxima* Ducke.

82. *Vochysia sprucei* Warm. in Flora Bras. XIII, II p. 99.

Small tree. Petioles, leaves beneath, young parts of the branchlets and of the inflorescence canescent ferruginous tomentellous. Branchlets slender, older parts subterete. Stipules none or reduced. Leaves opposite, Petioles 0.5-0.6 cm long. Blade lanceolate, oblanceolate or narrow elliptic, 5-6 × 1.5-1.8 cm; apex obtuse; base acute. Upper side of the leaves glabrous except for the midrib, nervation subconspicuous. Lateral nerves subprominent beneath, somewhat irregular, angle with the midrib 40-50', ending in the margin or running into a subdistinct marginal nerve at about 0.1 cm from the flat margin. Inflorescence terminal, subdensiflorous. Cincinni 1-3 flowered. Peduncles 0.3-0.5, pedicels 0.5-0.8 cm long. Flower-bud cylindrical, straight or subrecurved, obtusely apiculate, about 1.0 cm long. Spur recurved, cylindrical, angle with the pedicel 60-90', about half as long as the fourth calyx-lobe, apex not incrassate. Centre petal about 0.3 × 0.2 cm, ovate; lateral ones somewhat smaller, oblong. Stamen pilose along the margins, anther oblong, apex obtuse and incrassate; base cuneate; filament about 0.1 cm long. Staminodes about 0.1 cm long, oblong. Style cylindrical. Stigma terminal, small, orbicular. Capsule unknown.

Type: Spruce 4566 in C.

Distribution: PERU, San Martin: Tarapoto, near the top of the Cerro Pelado, Spruce 4566, type (BM, BR, C, F, G-BOIS, GH, K, NY, OXF, P, S, W). Fl.: May.

83. *Vochysia angustifolia* Ducke in Bull. Mus. Hist. Nat. Par. 1932 sér. II, IV p. 738; Ducke 1933 p. 46; - 1938 p. 33; - 1944 p. 13.

Small tree. Branchlets obtusely quadrangular or subterete, subpuberulous. Stipules lanceolate, 0.05-0.10 cm long. Leaves opposite. Petioles 0.7-0.9 cm long, adpressed pilose. Blade 4-8 × 1-3 cm, oblong or elliptic, glabrous and subnitid above; apex obtuse and retuse; base obtuse. Lower surface of young leaves adpressed greyish-brownish pilose, older blades glabrous. Nervation reticulate, scarcely prominent on either side. Lateral nerves numerous, mutual distance of major ones 0.2-0.4 cm (minor ones in between not reaching the marginal nerve), straight, angle with the midrib 50-60', ending in a subundulate marginal nerve at 0.1 cm from the flat margin. Inflorescence terminal, cylindrical, slightly pilose on the young parts. Cincinni 2-3 flowered. Peduncles and pedicels each 0.2-0.5 cm long. Flower-bud about 0.5 cm long, subrecurved or

nearly straight; apex obtuse. Spur 0.6-0.8 cm long, recurved or nearly straight, subconical. Centre petal ovate, about 0.4 cm long, apex obtuse; lateral ones somewhat smaller, oblong. Filament as long as the anther. Staminodes 0.05-0.10 cm long, irregular. Style cylindrical. Stigma terminal, flat, diameter 0.04 cm. Capsule unknown.

Type: Ducke RB 23499 in RB.

Distribution: Brazil, Amazonas: Rio Curucury affl. Rio Negro, Ducke RB 23499, type (G-BOIS, K, NY, P, RB, S, U, US); - - 324 (F, K, NY, S, US).

Ecology: On river bank. Fl.: Nov.

84. *Vochysia cayennensis* Warm. in Flora Bras. XIII, II p. 80; Benoist 1931 p. 165.

Tree (?). Nearly glabrous. Branchlets subterete or obtusely quadrangulate, canescent or subtostaceous, young parts darker; cortex slightly scaling off (not exactly exfoliating). Stipules thick, about 0.1 cm long. Leaves opposite. Petioles 0.5-1.0 cm long. Blade elliptic or oblong 6.0-7.5 × 2.5-3.5 cm; apex obtuse or rounded; base obtuse or acute; upper surface shining, nervation not prominent; lower surface subnitid, lateral nerves subprominent, characterised by numerous elevated points which are placed between the meshes of the reticulate nervation. Lateral nerves straight, parallel, making an angle of about 60° with the midrib, bending upwards near the margin, disappearing or inconspicuously anastomosing. No marginal nerve. Inflorescence terminal and sometimes also axillary. Cincinni mostly 1-flowered. Flower-bud 1.1-1.3 × 0.2-0.3 cm, subrecurved, cylindrical, obtuse, subnitid. Spur straight or incurved, cylindrical, about 0.5-0.6 × 0.1 cm, angle with the pedicel less than 30°. Stamen pilose, hairs ferruginous and somewhat twisted; anther linear, filament 0.1-0.2 cm long. Staminodes deltoid, obtuse, about 0.05 cm long. Style cylindrical. Stigma subcapitate, diameter about 0.05 cm. Capsule unknown.

Type: Martin s.n. in P (In herb. Jussieu).

Distribution: FRENCH GUIANA: Martin s.n., type (BM, K, NY, P, US; anon. in G-DC). Desfontaines s.n. cotype (C); Richard s.n. (GH).

Observation: All specimens have few and poorly conserved flowers. The presence of petals could not be established. The species has been put provisionally at the end of the series of Hylaeon species with terminal stigma. The ecology is unknown.

85. *Vochysia pyramidalis* Mart., Nov. Gen. I p. 148 t. 90; D.C. 1828 p. 27; A. Dietr. 1831 p. 112; Spach 1835 p. 323, D. Dietr. 1839 p. 23; Warm. 1875 p. 92; Glaziou 1905 p. 32; Luetzelbourg

1923 p. 226 (ecol.). *Cucullaria pyramidalis* Spreng. 1827 p. 9. *Vochysia chapadensis* Malme 1905 p. 11. *Vochysia acuminata* Pohl ex Ettingshausen (non Bongard) 1861 p. 185 (nervation only). (*Vochysia ferruginea* in Pohl 1831 p. 30 is also *V. pyramidalis* Mart.).

Small or medium sized tree. Petioles, stipules, leaves beneath, young parts of branchlets and inflorescences cinnamomeous tomentellous. Branchlets quadrangular, flanks slightly concave. Stipules 0.2-0.4 cm long, linear-lanceolate, acute. Leaves opposite. Petioles 0.6-1.2 × 0.2-0.3 cm. Blade lanceolate-ovate, 9-17 × 3.0-4.5 cm; apex long and acute or long acuminate; base rounded or orbiculate, obtuse in young blades. Upper surface of the leaves glabrous, with numerous impressed points, nerves sub-veins inconspicuous. Nervation on the lower surface not stronger pilose than on the blade itself. Lateral nerves prominent beneath, straight or slightly curved upwards, ending in the margin; angle with the midrib about 45°. No marginal nerve. Veins reticulate, major ones sometimes obliquely transversal. Inflorescence terminal, subpyramidal cylindrical. Cincinni 1-5 flowered. Peduncles and pedicels each 0.3-0.7 cm long. Flower-bud straight or subrecurved, cylindrical, 1.0-1.7 × 0.1-0.2 cm. Spur straight or subrecurved, angle with the pedicel less than 45°, subconical, 0.6-0.8 cm long. Petals as long as the stamen, membranaceous or subchartaceous; apex obtuse; centre one elliptic or oblanceolate; lateral ones linear-oblong. Stamen villose on the ventral side, anther oblong, apex obtuse or rounded; base gradually narrowing towards the 0.2-0.3 cm long filament. Staminodes 0.05-0.10 cm long. Style cylindrical. Stigma partly lateral, small, irregular. Capsule about 1.5-2.0 cm long, rugulose, flanks ovate.

Type: Martius s.n. prob. in M. The present author did not see this specimen, a duplicate is found in L.

Distribution: Campos region of C. and E. Brazil. BRAZIL, Mato Grosso: St. Anna da Chapada, Malme II 2183, type of *V. chapadensis* Malme (S, US); - - II 2183 a (S); - Sladen 698 (BM, K). Goyaz: Meia Ponte, Glaziou 20693 (flower-buds acute) (BR, C, G-DEL, K, P, S); Burchell 7759 (BR, GH, K, P). Bahia: Serra Assurua, Blanchet 2804 (BM, BR, G-BOIS, K, NY, OXF, P, W); Banks of Rio Preto, Gardner 2839 (BM, G-BOIS, G-DEL, GH, K, NY, OXF, P, W). Minas Geraes: Martius s.n. type (L); Pohl s.n. (1546, 2332 in W, 332 in PR) (BR, G-BOIS, OXF, PR, W). Ceara: Serra Grande, Lisboa 2920 (BM, RB, U, US sub PG 2420).

Ecology: On river banks in the campo region. Fl.: Aug.-Nov.

Vernacular names: Goyaz: Joá (sec. Glaziou l.c.).

Observation: Malme (l.c.) considers his specimens to be different from *V. pyramidalis*. He mentions a less developed indumentum but this falls well within reach of the normal variability; the petioles are certainly not shorter than in the type and the difference in the length of the spur is insignificant. I therefore cannot support *V. chapadensis* Malme.

86. *Vochysia acuminata* Bongard in Mém. Acad. Petersb. Sér. VI Sc. Nat. t. III part II 1839 p. 5. Warming 1875 p. 103.

ssp. *quadrangulata* (Warm.) Staf1. nov. comb. *Vochysia quadrangulata* Warm. 1867 p. 39; - 1875 p. 97; - 1889 p. 27; Wille 1882 p. 180 seq., (anat.); Glaziou 1905 p. 33. *Vochysia quadrangulata* Warm. var. *longifolia* Warm. 1875 p. 98.

Indumentum present only on the young parts of the petioles, the lower surface of the leaves, the branchlets and the stipules and on the young and adult parts of the inflorescence; mostly brownish puberulous. Young parts of the branchlets quadrangulate, flanks flat or concave, older parts subterete. Stipules about 0.1 cm long. Leaves opposite, rigidly coriaceous. Petioles 1.0-1.5 × 0.1-0.2 cm. Blade 7-15 × 1.8-3.0 cm, often about five times longer than wide, lanceolate-oblong or lanceolate; apex gradually acuminate; base gradually narrowing towards the petiole: acute. Upper surface of the leaves glabrous, nervation not prominent; lower surface glabrescent, lateral nerves scarcely prominent. Lateral nerves straight, but slightly curved upwards near the flat margin, disappearing in the venation or anastomosing subdistinctly; angle with the midrib about 60°. No marginal nerve. Veins reticulate, inconspicuous above, no distinction between major and minor ones. Inflorescence terminal, ferruginous tomentellous. Cincinni 3-1 flowered. Peduncles 0.4-0.6, pedicels 0.4-0.9 cm long. Flower-bud straight or subrecurved, acute or acuminate, 1.5-2.0 × 0.2-0.3 cm. Spur 0.4-1.2 × 0.1 cm, recurved or straight, apex incrassate. Centre petal spatulate or oblanceolate, as long as the stamen, acute, nearly twice as long as the linear-oblong lateral ones. Stamen villose; anther linear-oblong, base barbate; filament 0.4-0.5 cm long. Staminodes about 0.1 cm long. Style cylindrical. Stigma terminal, small, diameter about 0.05 cm. Capsule oblong, verruculose; apex truncate.

**T y p e:** The type of the subspecies is identical with the type of the species. Bongard does not indicate a type-specimen, but this is almost certainly Riedel s.n. at Serra da Lapa in LE (see obs.). The LE specimen has not been seen by the present author, but he saw several duplicates).

**D i s t r i b u t i o n:** In the region of the campos of Minas Geraes. BRAZIL, Minas Geraes: Serra da Lapa, Santa Luzia, Riedel s.n. type (GH, G-BOIS, K, NY, P); Libon s.n. in herb. Lund, type of *V. quadrangulata* Warm. (C); Barreto 7120 (F); - 7121 (F, US); - 8515 (F); -8591 (F); Gardner 4552 (BM, K); Brade 13896 (RB); Hilaire B<sub>1</sub> 1966 (P).

**E c o l o g y:** In "capao" in the region of the campos. Fl.: June-Nov.

**V e r n a c u l a r n a m e s:** Canella ruiva (sec. Glaziou l.c.).

**O b s e r v a t i o n:** See observation under spp. *laurifolia*.

ssp. *laurifolia* (Warm.) Staf1. nov. comb. *Vochysia laurifolia*

*Warm.* 1875 p. 96 t. XVII fig. 1; - 1889 p. 27; Wille 1882 p. 180 seq. (anat.); Glaziou 1905 p. 33; Correa 1926 p. 454 (uses, wood).

Flanks of the young branchlets flat, convex or slightly sulcate. Leaves coriaceous; blade 8-11 × 2-3 cm, mostly about four times longer than wide, elliptic-oblong, oblong or rarely lanceolate; veins subprominent beneath.

Type: Glaziou 12 in BR (lectotype).

Distribution: Contrary to the inland distribution of the spp. *quadrangulata*, this subspecies shows a coastal distribution on the Atlantic slopes of the Brazilian Plateau.

BRAZIL, Rio de Janeiro: Numerous collections in particular by Glaziou (numbers: 12 type; 672; 3950; 3951; 6141; 6164; 8672, 10735) mainly in the immediate vicinity of the town itself and on the Orgaos Mountains. Ceara: Sussuanhã, Löfgren 343 (S). Bahia: Kegel 12412 (W); Blanchet 239 (P); - 3347 (BM, BR, C, G-BOIS, NY, OXF, P, W). No locality: Riedel s.n. (BM, G-BOIS, GH, NY, OXF, P, S, US, W); Hilaire s.n. (K, NY).

Ecology: In rain forest on coastal slopes. Fl. juv.: Oct. Fl.: Oct.-Mar.; Fr.: Jan.-Mar.

Vernacular names: Rio de Janeiro: Canella murici, Canella santa.

Observation 1: Although Bongard mentions no type specimen of his *V. acuminata*, he does mention localities and it may be assumed that he described material of Riedel. The locality, the drawing and the ample description correspond exactly with Riedel s.n. from Serra da Lapa. This specimen was amongst those used by Warming (1875) in redescribing his *V. quadrangulata*. The locality and the mentioning of the fruits (Riedel collected fruits only of spp. *quadrangulata*) contradict Warming's remark (l.c. p. 97 obs. II) that *V. acuminata* Bongard might be identical with *V. laurifolia* Warm. This *V. laurifolia* belongs in my opinion to the same species, because of the exactly alike flowers and the absence of indumentum on the adult leaves. The leaves differ in shape, thickness, nervation and dimensions, which characters justify the rank of a subspecies. *V. acuminata* Bongard has now been divided in two subspecies, Bongard's type belongs to the subspecies *quadrangulata*. The earliest epithet of the subspecies which includes the type of the species is of course "*acuminata*" but for obvious practical reasons I think that the epithet "*quadrangulata*" is to be preferred.

Observation 2: *Vochysia acuminata* Pohl ex Ettingshausen 1861 p. 185 is identical with *V. pyramidalis* Mart.

87. *Vochysia rectiflora* Warm. in Flora Bras. XIII, II p. 96; - 1889 p. 27; Glaziou 1905 p. 33.

Inflorescences, leaves beneath and young branchlets subsericeous canescent ferruginous tomentose. Young branchlets quadrangular, adult parts subterete. Stipules deltoid, about 0.1 cm long. Leaves opposite. Petioles 1.0-1.5 × 0.1-0.2 cm, slightly pilose. Blade 7-12 × 3-5 cm, oblong, apex abruptly or gradually acuminate; base obtuse or acute. Upper surface of the leaves glabrous, nervation not prominent; lower surface with a distinctly prominent nervation.

Lateral nerves subparallel, angle with the midrib about 60', 15-20 major ones, minor ones in between, straight but curved upwards near the margin, ending in the margin or irregularly anastomosing, no marginal nerve. Major veins obliquely transversal, minor ones reticulate. Inflorescence terminal, densiflorous. Cincinni 2-1 flowered. Peduncles and pedicels each 0.4-0.7 cm long. Flower-bud straight, acuminate or acute, about 1.5 cm long and 0.2 cm wide. Spur 0.6-0.8 × 0.1 cm, recurved, apex subglobose. Centre petal lanceolate, acute, subchartaceous, as long as the stamen, nearly twice as long as the linear-oblong lateral ones. Stamen ferruginous villose; anther linear; base barbate; filament about 0.4 cm long. Staminodes about 0.1 cm long. Style cylindrical. Stigma small, partly lateral, diameter about 0.05 cm. Capsule unknown.

**Type:** Sello s.n. in K. (Warming's original specimen may have been the Berlin one).

**Distribution:** BRAZIL, Minas Geraes: Vicosas, Kuhlmann RB 57593 (RB, U); Tijuco (Diamantina), Vauthier s.n. (P). No locality: Sello s.n. type (BM, K, L, NY, P, US); Glaziou 8671 (C, P).

**Ecology:** In campo regions. Fl.: reports from June and Dec.

var. **glabrescens** Warm. in Vid. Med. Nat. His. För. 1889 p. 27.

Indumentum less developed; leaves puberulous beneath, slender, about four times longer than wide: base of the leaves acute.

**Type:** Glaziou 13434 in C.

**Distribution:** BRAZIL, Rio de Janeiro, Serra Orgaos, Petropolis, Glaziou 13434 type (C, G-DEL, K, P); - - 10734 cotype (BR, C, G-DEL, P).

**Ecology:** In the region of the coastal rain forests. Fl. et Fr. juv.: Dec.

**Vernacular name:** BRAZIL, Rio de Janeiro: Canella ruiva.

88. **Vochysia dasyantha** Warm. in Flora Bras. XIII, II p. 95; - 1889 p. 27; Glaziou 1905 p. 33.

Young branchlets obtusely quadrangular. Stipules 0.20-0.35 cm long, linear-lanceolate, base slightly incressate. Leaves opposite. Petioles 1.2-1.6 × 0.2 cm. Blade 13-17 × 4.5-6.5 cm, oblong; apex shortly acuminate and mucronate, top less than 1 cm long; base obtuse. Upper surface of the leaves glabrous, veins subconspicuous, nerves not prominent; lower surface ferruginous puberulous, in particular along the nervation, lateral nerves sharply prominent. Lateral nerves straight or slightly curved, major ones making an angle of 70-80' with the midrib, minor ones making a somewhat larger angle, mostly ending in the - flat - margin. No marginal nerve. Large veins irregularly obliquely transversal. Inflorescence terminal

and rarely axillary, ferruginous tomentose, densiflorous. Cincinni mostly 1-flowered, making an angle with the rhachis of about 60-90'. Peduncles and pedicels together up to 1.5 cm long. Bracts lanceolate or ovate, up to 0.8 cm long. Small groups of persistent bracts are gathered around the axils of the cincinni. Flower-bud straight or subrecurved, up to 2.5 × 0.3 cm, acute. Spur recurved, 0.5-0.7 cm long and about 0.1 cm wide. Petals linear, obtuse; centre one as long as the stamen, nearly twice as long as the lateral ones. Anther linear-subclavate, apex obtuse, inside villose, base semi-abruptly narrowed towards the 0.5 cm long villose filament. Stamnodes 0.10-0.15 cm long. Style subcylindrical. Stigma terminal, small. Capsule unknown.

Type: Gardner 4549 in K.

Distribution: BRAZIL, Rio de Janeiro: Nova Friburgo, Glaziou 20296 (BR, K, P); Santa Gallo, Peckolt 189 cotype (BR). Minas Geraes: Serra Frasco, Schwacke 15060 (RB, U); Rio S. Antonio, Sello s.n., cotype (BM, G-BOIS, K, L, P, US); Gardner 4594 type (BM, G-BOIS, GH, K, NY, OXF, P, US, W); Gaudichaud s.n. (P). Locality unknown: Lhotsky s.n. (W); Otto s.n. (C).

Ecology: Unknown. Fl.: Sept.-Nov.

89. *Vochysia spathulata* Warm. in Vid. Med. Nat. För. 1889 p. 25; Glaziou 1905 p. 33.

Stipules about 0.1 cm long, deltoid-acuminate. Leaves in tetra- rarely penta- or hexamerous whorls. Petioles 0.6-1.0 cm long. Blade spatulate, 6-10 × 2.0-2.5 cm; apex rounded and retuse; base acute; upper surface glabrous except for some hairs on the midrib of young blades; lower surface of young blades ferruginous tomentellous, of older blades glabrescent. Nervation reticulate, not prominent on either side. Lateral nerves very thin, numerous, angle with the midrib 70-80', ending in an undulate marginal nerve at about 0.1-0.2 cm from the flat margin. Inflorescence terminal, cylindrical, densiflorous, slightly brownish pilose. Cincinni 1-3 flowered. Peduncles about 0.5 cm, pedicels 0.5-1.0 cm long. Flower-bud about 1.0 × 0.2-0.3 cm, obtuse or subacute, recurved. Spur mostly straight, angle with the pedicel often about 90', 0.7-0.9 cm long, slightly attenuate, apex incrassate and discolor. Petals spatulate, unequal, back subpilose, apex densely ciliate, length of the centre one 2/3-1/1 of that of the stamen. Anther subclavate, adpressed brownish pilose on the back, base gradually narrowing towards the 0.2-0.3 cm long glabrous filament. Stamnodes about 0.1 cm long. Style slightly incrassate towards the apex. Stigma terminal, subcapitate, subtrilobed, diameter about 0.08 cm. Capsule unknown.

Type: Glaziou 6876 in C.

Distribution: BRAZIL, Rio de Janeiro: Nova Friburgo, Glaziou 6876 type (C, K, P, S); Dux d'Abrantes (C). Bahia: Kegel 12455 (W).

Ecology: Unknown, but collected in the region of the coastal rain forests. Fl.: Jan.-Feb.

Observation: Warming (l.c.) put this species and the next one (-1875 p. 96) with the "*Lutescentes*". The pilose staminodes and stamen however together with the subpilose petals are characters of the "*Ferrugineae*".

90. *Vochysia selloi* Warm. in Flora Bras. XIII, II p. 86; *Vochysia sellowii* Malme 1900 p. 49.

Glabrous. Branchlets greyish brown, subterete. Stipules deltoid,  $0.1 \times 0.1$  cm. Leaves in tetra- or trimerous whorls. Petioles about 1.5 cm long. Blade  $8-15 \times 2.5-4.5$  cm, spatulate or elliptic-spatulate; apex rounded and sometimes slightly retuse; base acute. Nervation reticulate, only above slightly prominent. Lateral nerves thin, 8-12 major ones, angle with the midrib about  $70^\circ$ , irregularly anastomosing, minor ones subconspicuous. No marginal nerve. Margin flat or subrevolute. Inflorescence terminal. Cincinni 2-5 flowered, firm, up to 6 cm long. Peduncles up to 1.5, pedicels up to 2.5 cm long (measured from upper bract),  $0.1-0.2$  cm wide. Flower-bud  $1.5-2.0 \times 0.3-0.4$  cm, subclavate, shining, acute, mostly straight. Spur straight or very slightly recurved, cylindrical,  $0.7-1.1 \times 0.1$  cm, subacute, angle with the pedicel  $30-90^\circ$ . Petals subchartaceous, in the bud as long as the stamen, spatulate-oblong, obtuse. Back and margins of the stamen adpressed pilose; anther linear-subclavate, apex obtuse, base with a 0.2 cm long sterile part narrowing towards a 0.2 cm long filament. Staminodes about  $0.15 \times 0.05$  cm, obtuse, apex with long brown cilia. Style subclavate, in adult buds bent near the base. Stigma terminal, flat,  $0.05 \times 0.05$  cm. Capsule unknown.

Type: Sello in B according to a photograph in F. The present author knows no duplicates, but the photograph is excellent and it is probable that in some herbarium unknown to him a duplicate exists; no lectotype is therefore suggested.

Distribution: BRAZIL, São Paulo: collected only on the Serra do Mar (Alto da Serra); Lemos 1947 (GH, S); Hoehne 1500 (NY); Brade 5895 (S); Mosen 3268 (S). Locality unknown, but probably in São Paulo or Parana: Sello coll. 1828 s.n. (B according to photograph in F) type.

Ecology: In Forest on the Serra do Mar., 800-900 m. Fl.: Feb.

Observation: See observation under number 89.

91. *Vochysia schomburgkii* Warm. in Flora Bras. XIII, II p. 78.

Small tree. Branchlets subterete, glabrous; young parts quadran-

gular, appressed pilose. Stipules deltoid, about 0.1 cm long. Leaves opposite. Petioles about 1 cm long. Blade 9-14 × 3-6 cm, thin, apex acuminate, base obtuse, dull and glabrous above; lower surface of the young leaves ferruginous pubescent, in particular along the nervation, later on glabrescent. Lateral nerves prominent only beneath, angle with the midrib about 70°; 10-12 major ones, elegantly curved, ending in the margin or vanishing in the network of the veins. No marginal nerve. Veins nowhere prominent. Margin flat. Inflorescence terminal, cylindrical, ferruginous tomentose. Cincinni 2 (-1) flowered. Peduncles 0.3-0.4, pedicels 0.4-0.7 cm long. Flower-bud obtuse, recurved, 1.0-1.3 × 0.2-0.3 cm. Spur straight or slightly curved, angle with the pedicel often about 90°, constricted near apex and base. Only the centre petal is present, chartaceous, about half as long as the stamen, back densely ferruginous tomentose. Stamen densely tomentose on the ventral side; anther linear, gradually narrowing towards the 0.2-0.3 cm long filament. Staminodes about 0.05 cm long, glabrous or rarely with some cilia (N.B. further material necessary). Style subincrassate towards the apex. Stigma terminal, capitate, orbicular, diameter about 0.05 cm. Capsule unknown.

Type: Schomburgk 902/1360 in K.

Distribution: BRITISH GUIANA, Berbice River, Wiruni Ck., Forest Dept. 2613 (IFI, K); Makauria Ck. For. Dept. 3260 (K, NY, U); Essequibo, For. Dept. 155 (IFI); Tapacoona, Jenman 7802 (K, NY); Upper Demarara, Jenman 4276 (K); Schomburgk 902/1360 (BM, G-DEL, K, P, W) type.

Ecology: In swamp savannas. Fl.: reports from July and Feb.

Vernacular names: BRITISH GUIANA: Ité Balli (Arowaccan); Tuacoo.

Observation: See general section p. 408. See also obs. under the next species.

92. *Vochysia eximia* Ducke in Arch. Jar. Bot. Rio I 1915 p. 45; - 1922 p. 194 (wood); - 1938 p. 34; Lecointe 1934 p. 386 (wood).

Tree of medium size. Branchlets thick, subterete. Stipules thick, deltoid, 0.05-0.10 cm long, base 0.1-0.2 cm wide. Leaves opposite. Petioles firm and thick, 3.0-4.5 × 0.3-0.5 cm, subpuberulous. Blade 15-42 × 6-14 cm, elliptic or oblong, rigidly coriaceous; apex acuminate, top 1-4 cm long, acute; base variable. Upper surface of the leaves shining, yellowish green, nervation scarcely prominent; lower surface splendid, rufous ferruginous tomentellous, of older leaves glabrescent. Lateral nerves thin, sharply prominent beneath, straight or slightly curved, parallel, angle with the midrib 70-80°, divided in major and minor ones, ending in a subundulate marginal nerve at about 0.1 cm from the margin. Veins reticulate, meshes wide. Margin

entire or subundulate, subrevolute. Inflorescence terminal, densiflorous, shortly cylindrical or subglobose, some parts puberulous. Cincinni mostly 2 flowered. Peduncles about 1 cm long, pedicels 1-2 cm long, incrassate towards the apex. Flower-bud 2-4 × 0.3-0.4 cm, cylindrical, straight or subrecurved, apex rounded. Spur 1.0-1.2 × 0.3-0.4 cm, stretched along the pedicel. Lateral petals absent. Length of the centre petal 1/4-1/3 of that of the stamen, ovate, densely tomentellous. Ventral side of the anther tomentose, back subpuberulous, base barbate; anther linear, apex subacute, base bauriculate or subsagittate; filament about 0.3 cm long. Staminodes if present (N.B.) glabrous, about 0.05 cm long. Style subclavate. Stigma terminal, capitate, orbicular, diameter about 0.15 cm. Capsule 5-6 × 2-3 cm, oblong, glabrous, black, verruculose, apex subapiculate; one per peduncle.

**Type:** Ducke PG 10519 in PG.

**Distribution:** Northern Amazonia. BRAZIL, Para: Faro, Ducke PG 10519 type (BM; PG acc. to fragment and photograph in F); - - PG 15678 cotype BM, F, US; PG and B acc. to photographs in F); - - PG 15903 (BM, G-DEL, P, US); - - RB 5724 (G-BOIS, K, NY, P, RB, S, U, US). AMAZONAS: Rio Curucuryary, Ducke RB 34644 (G-DEL, K, P, S, U, US).

**Ecology:** In Faro in swampy forests on sandy soil with black humus along a rivulet in a campo region. Along the Curucuryary in catinga on upland. Fl.: Nov.-Feb. Fr.: Dec.-Feb.

**Observation:** See general section p. 407. Glabrous staminodes are an unusual feature in this subsection (*V. eximia*, *V. maxima* and probably *V. schomburgkii*) (see also observ. under 69, *V. maxima*). It might be possible to put the monopetalous *V. eximia* and *V. schomburgkii* in a separate subsection on account of petals and staminodes. This is inadvisable: 1. because of the fact that *V. maxima* is a tripetalous species of the *Ferrugineae* with glabrous staminodes; 2. because of the fact that the staminodes of *V. schomburgkii* are incompletely known.

93. *Vochysia punctata* Spruce ex Warm. in Flora Bras. XIII, II p. 102.

“Lofty tree”. Branchlets, inflorescences and flower-buds ferrugineous puberulous; petioles and leaves beneath flavescent ferrugineous puberulous. Branchlets obtusely quadrangular, flanks flat or subconcave. Stipules 0.1-0.2 cm long, subulate. Leaves opposite. Petioles 1.5-2.5 cm long, striate, rugulose. Blade 8-11 × 4.0-5.5 cm, cuneate, obovate or nearly elliptic, firm; apex truncate or rounded, retuse, sometimes minutely apiculate; base cuneate. Upper surface of the leaves glabrous, subnitid, nervation impressed; lower surface with numerous elevated points, nervation subprominent. Lateral nerves thin, slightly curved, 10-15 major ones, angle with the midrib about 60°, ending in an undulate marginal nerve at about 0.05-0.10 cm from the margin. Venation reticulate, subdistinct in adult blades,

major ones irregularly obliquely transversal. Margin subrevolute, entire or subundulate. Inflorescence terminal, elongate cylindrical. Cincinni 2-4 flowered. Peduncles 0.2-0.4, pedicels 0.6-0.8 cm long. Flower-bud mostly 1.6-1.8 × 0.3 cm, cylindrical or subclavate, recurved or nearly falcate. Spur incurved, apex touching the pedicel, about half as long as the fourth calyx-lobe, subinflated, base constricted. Petals absent. Stamen with pilose margins, anther linear, acute, base rounded or biauriculate, filament 0.1-0.2 cm long. Staminodes if present (N.B.) ovate, obtuse, pilose, about 0.1 cm long. Style subincrassate towards the apex. Stigma terminal, capitate, diameter about 0.05 cm. Capsule large (up to 5 cm sec. Warm.).

Type: Spruce 2675 in K.

Distribution: BRAZIL, Amazonas: Panuré on Rio Uaupès, Spruce 2675 type (BM, BR, G-BOIS, GH, K, NY, OXF, P, W).

Ecology: "In forest". Fl.: Nov.

Observation: See general section p. 407. The characters of the stamen, the staminodes and the indumentum on the vegetative parts bring this apetalous species to the "*Ferrugineae*".

94. *Vochysia majuscula* Pilger in Notizbl. Berl. XI 1931 p. 297.

Tree of medium size. Branchlets shortly ferrugineous tomentelous, glabrescent, subterete or obtusely quadrangular. Stipules inconspicuous. Leaves opposite. Petioles up to 2 cm long. Blade elliptic or oblong, 12-14 × 4.5-5.5 cm; apex rounded and abruptly acuminate, top about 1.0 cm long; base cuneate. Upper surface of the leaves glabrous, nervature not prominent or subimpressed; lower surface shortly ferrugineous tomentelous, glabrescent, lateral nerves prominent. Lateral nerves up to 20, thin, angle with the midrib about 60°, ending in an undulate marginal nerve at 0.1-0.2 cm from the margin. Veins subconspicuous on either side, partly obliquely transversal. Margin flat or subrevolute, entire or subundulate. Inflorescence terminal, laxiflorous. Cincinni 1-2 flowered. Rhachis firm. Peduncles about 0.5, pedicels about 0.5-1.0 cm long. Flower-buds absent in type specimen. Fourth calyx-lobe up to 2.5 × 0.8 cm, falcate recurved (after anthesis). Spur thick, incurved, 0.8-0.9 cm long. Petals? Stamen with a short filament. Stigma terminal, truncate.

Type: Tessmann 4797 in B, photograph in F.

Distribution: PERU, Loreto: Basin of R. Marañon, between Iquitos and Pongo de Manseriche, Tessmann 4797 type (Photograph of Berlin type in F).

Ecology: Tropical rain forest. 155 m. Fl.: Dec.

Observation: See General section p. 407 and 408. The present author saw only a photograph of the type specimen. Duplicates or other

collections are unknown to him. According to the available facts this specimen is closely related to *V. punctata* (no. 93) (indumentum, nervation, petioles, inflorescence, shape and dimension of flowers and spur, apical stigma, probable absence of petals) but it seems to differ from it in several points, which might give it the rank of species. These differences are: Leaves 12-14 cm long, elliptic-oblong, acuminate, top about 1.0 cm long, major lateral nerves up to 20, marginal nerve at 0.1-0.2 cm from the margin, cincinni 1-2 flowered.

### Section C: *PACHYANTHA* Staf. nov. sect.

Non decorticantes. Inflorescentia, ramuli novelli et folia subtus ferrugineo-tomentelli vel tomentosi. Stipulae persistentes vel caducae. Alabastra magna, crassa. Petala absunt. Stamen villosum. Stigma terminale parvum. Ovarium tomentosum.

Inflorescences, young parts of the branchlets and leaves beneath ferruginous tomentellous or tomentose (rarely hirtellous). Cortex of the branchlets not exfoliating. Stipules 0.1-0.3 cm long, acute, persistent or dropping late. Leaves in tri- or tetramerous whorls, rarely opposite. Marginal nerves undulate, running at 0.1-0.2 cm from the margin. Major veins if conspicuous irregularly obliquely transversal. Margin entire. Inflorescence multi- and densiflorous. Cincinni 1-2 flowered. Flower-buds large, thick. Petals absent. Stamen densely villose, in particular on the back. Staminodes 0.05-0.10 cm long. Stigma terminal, small. Ovary tomentose.

**Distribution:** In isolated localities throughout tropical South America.

**Observation:** See general part. p. 407.

### Key to the species.

1. *a.* Leaves discolor, densely canescent ferruginous tomentellous beneath. Petioles 1.2-1.8 cm long. Leaves 10-13 cm long . . . . . 97. *V. pinkusii* A. C. Smith.
- b.* Leaves not discolor although pilose beneath. Petioles much shorter or leaves almost sessile. . . . . 2
2. *a.* Leaves almost sessile: petioles 0.0-0.3 cm long. Leaves in trimerous whorls, 8-17 cm long on tops of flowering branchlets. Spur slender, subincurved. . . . . 96. *V. leguiana* Macbride.
- b.* Petioles 0.5-1.0 cm long. Leaves 20-30 × 7-11 cm. Spur inflated, thick, incurved, apex touching the pedicel . . . . . 95. *V. pachyantha* Ducke.

95. *Vochysia pachyantha* Ducke in Arch. Inst. Biol. Veg. IV 1938 p. 36.

Small tree. Branchlets subterete, ultimate parts 0.8-1.0 cm wide.

Stipules broadly deltoid, about 0.2 cm long, pilose. Leaves in tetramerous whorls. Petioles 0.5-1.0 × 0.3-0.7 cm, pilose, base incrassate. Blade 20-30 × 7-11 cm, generally elliptic, rigidly coriaceous; apex abruptly acuminate, top fragile and often deficient; base obtuse. Upper surface of the leaves shining, sparsely hirtellous; lower surface hirtellous, in particular along the nervation, lateral nerves sharply prominent, veins prominent. Lateral nerves making an angle of about 70° with the midrib, 25-30 major ones, minor ones only near the apex and the base, straight, ending in a marginal nerve at about 0.1-0.2 cm from the subrevolute margin. Major veins subparallel and obliquely transversal, minor ones reticulate. Inflorescence terminal, cylindrical. Rhachis 0.8-1.0 cm wide at the base. Peduncles 0.5-0.7, pedicels 0.5-1.0 cm long, incrassate towards the apex. Flower-bud 2.0-2.5 × 0.3-0.5 cm, recurved, obtuse or subacute, ferruginous subsericeous. Spur recurved, its apex touching the pedicel, inflated, 0.7-0.9 cm long, base constricted. Living flowers ferruginous outside, yellow inside. Apex of the anther obtuse; filament about 0.1 cm long. Staminodes glabrous, lingulate, about 0.15 cm long. Style incrassate towards the apex. Stigma capitate, diameter about 0.1 cm. Capsule unknown.

Type: Ducke 34653 in RB.

Distribution: BRAZIL, Amazonas: Rio Curucury (affl. Rio Negro), Ducke RB 34653 type (G-DEL, K, NY, P, RB, S, U, US).

Ecology: In upland forest. Fl.: Feb.

96. *Vochysia leguiana* Macbride in Field Mus. Bot. VIII 1930 p. 121.

Large or medium sized tree. Branchlets subterete, the ultimate parts about 0.6 cm wide with lighter coloured lines running down from the stipules. Stipules 0.2-0.3 cm long, ovate. Leaves in trimerous whorls. Petioles 0.0-0.3 cm long (rarely up to 0.8 cm). Blade up to 17 × 7 cm, obovate or spatulate, coriaceous or chartaceous; apex rounded or abruptly cuneate and plicate; base very gradually cuneate. Upper surface of the leaves dull, subpuberulous, nervation impressed; lower surface densely tomentose, in particular along the nervation, lateral nerves sharply prominent. Lateral nerves strictly parallel, slightly curved upwards, angle with the midrib about 50°. Margin subrevolute. Inflorescence terminal and axillary, cylindrical. Cincinni mostly 1-flowered. Bracts linear-lanceolate. Peduncles 0.2-0.4 cm, pedicels 0.4-0.6 cm long, slender. Flower-bud about 1.5 × 0.2 cm, cylindrical, straight or subrecurved, obtuse, slightly puberulous. Spur about 0.5 × 0.1 cm, stretched along the pedicel, subincurved. Anther obtuse or subacute; base with a 0.3 cm long

sterile part gradually narrowing towards the 0.3 cm long filiform filament. Staminodes glabrous, about 0.05 cm long, variable. Style cylindrical. Capsule unknown.

Type: Schunke 434 in F.

Distribution: PERU, Junin, Chanchamayo Valley, Schunke 434 type (F, G-DEL fragm.).

BOLIVIA, La Paz: Mapiri region, San Carlos, Buchtien 1702 (NY, US).

VENEZUELA, Amazonas: Yavita, Ll. Williams 14162 (F).

Ecology: In rain forest. Fl.: Dec.-Feb.

97. *Vochysia pinkusii* A. C. Smith in Bull. Torr. Bot. Cl. 67 1940 p. 288.

Tree of medium size. Branchlets firm, ultimate parts 0.4-0.7 cm wide, obtusely angled, flanks flat or subconcave. Stipules 0.1-0.2 cm long, subulate, corresponding to the ribs. Leaves opposite or in trimerous whorls. Petioles 1.2-1.8 × 0.2-0.3 cm, base incrassate. Blade oblong or broadly elliptic, 10-13 × 4.5-7.0 cm, rigidly coriaceous; apex abruptly and shortly acuminate, top 0.5-0.9 cm long; base obtuse. Upper surface of the leaves glabrous, shining, with numerous elevated points, lateral nerves not prominent; lower surface contrasting with the upper one because of the ferruginous indumentum; lateral nerves subprominent. Lateral nerves thin, curved upwards, angle with the midrib about 70°, about 15 major ones, minor ones in between. Veins inconspicuous on either side. Inflorescence terminal and axillary, broadly cylindrical. Peduncles 0.3-0.5 cm, pedicels 0.5-0.8 cm long. Flower-bud straight or sub-curved, acute, ferruginous puberulous, 2.0-2.5 × 0.3-0.4 cm. Flowers chrome coloured. Spur stretched along the pedicel, straight or slightly S-shaped, 0.6-0.8 × 0.1 cm. Apex of the anther acuminate; base short, cuneate; filament 0.1-0.2 cm long. Staminodes deltoid, obtuse, about 0.05-0.10 cm long, pilose. Style cylindrical, glabrous except for the base. Stigma subcapitate, diameter about 0.07 cm. Capsule unknown.

Type: Pinkus 167 in NY.

Distribution: BRAZIL, Amazonas: Maurukow Ck., tributary of the Rio Cotinga near the Venezuelan Boundary, Pinkus 167 type (G-DEL, GH, IFI, K, NY, S, US).

Ecology: 1350 m. in mixed forest. Fl.: Jan.

### DUBIOUS SPECIES.

98. *Vochysia radlkoferi* O. Kuntze 1896 p. 12 is the species brought by Kuntze to the section or genus *Vochyopsis*, discussed on p. 403. It does not belong to *Vochysia* but the material (Kuntze s.n. Bolivia, fruct. in NY) is too incomplete to allow any determination.

99. *Vochysia racemosa* Poir. 1808 p. 682, has a globose, univalvate capsule. It therefore does not belong to *Vochysia*. I have not seen the type specimen.

100. *Vochysia verticillata* Dietr. 1831 p. 104 is unknown to me. Sprengel (1825 p. 17) and De Candolle (1828) mention a *Qualea verticillata*.

#### D. LITERATURE.

- BAILLON, H. 1874. Histoire des Plantes V 1874 p. 93.  
 — 1892. Dictionnaire de Botanique, Vol. IV 1892 p. 10, 264.  
 BECKMAN, P. 1908. Vochysiaceae novae austro-americanae. Engl. Bot. Jahrb. XL 1908 p. 279.  
 BENTHAM AND HOOKER, 1862-1867. Genera Plantarum I p. 975 seq.  
 BENOIST, R. 1915. Contribution à l'étude de la flore des Guianes, Vochysiacees. Bull. Soc. Bot. Fr. 62 1915 p. 235.  
 — 1919. Contribution à l'étude de la flore des Guianes. Bull. Soc. Bot. Fr. 66 1919 p. 317.  
 — 1931. Les Bois de la Guiane Française. Arch. d. Bot. V mém. 1, 1931 p. 162 seq.  
 BOERMAN, W. E. 1946. Klimaat. Noorduijn's Wetensch. Reeks 25, 1946.  
 BONGARD, H. G. 1840. Plantae quatuor brasiliensis novae. Mém. Acad. Pétersb. Sér. VI. Sc. Nat. III afd. II 1840 p. 5, 7.  
 BOUILLENNE, R. 1930. Un voyage Botanique dans le Bas Amazone. In: Miss. Biol. belge au Brésil II 1930.  
 BRIQUET, J. 1919. Decades Plantarum Novarum vel minus Cognitarum. Ann. Cons. Jard. Bot. Genève 20 1919 p. 342 seq.  
 CANDOLLE, A. P. DE, 1828. Prodromus syst. nat. reg. veg. etc. Paris 1828. Vol. III p. 25 seq.  
 COINTE, P. LE, 1934. A Amazonia Brasileira. III, Arvores e Plantas Uteis. Para 1934.  
 CORREA, M. P. 1926. Diccionario das Plantas Uteis do Brasil. Vol. I. Rio de Janeiro 1926.  
 — 1931. Diccionario das Plantas Uteis do Brasil. Vol. II. Rio de Janeiro 1931.  
 CUATRECASAS, J. 1946. Notas a la Flora de Colombia VIII. Rev. Acad. Colomb. Cienc. Ex. VI 1946. V. pacifica on p. 548.  
 DALLA TORRE, C. G. et H. HARMS, 1900. Genera Siphonogamarum.  
 DIETRICH, A. 1831. Caroli a Linné Species Plantarum ed. Sexta. Vol. I.  
 DIETRICH, D. 1839. Synopsis Plantarum Vol. I 1839.  
 DUCKE, A. 1913. Exploracoes scientificas no Estado do Para. Bol. Mus. Goeld. VII 1913 p. 171.  
 — 1915. Plantes Nouvelles ou peu connues de la région Amazonienne. I. Arch. Jard. Bot. Rio. I 1915 p. 5 seq.  
 — 1922. Plantes nouvelles etc. II. Ibid. III 1922 p. 3 seq.  
 — 1930. Plantes nouvelles etc. IV. Ibid. V 1930 p. 99 seq.  
 — 1932. Bull. Mus. Nat. His. Par. 1932. Sér. II IV p. 738 seq.  
 — 1933. Plantes nouvelles etc. V. Arch. Jard. Bot. Rio VI 1933 p. 1 seq.  
 — 1935. Plantes nouvelles etc. VIII. Arch. Inst. Biol. Veg. II 1935 p. 27 seq.

- 1938. *Plantes nouvelles etc.* X. *Ibid.* IV 1938 p. 31 seq.
- 1943. New forest trees and climbers of the Brazilian Amazon. *Trop. Woods* 76 1943 p. 16 seq.
- 1944. *Flora do Rio Urubu.* Bol. Minist. Agric. June 1944.
- 1945. New forest trees and climbers of the Brazilian Amazon V. Bol. Tec. Inst. Agron. Norte 4 1945 p. 14.
- DUGAND, A. 1945. On the vegetation and plant resources of Colombia. In: Verdoorn 1945 p. 289.
- ENDLICHER 1836-1840. *Genera Plantarum.* Wien. 1836-1840.
- ENGLER, A. 1912. *Syllabus der Pflanzenfamilien.* 7 Aufl. 1912.
- ETTINGSHAUSEN 1861. *Die Blattskelete der Dikotyledonen.* Wien 1861.
- EVERDINGEN, E. VAN. 1947 *Klimaat van Zuid Amerika.* Winkler Prins' Alg. *Encycl.* 6e druk. Vol. I p. 753.
- GARCKE, 1849. *Plantae Kegelianae Surinamensis.* *Linnaea* XXII 1849 p. 58.
- GEEL, P. C. VAN. 1828 seq. *Sert. Bot. Coll.* I.
- GLAZIOU, A. F. M. 1905. *Plantae Brasiliensis centralis, etc.* *Bull. Soc. Bot. Fr.* 52 1905 mém. 3.
- GMELIN, J. F. 1791. *Caroli a Linné Systema Naturae ed. 13.* 1791.
- GOYENA, M. G. 1909. *Flora Nicaraguense.* Managua 1909.
- GRAHAM, E. H. 1933. *Flora of the Kartabo Region Br. Guiana;* *Ann. Carn. Mus.* XXII 1933.
- HAYEK, A. 1926. *Algemeine Pflanzengeographie.* Berlin 1926.
- HEMSLEY, W. B. 1888. *Botany in "Godman and Salvin Biologia Centr. Amer."* London 1879-1888. Vol. I p. 65.
- HIERONYMUS, G. 1895. *Plantae Lehmannianae etc.* *Engl. Bot. Jahrb.* 1895 XX Beibl. 49.
- HILAIRE, A. DE ST. 1820. *Mémoire sur la nouvelle famille des Vochisiées.* *Mém. Mus. Hist. Nat. Par.* VI p. 253, IX p. 340.
- 1824/1946. *Esquisse de mes Voyages, etc.* *Reprint Chron. Bot.* X no. 1 1946.
- HUBER, J. 1898. O "Muricy" da Serra dos Orgaos. *Bol. Mus. Para II* 1898 p. 382.
- 1910. *Mattas e madeiras amazonicas.* *Bol. Mus. Para.* VI 1909 p. 91 seq.
- HUMBOLDT, A. VON. 1849. *Ansichten der Natur.* I p. 150 (*Descr. llanos*).
- HUTCHINSON, J. S. 1926. *The families of Flowering Plants.* Vol. I.
- JACKSON, B. D. 1900. *A Glossary of Botanic terms.* London 1900.
- JUSSIEU, A. L. DE. 1774/1789. *Genera Plantarum.* Paris. 1789.
- KONIG, CH. 1806. *Review of Vahl's Enumeratio.* *Ann. Bot.* II 1806 p. 179.
- KÖPPEN, W. 1931. *Grundriss der Klimakunde.* Berlin and Leipzig 1931. ref. Boerman 1946.
- KÖPPEN, W. und GEIGER R., *Handbuch der Klimatologie II.* 1931. ref. Stone 1945.
- KUNTZE, O. 1898. *Revisio Generum Plant.* III 2 1898 p. 11, 12.
- LAMARCK, J. 1791. *Tableau encycl., III. Genres.* I 1791.
- LANJOUW, J. 1932. *Über die Verwendung des Begriffes „Varietät“ in taxonomischen Arbeiten.* *Rec. Trav. Bot. Néerl.* XXIX 1932 p. 36. *Med. Bot. Mus. Utr.* 3.
- 1936. *Studies . . . Suriname savannahs and swamps.* *Ned. Kruid. Arch.* 46, p. 823, *Med. Bot. Mus. Utr.* 33.
- 1939. *On the standardisation of herbarium abbreviations.* *Chronica Bot.* V 1939 p. 142.
- 1945. *On the location of Botanical Collections from Central and South America.* In: Verdoorn 1945 p. 224.
- et H. UITTEN 1940. *Un nouvel herbier de Fusée Aublet découvert en*

- France. Rec. Trav. Bot. Néerl. XXXVII 1940 p. 133. Med. Bot. Mus. Utr. 75.
- LEMEE, A. 1935. Dictionnaire descriptif etc. V p. 936; VI p. 883.
- LIAIS, E. 1872. Climats, géologie, faune et géographie botanique du Brésil. Paris 1872.
- LINDLEY. 1853. The vegetable Kingdom 1853.
- LINK, H. F. 1820. Jahrbücher der Gewächskunde. Vol. I Heft III 1820.
- LUETZELBOURG, PH. VON. 1923. Estudo Botanico do Nordéste. Rio de Janeiro 1923 vol. III.
- LUNDELL, C. L. 1945. The vegetation and natural resources of British Honduras. In: Verdoorn 1945 p. 271.
- MAAS GEESTERANUS, R. A. 1947. Revision of the Lichens of the Netherlands. I. Parmeliaceae. Thesis Leiden 1947.
- MACBRIDE, J. F. 1930. Spermatophytes, mostly Peruvian II. Field Mus. Bot. VIII no. 2 1930 p. 77 seq.
- 1931. Id. IV. Ibid. XI no. 2 1931 p. 39 seq.
- MALME, G. O. 1900. Ex herbario Regnelliano III. Bihang till. K. Svenska. Vet. akad. Handlingar 25 Afd. III no. 11 p. 44 seq.
- 1905. Die Vochysiaceen Matto Grossos. Ark. Bot. V 1905 no. 6.
- 1906. Vochysiaceae Mattogrossenses novae. Fedd. Rep. II 1906 p. 187.
- MARTIUS, C. F. P. VON. 1840-1869. Tabulae physiognomicae etc. In Flora Bras. I, pars 1.
- et J. G. ZUCCHARINI. 1824. Nova Genera et Species Plantarum. München 1824 Vol. I.
- MEISNER. 1836-1843. Plant. Vasc. Genera. I p. 119, II p. 85.
- MEYER, E. 1825. Plantarum surinamensium. Nov. Act. Leop. XII 1825 pars II p. 812.
- MEYER, G. F. W. 1818. Primitiae Florae Essequeboensis. 1818.
- MYERS, J. G. 1933. Notes on the vegetation of the Venezuelan llanos. Journ. Ecol. XXI 1933 p. 335.
- 1936. Savannah and Forest Vegetation of the Interior Guiana Plateau. Ibid. XXIV 1936 p. 162.
- NECKER, N. J. DE. 1791-1808. Elementa Botanica etc. Vol. II p. 126.
- OCHOTERENA, J. 1945. Outline of the geographic distribution of Plants in Mexico. In: Verdoorn 1945 p. 261.
- PETERSEN, O. G. 1896. Vochysiaceae in Engler und Prantl's Pflanzenfamilien Vol. III pars 4 p. 312. Nachtr. IV p. 163.
- PFEIFFER, Dr J. PH. 1926. De Houtsoorten van Suriname deel I. Med. Kon. Ver. Kol. Inst. 1926.
- PILGER, R. 1901. Beitrag zur Flora von Matto Grosso. Engl. Bot. Jahrb. 30 1901 p. 127 seq.
- 1930. Vochysiaceae in J. Mildbread: Plantae Tessmannianae Peruvianae IX. Notizbl. Berl. XI 1930 p. 295.
- 1937. Vochysiaceae in Burret, Plantae Duqueanae. Notizbl. Berl. XIII 1937 p. 489.
- 1939. Vochysiaceae in Diels. Neue Arten aus Ecuador II. Notizbl. Berl. XIV 1939 p. 323.
- PITTIER, H. 1917. A species of Vochysia redescribed. Contr. US Nat. Herb. 18 1917 p. 237.
- 1926. Manual de las Plantas Usuales Venez. 1926.
- and LL. WILLIAMS 1945. A review of the flora of Venezuela. In: Verdoorn 1945 p. 102.
- POHL, J. E. 1831. Plantarum Bras. Ic. et Descr. Vol. II Wien 1831.
- POIRET. 1908. Encycl. Meth. Bot. VIII 1808.

- POPENOE, W. 1945. Plant Resources of Guatemala. In Verdoorn 1945 p. 278.
- POST et KUNTZE. 1903. Lexic. Gen. Plant. 1903.
- PRESL, K. B. 1835-1836. Symbolae botanicae II.
- PULLE, A. A. 1906. An enumeration of the vascular Plants known from Surinam. Leiden 1906.
- RECORD, S. J. and R. W. HESS. 1944. Timbers of the New World. New Haven 2nd. print 1944.
- and C. D. MELL. 1924. Timbers of tropical America. New Haven 1924.
- REES. 1819. Cyclopaedia. Vol. 10 1819 Cucullaria. Vol. 37 1819 Vochy.
- REICHENBACH, H. G. L. 1836. Flora Exotica. Vol. V 1836.
- ROEMER, J. J. 1796. Scriptores de Plantis hispanicis etc. 1796.
- et J. A. SCHULTES. 1817. Caroli a Linné Systema Vegetabilium. Stuttgart 1817 Vol. I.
- — — 1822. Mantissa in Vol. Prim. Syst. Veg. etc.
- RUSBY, H. H. 1893. On the Collections of Mr Miquel Bang in Bolivia. Mem. Torr. Bot. Cl. III 1893 no. 3 p. 7.
- 1896. An Enumeration of plants coll. in Bol. by M. Bang, III. Mem. Torr. Bot. Cl. VI 1896 p. 7.
- SAMPAIO, A. J. DE. 1934. Phytogeographia do Brasil. Sao Paulo 1934.
- SCHIMPER, A. F. W. und F. C. FABER. 1935. Pflanzengeographie auf physiologischer Grundlage. Jena 1935.
- SCHNIZLEIN. 1843-1870. Iconogr. fam. nat. etc. Vol. IV.
- SCHOMBURGK, R. 1848. Reisen in Brit. Guiana Vol. III.
- SCHREBER, D. J. C. D. 1789. Genera Plantarum ed. 8. Vol. I 1789.
- SCHUBART, O. 1938. Pernambuco. Sitz. berg. Ges. Naturf. Fr. 5 Sept. 1938.
- SCOPOLI, J. A. 1777. Introd. Hist. Nat. Pragae 1777.
- SEEMANN, B. 1857. The botany of the Voyage of H. M. S. Herald. London 1852-1857.
- SILVEIRA, A. 1921. Esp. nov. cit. Minas Geraes. Arch. Mus. Rio XXIII 1921 p. 164.
- SKUTCH, A. F. 1945. The natural resources of Costa Rica. In: Verdoorn 1945 p. 281.
- SMITH, A. C. 1940. A collection of flowering plants from Mount Roraima. Bull. Torr. Bot. Cl. 67 1940 p. 288.
- 1945. The vegetation of the Guianas. In: Verdoorn 1945 p. 295.
- and I. M. JOHNSTON. 1945. A phytogeographic sketch of Latin America. In: Verdoorn 1945 p. 11.
- SMITH, J. D. 1887. Undescribed plants from Guatemala I. Bot. Gazette XII 1887 p. 131.
- 1888. Bot. Gazette XIII 1888 Plate XXIII.
- 1889. Enumeratio Plant. Guatem. Vol. I-VII 1889.
- SMITH, L. B. 1945. The vegetation of Brazil. In: Verdoorn 1945 p. 297.
- SOUZA, P. F. 1945. The Brazilian Forests. In: Verdoorn 1945 p. III.
- SPACH, E. 1835. Hist. Nat. Vég. (Suites à Buffon). Vol. IV. Atlas.
- SPENCER LE MARCHANT MOORE. 1895. The Phanerogamic Botany of the Matto Grosso Expedition 1891-'92. Trans. Linn. Soc. London. 2nd ser. Vol. IV part 3 1895.
- SPRAGUE, T. A. 1922. Decades Kewensis, Decas CVI Kew Bull. 1922 p. 183.
- 1929. The correct spelling of certain generic names. IV. Ibid. no. 2 1929 p. 40.
- SPRENGEL, C. 1825. Caroli Linnaei Systema Veg. ed. 16. Vol. I.
- 1827. Id. Vol. IV Cur. Post.
- 1830. Caroli Linnaei Genera Plant. ed. 9. 1830 Vol. I.

- SPRUCE, R. 1908. Notes of a Botanist. London 1908.
- STANDLEY, P. C. 1924. N. Amer. Flora 25 1924 p. 302.
- 1926. Trees and shrubs of Mexico. Add.; Contr. US Nat. Herb. 23 pars 5 1926 p. 1668.
- 1928. Flora of the Panama Canal Zone. Ibid. 27 1928 p. 229.
- 1931. Flora of the Lancetilla Valley, Honduras. Field Mus. Bot. X 1931 p. 245.
- 1937a. Flora of Costa Rica II; Ibid. XVIII, pars 2, p. 592.
- 1937b. Studies of American Plants VIII. Field Mus. Bot. XVII pars 3 1937 p. 265.
- 1940. Id. XI. Ibid. XXII 1940 p. 149.
- and S. J. RECORD. 1936. The Forests and Flora of British Honduras. Ibid. XII 1936.
- and J. A. STEYERMARK. 1945. The vegetation of Guatemala. In: Verdoorn 1945 p. 275.
- STEUDEL, E. G. 1841. Nomenclator Botanicus. ed. II 2 Vols.
- STONE, H. and W. G. FREEMAN. 1914. The timbers of British Guiana. London 1914.
- STONE, R. G. 1945. Climatology and Meteorology. In: Verdoorn 1945 p. 156.
- TAUBERT, P. 1896. Beitr. Kenntnis . . . Goyaz. Engl. Bot. Jahrb. XXI 1896 p. 402.
- ULE, E. 1914. Die Vegetation des Roraima. Ibid. LII 1914, beibl. 115 p. 42-43.
- 1915. Plantae Uleanae . . . etc. Notizbl. Berl. VI 1915 p. 311.
- URBAN, J. 1906. Vitae, itineraque etc. Flora Bras. I, pars I 1906.
- USTERI, A. 1911. Flora der Stadt Sao Paulo. Jena 1911.
- VAHL, M. 1804. Enum. Plant. I 1804.
- VANDELLI, D. 1788. Florae lusit. et bras. etc. 1788.
- VAILOV, N. I. 1940. The new systematics of cultivated plants; in Huxley, The new Systematics. 1940 p. 549.
- VELLOZO, J. M. DE. 1790. Flora Fluminensis I 1790. See also Arch. Mus. Nac. Rio. V 1880 p. 7.
- VELOSO, H. P. 1946. A vegetação no municipio de Ilhéus. Mem. Inst. Osw. Cruz. 44 1946 fasc. I p. 13.
- VERDOORN, F. 1945. Plants and Plant Science in Latin America. 1945 Waltham Mass. U.S.A.
- VESTER, H. 1940. Die Areale und Arealtypen der Angiospermen. Bot. Arch. 41 1940 p. I seq.
- VILLADA, M. M. 1903. Una nueva especie del genero Vochysia. La Naturaleza. Sér. II t. III 1903 p. 681.
- WALPERS. 1843. Rep. Bot. Syst. Vol. II 1843.
- WARMING, E. 1867. Symbolae ad floram Brasiliae centr. cogn. I Vid. Med. Soc. Nat. Hist. For. 1867.
- 1875. Vochysiaceae in Flora Bras. XIII, pars II.
- 1889. Symbolae ad Floram Brasiliae centr. cogn. XXXII. Vid. Med. Nat. Hist. For. 1889.
- 1892. Lagoa Santa, Kjob. 1892. Kgl. Dansk. Vid. Sel. Skr. 6 Raekke; nat.-mat. avd. VI 3 1892.
- 1893. Lagoa Santa. Rev. Gen. Bot. V 1893 p. 97.
- 1909. Oecology of Plants. Oxf. 1909.
- WEBERBAUER, A. 1936. The phytogeogr. of the Peruv. Andes. Field. Mus. Bot. XIII, part I 1936 p. 13 seq.
- WIESNER, J. VON. 1928. Die Rohstoffe des Pflanzenreiches. IV. Aufl. Band II. Leipzig 1928.
- WILDENOW, C. L. 1797. Caroli a Linné Spec. Plant. ed. 4 Vol. I.

- WILLE, N. 1882. Overs. Kgl. Dansk. Vid. Selksk. For. 1882 no. 2; p. 180 seq.
- WILLIAMS, LL. 1931. The Forests of N. E. Peru. Trop. Woods 25 1931 (2)  
p. 5 seq.
- 1936. The woods of N. E. Peru. Field. Mus. Bot. 15 1936 587.
- 1940. Bot. expl. Middle and Lower Caura. Trop. Woods 62 1940  
p. 1 seq.
- 1941. Forests of Ven. Guiana. Ibid. 68 1941 p. 13 seq.
- 1945. The Phytogeogr. of Peru. in Verdoorn 1945 p. 308.
- 1947. Forests of the Upper Urinoco. Trop. Woods. 91 1947 p. 17 seq.
- YUNCKER, T. G. 1940. Flora of the Aguan Valley, Honduras. Field. Mus.  
Bot. IX 1940 p. 245.
- 1945. The vegetation of Honduras. In: Verdoorn 1945 p. 55.
- ZON, RAPHAEL and SPARHAWK. 1923. Forest resources of the world. 1923  
vol. 2, p. 727.

## E. COLLECTORS' NUMBERS.

The numbers in parentheses correspond with the numbers of the species of *Vochysia* in the taxonomic section. Salv. indicates *Salvertia*.

The collectors' numbers printed in *italics* have not been mentioned in the taxonomic section. (See Notes and Abbreviations on p. 419). (B.W. and For. Dept. numbers on p. 534).

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 PG 15651 (11); PG 15660 (67);  
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 (27); RB 23809 (11); RB 23811  
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 (44); RB 34649 (81); RB 34651  
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 15078 (64); 15167 (64); 16013 (11);  
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## F. VERNACULAR NAMES.

The numbers correspond with the numbers of the species of *Vochysia* in the taxonomic section. Salv. indicates *Salvertia*.

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