

A MONOGRAPH OF THE VOCHYSIACEAE

IV. ERISMA¹

BY

F. A. STAFLEU (*Utrecht*)

(Received Sept. 11th, 1954)

The genus *Erisma* is found in the Amazonian basin and in the Guianas; it comprises 16 species as defined in this paper, all of them typical Hylaeon forest trees.

The genus was first described by RUDGE in 1805; its name is a greek word meaning "a cause of dispute". RUDGE may have wanted it to refer to the romantic story of the type-specimen of his *Erisma floribundum*, a specimen belonging to a set of plants collected by the Frenchman Martin in French Guiana and captured by British privateers on its way to Paris. The name was also well suited to indicate the difficult taxonomic position of the genus.

ACKNOWLEDGMENTS

This conclusion of a revision of the *Vochysiaceae* has been made possible by the courtesy and collaboration of a great number of herbaria and institutions listed in the second part of this Monograph. The author expresses once again his deep gratitude to the directors of these institutions for the generous way in which they placed their collections at his disposal.

The revisional work has been accomplished at the Utrecht Botanical Museum and the author is greatly indebted to the director, Dr J. Lanjouw, whose stimulating interest and great help have always been of great value to him. The author is also greatly obliged to Mr N. Y. Sandwith of Kew for his constant help and assistance.

MORPHOLOGICAL REMARKS

The South-american genus *Erisma* and the Central-african *Erismadelphus* constitute the tribe *Erismeae* Dumort. of the *Vochysiaceae*. The comparative morphology of the tribe *Vochysieae* and that of the family as a whole was discussed in some detail in the second part of this Monograph. The following remarks are mainly concerned with the variation inside the *Erismeae* and its genera.

The diagram of the flower of an *Erisma* species is given in Fig. 4, a diagram of the flower of *Erismadelphus sessilis* is given by KEAY and STAFLEU (1952, p. 596).

¹ Parts I-III are listed under "References".

The calyx is very characteristic: the cup envelopes the indehiscent fruit and is crowned by the wing-shaped enlarged calyx-lobes. The spurred (fourth) lobe is deciduous in *Erisma* but persistent in *Erismadelphus*, the fruit of the former genus is therefore four-winged, that of the latter five-winged. The calyx is of the *Salvertia*-type (cf. STAFLEU 1953, p. 145): the spurred lobe is only slightly larger than the other lobes and the latter are never closely adpressed against the former.

The corolla of *Erismadelphus* consists of a complete set of five petals linking up with the quincuncial aestivation of the calyx, that of *Erisma* is reduced to a single petal corresponding with the third petal of *Erismadelphus* and *Salvertia*. Rudimentary petals are rarely present.

The only fertile stamen of *Erisma* (and *Qualea*) stands in front of the fifth calyx-lobe, outside the plane of symmetry; that of *Erismadelphus* (and *Vochysia*), on the other hand, stands in the symmetry plane at the base of the (third) petal. They obviously belong to different cycles: to an outer cycle in *Erisma*, to an inner cycle in *Erismadelphus*. The staminodes always belong to the inner cycle.

It follows that—morphologically speaking—the flowers of the African genus *Erismadelphus* are much simpler than those of the American *Erisma*: the corolla is complete and the flower is perfectly symmetrical.

The ovary of the *Erismeae* is inferior or nearly so and unilocular, that of the *Vochysieae* is superior and trilocular.

The fruits resemble the fruits of the Asian *Dipterocarpaceae* on account of the wing-shaped enlarged calyx-lobes. They contain a single wingless seed, are indehiscent and enclosed by the thickened persistent calyx-cup. The *Vochysieae* have dehiscent trilocular capsules with winged seeds.

The common feature of the inflorescence of all *Vochysiaceae* is the cincinnus. In the *Erismeae* these cincinni are arranged in ample panicles. The characters of the bracts provide the main criterion of division, between the two sections of *Erisma*. The outer bracts are always much larger than the inner ones and in the section *Erisma* they even surpass in length the flower-bud together with the distal part of the cincinnus. Young cincinni in which the first flower is still a bud are thus completely covered by the outer bract of this flower, it drops during or shortly after anthesis and then the outer bract of the next flower covers the remaining part of the cincinnus, and so on. In the section *Rixa* the outer bracts are smaller and drop earlier, the inner bracts are often absent.

GEOBOTANICAL AND ECOLOGICAL REMARKS

A peculiarity of the tribe *Erismeae* is of course its bicontinental distribution (see fig. 1). The two species of *Erismadelphus* are the only representatives of the *Vochysiaceae*, out of a total of about 190 species, outside the New World. No species are known from Atlantic or Caribbean islands.

The area of *Erisma* is strictly limited to the Amazonian basin and

the Guianas. All species but one are characteristic trees of the Hylaeon terra firme rain-forest; *Erismia calcaratum*, however, is a varzea tree and it is interesting to note that its fruits are well adapted to water

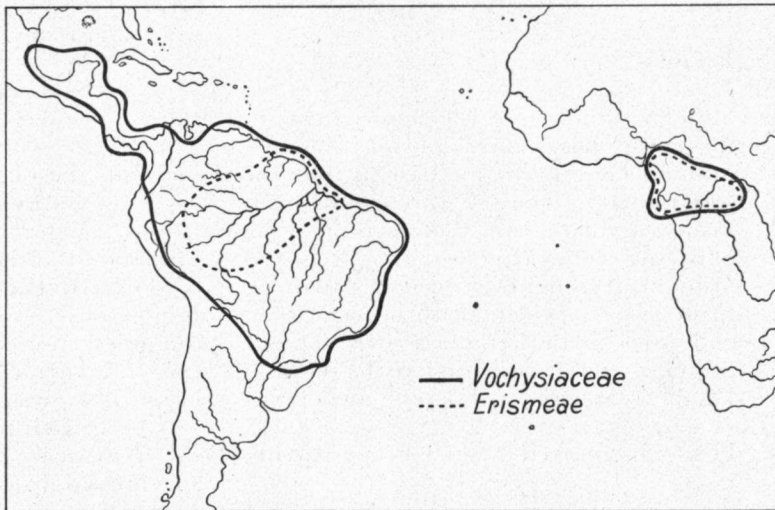


Fig. 1. Distribution of the *Vochysiaceae* and its tribe *Erismeeae*

transport. Unlike those of the other species, the wings of its fruits are poorly developed but the calyx-cup is exceptionally thick and woody.

NOTES AND ABBREVIATIONS

Most of the species of *Erismia* are of very little economic value. The wood seems to be poor but in one or two species an oil is extracted from the seeds (*E. calcaratum*, *E. japura*).

The abbreviations that have been used for the herbaria are those of the Index Herbariorum (LANJOUW and STAFLEU 1954).

Erismeeae Dumort.

Dumortier, Analyse des familles des plantes 6. 1829 ("*Erismaceae*"); Baillon 1874 p. 96, 100, 103; Chevalier & Russel 1929 p. 565; Stafleu 1952 p. 223; Keay & Stafleu 1952 p. 594.

Trees. Hairs generally stellate. Calyx semisuperior. Ovary unilocular, inferior or semi-inferior. Fruit indehiscent, enclosed by the enlarged calyx-cup and winged on account of the enlarged calyx-lobes. Seeds wingless, one per fruit.

Type genus: *Erismia* Rudge.

Distribution: Two genera, one in Amazonian South-america and one in West tropical Africa (cf. Fig. 1).

Key to the genera of the Vochysiaceae

1. *a.* Ovary superior, trilocular. Fruit dehiscent *tribus I Vochysieae* 2
b. Ovary inferior or semi-inferior, unilocular. Fruit indehiscent,
enclosed by the calyx-cup and the enlarged calyxlobes *tribus II Erismeae* 5
2. *a.* Petals 3, 1 or 0 3
b. Petals 5 1. **Salvertia**
3. *a.* Stamen standing at the base of the fifth calyx-lobe, outside
the plane of symmetry. Petal 1, convolute 4
b. Stamen standing at the base of the central petal, in the plane
of symmetry. Petals 3, rarely 1 or 0, imbricate. 2. **Vochysia**
4. *a.* Fruit provided with a thick central column, exocarp fragile,
only the endocarp regularly trivalved. Staminodes absent.
Stipular region never provided with glands. 3. **Callisthene**
b. Fruit not provided with a central column. Exocarp and
endocarp both regularly trivalvous. Staminodes present.
Stipular region provided with glands 4. **Qualea**
5. *a.* Petal 1. Spurred calyx-lobe deciduous. (Tropical America)
. 5. **Erisma**
b. Petals 5. Spurred calyx-lobe persistent (Tropical Africa) . .
. 6. **Erismadelphus**

Erisma Rudge

Rudge, Pl. Gui. 1: 7. 1805; Martius 1824 p. 136; E. Meyer 1825 p. 812; D.C. 1828 p. 29; A. Dietrich 1831 p. 101; Poeppig 1833 p. 121; Meisner 1836-43 p. 119; Endlicher 1840 p. 1179; Benth. & Hook. 1867 p. 967; Baillon 1874 p. 103; Warming 1875 p. 106; Petersen 1896 p. 319; Benoist 1915 p. 236; — 1931 p. 169; Ducke 1938 p. 38; Mennega 1948 p. 47 (wood anatomy, references); Macbride 1950 p. 872; Stafleu 1951 p. 196; Lemée 1952 p. 243. *Debraea* Roem. & Schult. 1817 p. 34, — 1822 p. 50. *Ditmaria* Spreng. 1818 p. 704, — 1825 p. 16, — 1827 p. 8. *Braya* Schult. ex Mart. 1824 p. 136 *in synon.*

Trees. Indumentum (except where otherwise stated) consisting of stellate hairs. Perulate buds rarely present. Stipules absent or small. Leaves opposite or in whorls, simple, petioled, entire, coriaceous or subcoriaceous, penninerved, the petioles mostly canaliculate above, the midrib prominent below. Flowers hermaphrodite, irregular; cincinni 2-5 flowered, peduncled, arranged in ample panicles, accessory axes often present in the inflorescence. Pedicels bibracteate, the outer bracts larger than the inner ones. Calyx semisuperior, gamosepalous, quincuncial, densely stellate-pilose, the base cup-shaped, the limb five-parted, the lobes unequal, the fourth ("posterior", "major") lobe deciduous, spurred, irregularly suborbicular or subobcordate, two-winged, convolute, the inner wing petaloid, its inner side provided with a tuft of (mostly c. 1 mm) long simple hairs, the other lobes smaller, persistent and in nearly all species excrecent

and enveloping the fruit, the second and third ones larger than the first and fifth ones, the fifth one always subtriangular and more or less acute. Corolla, stamen and staminodes epigynously inserted on the calyx. Petal one, violaceous, yellow or white, membranous, convolute, alternating with the third and fifth calyx-lobes, caducous, generally obcordate, the apex two-lobed, the base unguiculate. Rudimentary petals rarely present. Stamen one, in front of the fifth calyx-lobe, deciduous, glabrous, the filament laterally flattened, the anther bithecate, about half as long as the filament, the base subhastate or emarginate, the filament attached above the base, the pollen grains triporous ("tricolpate"). Staminodes 0-4, petaloid, small, alternating with the calyx-lobes, rarely one in front of the second calyx-lobe and belonging to the cycle of the fertile stamen. Ovary nearly inferior, the free apical part pilose, unilocular. Ovules 2, epitropic, inserted on the same side as the petal, integuments 2. Style simple, not elongated after anthesis. Stigma one, capitate. Fruit indehiscent, coriaceous, ellipsoid, the base of the style persistent, remaining in the calyx-cup and crowned by the enlarged wing-shaped smaller calyx-lobes, the major wing (the third calyx-lobe) at least twice as long as the other ones, the second lobe constituting the second wing, the first and fifth lobes constituting the two smallest wings, the fifth generally subtriangular and more or less acute. Wings very small in one species but then calyx-cup strongly developed. Seeds one per fruit, oblong, not winged. Embryo homotropous, straight, radicle small, cotyledons flat.

Typification: Type species of *Erismia* Rudge (1805), *Debraea* Roem. & Schult. (1817) and *Ditmaria* Spreng. (1818, 1825): *Erismia floribundum* Rudge. The generic name *Braya* was not validly published, being given in synonymy.

Distribution: Sixteen species in the Amazonian basin and Guiana.

Ecology: Nearly all the species are found in primeval forests on terra firme.

Remarks on the subdivision: The subdivision by WARMING (1875) still holds: "Sect. I Warm." being *Sect. Erismia*, „Sect. II Warm." being named *Rixa*; the latter name is almost a linguistic synonym of the former.

Key to the species

1. *a.* Outer bracts dropping late, larger than the subtended flowers, enveloping the young cincinni. Inner bracts always present Section I *Erismia* 2
- b.* Outer bracts deciduous, smaller than the subtended flowers, never enveloping these flowers and the distal part of the cincinnus. Inner bracts small and deciduous or absent Section II *Rixa* 11
2. *a.* Adult leaves pilose below 3
- b.* Adult leaves glabrous or with a few scattered hairs 8
3. *a.* Petioles about $\frac{1}{2}$ -1 $\frac{1}{2}$ cm long; blades 3-6 cm wide 4
- b.* Petioles about 2 $\frac{1}{2}$ cm long; blades 15-25 $\times$ 5-12 cm 1*a.* ***E. bicolor*** Ducke var. ***bicolor***
4. *a.* Lateral nerves strongly („costate") prominent below, leaves coriaceous 5
- b.* Lateral nerves not or only slightly prominent below, leaves

- rigid 2. **E. laurifolium** Warm.
5. a. Inner bracts linear-subulate, 1–2 mm long; petioles 10–17 mm long 6
- b. Inner bracts oblanceolate-spathulate, 3–4 mm long; petioles 4–9 mm long 7
6. a. Petioles 3–3½ mm wide; leaves 4½–7 cm wide
- b. Petioles 1½–2 mm wide; leaves 3½–4½ cm wide
- 3a. **E. costatum** Stapf. var. **costatum**
- 3b. **E. costatum** Stapf. var. **gracilipes** Stapf.
7. a. Petal glabrous
- b. Base of the petal lanuginose inside
- 4a. **E. floribundum** Rudge var. **floribundum**
- 4b. **E. floribundum** Rudge var. **tomentosum** (Ducke) Stapf.
8. a. Petioles c. ½–1½ cm long; stipules present 9
- b. Petioles c. 2½ cm long; stipules absent
- 1b. **E. bicolor** Ducke var. **macrophyllum** (Ducke) Stapf.
9. a. Leaves 6–11 × 2½–4½ cm; flower-buds 4–5 mm long 10
- b. Leaves 12–22 × 6–11 cm; flower-buds c. 10 mm long
5. **E. bracteosum** Ducke
10. a. Spur subglobose, bag-shaped, c. 1½ × 1½ mm; outer bracts c. 4 mm long 6. **E. gracile** Ducke
- b. Spur straight, slender, c. 4 mm long; outer bracts c. 7 mm long 7. **E. tessmannii** Pilger
11. a. Indumentum of the inflorescence brownish 12
- b. Indumentum of the inflorescence greyish or yellowish-greyish 16
12. a. Leaves elliptic or obovate, about twice as long as wide 13
- b. Leaves lanceolate, about three times longer than wide
8. **E. lanceolatum** Stapf.
13. a. Petioles 3–10 mm long 14
- b. Petioles c. 10 mm long; lateral nerves making an angle of c. 50° with the midrib 9. **E. megalophyllum** Stapf.
14. a. Spur straight, leaves glabrous below 15
- b. Spur uncinately incurved; leaves pilose below
10. **E. fuscum** Ducke
15. a. Petioles 3–5 mm long; spur c. 1½ mm long
- b. Petioles 8–10 mm long; spur 4–5 mm long
11. **E. micranthum** Spruce ex Warm.
12. **E. nitidum** D.C.
16. a. Leaves opposite, or if verticillate spur uncinately incurved 17
- b. Leaves verticillate; spur bag-shaped
13. **E. japura** Spruce ex Warm.
17. a. Petioles 3–6 mm long 18
- b. Petioles 10–20 mm long 19
18. a. Flower-buds up to 5 mm long; fruits winged
- b. Flower-buds up to 10 mm long; fruits not winged
11. **E. micranthum** Spruce ex Warm.
14. **E. calcaratum** (Link) Warm.
19. a. Spur uncinately incurved; leaves pilose below

- 15. **E. uncinatum** Warm.
 b. Spur straight or slightly incurved; leaves glabrous
 16. **E. splendens** Stafl.

section I **Erisma**

Sect. I Warming, Fl. Bras. 13(2): 108. 1875.

Bracteeae persistentes vel semipersistentes, ultimae maximae axes cum floribus et bracteis insequentes ante evolutionem tegentes.

Holotypus: *Erisma floribundum* Rudge.

1. **Erisma bicolor** Ducke, Bull. Mus. Hist. Nat. Paris II. 4: 740. 29 Nov. 1932; — 1933 p. 47, — 1935 p. 56, — 1938 p. 44. *Erisma petiolatum* Gleason, 1933 p. 363.

a. var. **bicolor**

Large tree. Young branchlets, petioles, buds, leaves below, inflorescence, bracts and calyx densely brownish pilose. Stipules absent. Leaves opposite; petioles firm, c. $2\frac{1}{2}$ cm long; leaf-blades obovate or elliptic-obovate, 15–25 × 5–12 cm, the apex acuminate, the base more or less obtuse or acute; lateral nerves strongly prominent below, 15–18 on each side, angle with the midrib 50–60°, marginal nerve undulate, at 1–2½ mm from the margin. Panicles up to 30 × 30 cm, many-flowered, the cincinni 2–5 flowered, up to 2½ cm long, the peduncles up to 10 mm long, the pedicels 1–3½ mm long, the outer bracts ovate, obtuse, up to 9 × 6 mm, the inner bracts subulate, c. 1 mm long, the flower-buds 6–8 mm long. Flowers fragrant. Fourth calyx-lobe violaceous, about 8 mm long and 10–12 mm wide, the spur ascending, recurved, cylindrical, c. 3 mm long. Petal white, up to 15 × 18 mm. Style c. 8 mm long, basal half pilose, upper half violaceous. Fruit winged, the major wing oblong, 6–8 × 2–3 cm, rounded, the second wing elliptic, c. 3 cm long, rounded.

Holotype: *Ducke* RB 23500 in RB from Borba (Brazil, Amazonas), duplicates in: G, K, NY, P, S, U, US. Holotype of *E. petiolatum* Gleason: *Krukoff* 1334 in NY, duplicates: A, F, G, MO, P, S, U.

Distribution: C. Amazonas and N. Matto Grosso.

BRAZIL, Amazonas: Near Borba, Rio Madeira inf., *Ducke* 23500; Manáos, *Ducke* RB 23796. Matto Grosso: Near Tabajara, upper Machado River region, *Krukoff* 1334 and 1376.

Ecology: On terra firme along fringes of marshes; fl. Nov.–Jan., fr. May (1 report).

b. var. **macrophyllum** (*Ducke*) Stafl. nov. comb. *Erisma macrophyllum* *Ducke* 1938 p. 44.

Small tree. Branchlets and lower surface of the leaves glabrous or nearly so and therefore leaves not “bicolor”. Indumentum of the inflorescence less dense than in var. *bicolor*. Major wing of the fruit subelliptic.

Holotype: *Ducke* RB 34.685 in RB, along Rio Curicuriary (Brazil, Amazonas), duplicates in: K, US.

Distribution: Upper Amazonia.

BRAZIL, Amazonas: Rio Curicuriary, *Ducke* RB 34685; São Paulo de Olivença, *Krukoff* 8892.

Ecology: On terra firme, fr. Febr. (one report).

2. **Erisma laurifolium** Warm. Fl. Bras. 13(2): 109. t. 20. 1875; Petersen 1896 fig. 173 A-F; Ducke 1938 p. 42. *Qualea laurifolia* Spruce ex Warm. l.c. in *synon.*

Large tree. Branchlets, petioles, buds, leaves below, inflorescence, bracts and calyx densely pilose. Buds pedicelled. Stipules absent. Leaves opposite; petioles c. 1–1½ cm long, articulate at the base; leaf-blades oblong or elliptic-oblong, 11–13 × 4–5½ cm, often folded, the apex abruptly long-acuminate, rarely obtuse, the base obtuse; lateral nerves slightly prominent below, 10–15 on each side, angle with the midrib 60–80°, anastomosing near the margin, marginal nerve absent. Panicles provided with 2–4(–7) flowered cincinni, the peduncles up to 10 mm, the pedicels up to 3 mm long, outer bracts ovate, obtuse, the first one 8–10 × 5–8 mm, inner bracts lanceolate, obtuse, the first one 3–5 × 1–2 mm, flower-buds 6–8 mm long. Fourth calyx-lobe up to 8 × 8 mm, the spur patent, (slightly) incurved, up to 4 mm long. Petal white-yellowish, c. 10–13 × 8–10 mm, deeply two-lobed. Style pilose on the lower ⅔ part. Fruit winged, the major wing oblong, 5–6 × 1½–2 cm, the second wing subelliptic, rounded, 2–3 × 1–1½ cm.

Holotype: *Spruce* 2889 in C, from Vaupés River (Brazil, Amazonas), duplicates in: BR, G, GOET, K, LD, NY, OXF, P, W; photograph of the C holotype in GH and F.

Distribution: Upper Amazonia.

BRAZIL, Amazonas: Vaupés River, *Spruce* 2889; Rio Curicuriary, *Ducke* RB 34681; São Paulo de Olivença, *Ducke* RB 34680; Rio Solimões, Belém, *Froes* 23745.

Ecology: On terra firme in or along marshy places; fl. Dec.–Febr., fr. Febr. (one report). "Perhaps the loftiest tree from which I have taken specimens" *Spruce* in mss.

3. **Erisma costatum** Staf. nov. spec. (fig. 2).

Sectio *Erisma*. Ab *E. floribundo* Rudge petiolis longioribus, foliis subtiliter stellato-pilosis, nervis lateralibus paucioribus supra haud impressis, bracteis interioribus subulatis minimis differt.

a. var. **costatum**

Arbor. Ramuli juveniles, nervorum lateralium et costae pagina inferior, inflorescentia, calyx extra indumento denso fulvo instructi. Stipulae nullae. Gemmae ut in *E. laurifolio* pedicellatae. Folia opposita, petiolo crasso, c. 10–14 mm longo, 3–3½ mm lato, lamina late elliptica, c. 7–11 cm longa, c. 4½–7 cm lata, apice obtuse apiculata vel breviter acuminata, basi abrupte in petiolum attenuata, nervis supra haud impressis, lateralibus subtus fortiter prominentibus, utrinque 10–12, mediis sub angulo c. 40–60° e costa ortis nervo limbali undulato margini proximo (1–2 mm) junctis. Paniculae cincinnis ad 2½ cm longis, bracteis exterioribus late ovatis, rotundatis, ad 9 mm longis, interioribus subulatis, 1–2 mm longis, alabastris 5–6 mm longis instructae. Calycis lacinia quarta calcare cylindrico, recurvo, c. 4–5 mm longo instructa. Petalum album basi flavum, ad 12 × 12 mm. Stamen glabrum. Staminodia c. ½ mm longa. Stylus c. 6 mm longus, basi pilosus.

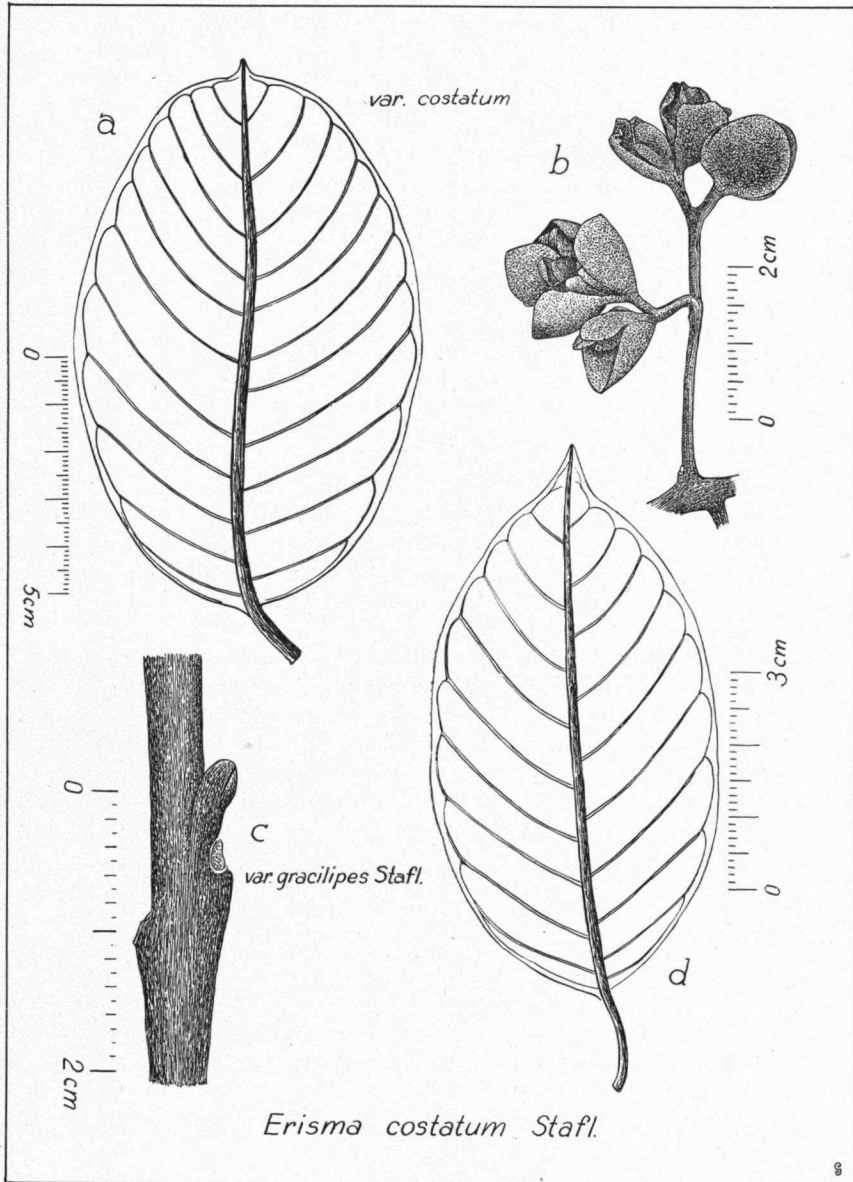


Fig. 2. *Erisma costatum* Stapf. a & b.: var. *costatum*, a. leaf, b. bracteate cincinni; c. & d.: var. *gracilipes* Stapf., c. "pedicelled" bud, d. leaf

Holotypus: *Ducke* 1842 in U from Tabatinga (Goias, Brazil) in terra firme, fl. Nov., duplicates in F, GH, NY, RB, US, (= RB 60.347).

b. var. **gracilipes** Stapf. nov. var.

A var. *costato* petiolis gracilibus, c. 13–17 mm longis, c. 1½–2 mm

latis, laminis anguste ellipticis, c. $3\frac{1}{2}$ – $4\frac{1}{2}$ cm latis, nervis lateralibus utrinque 9–11 instructis differt.

Holotypus: *Fróes* 23921 in U from Igarapé Jandiatuba (Brazil, Amazonas), defl. Jan., in terra firme, duplicate in IAN.

4. ***Erisma floribundum*** Rudge, Pl. Gui. Rar. 1: 7–8. *t. 1*. 1805 (“*floribunda*”); Trattinick 1811 p. 70; D.C. 1828 p. 30; A. Dietrich 1831 p. 101; D. Dietrich 1839 p. 21; Warming 1875 p. 108. *t. 21* fig. 2. *Debraea floribunda* Roem. & Schult. 1817 p. 34. *Ditmaria floribunda* Spreng. 1825 p. 16, — 1827 p. 8. *Erisma parvifolium* Gleason 1933 p. 362; Ducke 1938 p. 43.

a. var. floribundum *Erisma pallidiflorum* Ducke 1935 p. 54. *Erisma parvifolium* Gleason var. *pallidiflorum* Ducke 1938 p. 43.

Large tree. Young branchlets, leaves below, petioles, inflorescence, bracts and calyx densely brownish pilose. Stipules absent. Leaves opposite or in 3–4 merous whorls; petioles 4–9 mm long; leaf-blades obovate or elliptic, 9–16 × 3–6 cm, the apex shortly acuminate, the base rounded or obtuse; lateral nerves strongly prominent below, impressed above, 12–17 major ones on each side, angle with the midrib 50–80°, arcuately anastomosing at 2–5 mm from the margin. Panicles provided with 2–5 flowered, 2–3 cm long cincinni, the peduncles 4–7 mm long, the pedicels 1–4 mm long, the outer bracts subovate, up to 10 × 8 mm, the inner bracts oblanceolate, “petioled”, up to 5 mm long, the flower-buds 6–7 mm long. Fourth calyx-lobe up to 9 × 9 mm, the spur cylindrical, recurved, up to 5 × 1 mm. Petal pale yellow, glabrous, up to c. 15 × 15 mm. Staminodes 2–4, $\frac{1}{2}$ –1 mm long. Style glabrous, c. 5–6 mm long. Fruit winged, the major wing elliptic-oblong, c. 6 × 2 cm, obtuse; the second wing elliptic-oblong, c. 3 × $1\frac{1}{2}$ cm, obtuse.

Holotype: *Joseph Martin* s.n. from French Guiana in BM, duplicates in BR and MO, fragments in M. (cf. remarks below). *Debraea floribunda* and *Ditmaria floribunda* are based on the same type (nomenclatural synonyms). Holotype of *E. parvifolium*: *Krukoff* 1401 in NY, duplicates in: A, F, G, MO, P, S, U, US. Holotype of *E. pallidiflorum* and *E. parvifolium* var. *pallidiflorum*: *Ducke* RB 24102 in RB, duplicates in: K, NY, P, S, U, US.

Distribution: Rare throughout the Amazonian basin. Type from French Guiana.

FRENCH GUIANA: *Martin* s.n.

VENEZUELA, Amazonas: Yavita, *Ll. Williams* 14111.

BRAZIL, Amazonas: Manáos, *Ducke* RB 32144; Igarapé Mioá infra Camanáos, Rio Negro sup., *Ducke* RB 24102. Matto Grosso: Upper Machado River region near Tabajara, *Krukoff* 1332, 1401; Jaturana River, *Krukoff* 1679.

Ecology: On terra firme, fl. Nov.–Dec., fr. Dec. (one report).

Remarks: The type specimen belonged to a set of plants collected by *Joseph Martin* in French Guiana and captured, on its way to France in the French warship l'Union, by two British privateers in 1803 or 1804. The plants came into the hands of Rudge who sent a set of 136 duplicate specimens to Martius (herbarium now in BR).

b. var. tomentosum (Ducke) Staf. nov. comb. *Erisma tomentosum* Ducke 1935 p. 55. *Erisma parvifolium* Gleason var. *tomentosum* Ducke 1938 p. 43.

Petal yellow with a white tip, the base unguiculate, densely lanuginose inside.

Holotype: *Ducke* RB 24100 in RB from Manáos (Brazil, Amazonas), duplicates in: K, NY, P, S, U, US. The synonyms are based on the same type.

BRAZIL, Amazonas: Manáos, *Ducke* 104, RB 24100 and 24101.

Ecology: In terra firme forests, fl. Dec., fr. Apr. (one report).

5. ***Erisma bracteosum*** Ducke, Bull. Mus. Hist. Nat. Paris II. 4: 740. 1932; *Ducke* 1933 p. 48, — 1935 p. 56, — 1938 p. 42.

Large tree. Branchlets and leaves glabrous. Stipules triangular, c. 3 mm long, the apex subulate, deciduous, the base slightly incusate. Leaves opposite; petioles firm, c. 8–15 mm long; leaf-blades elliptic or subovate-oblong, 12–22 × 6–11 cm, the apex shortly obtuse-acuminate, the base rounded; major lateral nerves slightly prominent below, 7–11 on each side, angle with the midrib c. 60–70°, anastomosing at 3–7 mm from the margin, proper marginal nerve absent. Panicles when fresh white-yellowish, all parts densely fulvous pilose, the cincinni up to 4 cm long, up to 6-flowered, the peduncles up to 7 mm, the pedicels 1–2 mm long, the outer bracts suborbicular, diam. 8–11 mm, the inner bracts subulate, c. 1 mm long, the flower-buds c. 10 mm long. Flowers fragrant. Fourth calyx-lobe up to 14 × 14 mm, the spur slightly recurved, subcylindrical. Petal yellow with a small red spot, up to 25 × 25 mm. Staminodes linear, 1–1½ mm long. Style 8 mm long, the lower half pilose. Fruit winged, the major wing oblong, rounded, up to 8 × 2½ cm, the second wing suboblong, rounded, up to 4 × 1½ cm.

Holotype: *Ducke* RB 23502 in RB from Borba (Brazil, Amazonas), duplicates in: G, K, NY, P, S, U, US.

Distribution: Upper Amazonian basin.

BRAZIL, Amazonas: Borba, Rio Madeira inf., *Ducke* RB 23502; São Paulo de Olivença, *Ducke* RB 24037; São Jerônimo, Rio Solimões, *Ducke* RB 24038; Igarapé Belém, Rio Solimões, *Fróes* 23701; Camatian, *Fróes* 24014.

Ecology: On terra firme in humid forests, fl. Oct.–Jan., fr. Jan. (one report).

6. ***Erisma gracile*** Ducke, Arch. Inst. Biol. Veg. 2: 55. 1935; *Ducke* 1938 p. 44.

Large tree. Young branchlets subpilose. Stipules subulate, caducous, 1–3 mm long. Leaves opposite, glabrous except for a few hairs on the blade below; petioles 6–8 mm long, slender; leaf-blades subcoriaceous, ovate-elliptic, 6–11 × 2½–4½ cm, the apex obtuse-acuminate, the base subacute, the lateral nerves very slightly prominent on both sides, 6–9 major ones on each side, angle with the midrib 60–80°, anastomosing at 3–6 mm from the margin, proper marginal nerve absent. Branchlets and peduncles of the panicles moderately, the other parts densely fulvous pilose, the cincinni ½–1½ cm long, 2–4 flowered, the peduncles 2–4 mm long, the pedicels 1½–2½ mm long, the outer bracts subovate, up to 4 × 4 mm, the inner bracts linear-subulate, ½–1½ mm long, the flower-buds 4–5 mm long. Flowers when fresh white with a yellow petal. Fourth calyx-lobe c. 6 × 6 mm, the spur subglobose, pendent, diam. c. 1½ mm. Petal c. 11 × 9 mm the base pilose inside. Style 4–5 mm long, the base pilose. Fruit

winged, the major wing oblong, up to $5 \times 1\frac{1}{2}$ cm, the second wing oblong, up to 2×1 cm.

Holotype: *Ducke* RB 24103 in RB from Rio Tarumá (Brazil, Amazonas), duplicates in: K, NY, P, S, U, US.

Distribution: Collected four times from the same tree.

BRAZIL, Amazonas: Rio Tarumá near Manács, *Ducke* RB 24103, — 371.

Ecology: In rarely flooded riparian forest; fl. Dec.-Feb., fr. Apr. (one report).

7. ***Erisma tessmannii*** Pilger, Notizbl. Berlin 11: 295. 1931.

Medium-sized tree. Young branchlets pilose. Leaves opposite; petioles c. 5 mm long, c. 1 mm wide, canaliculate above; leaf-blades glabrous or slightly pilose in youth, elliptic, $6-8\frac{1}{2} \times 2-4$ cm, the apex shortly obtuse-acuminate, the base cuneate-rounded or rounded; the lateral nerves somewhat impressed above, slightly prominent below, 8-10 on each side, angle with the midrib 60-80°, anastomosing near the margin, proper lateral nerve absent. Panicles loose, up to 12 cm long, all parts (probably) yellowish-brown pilose, the calyx tomentose outside, the cincinni 2-3 cm long, 3-6 flowered, the peduncles c. 5 mm long, the pedicels c. 1-3 mm long, the outer bracts subovate, rounded, up to 7 mm long, the inner bracts narrow-ovate, c. 3 mm long. Fourth calyx-lobe irregularly sub-orbicular, c. 9 mm long, the spur straight, subcylindrical, narrow, up to c. 4 mm long. Petal orange-coloured. Fruit winged, the major wing oblong, rounded, c. 5 cm long and c. 1 cm wide.

Holotype: Tessmann 4932 in B (now destroyed) from Peru, R. Marañon between Iquitos and Pongo de Manseriche, San Antonio, in forest on terra firme, 135 m, fl. et fr. 14-1-1924 (photograph in F).

Remarks: No duplicate is known to the present author. Since no other material has come to hand, the above description has been based on Pilger's original description and the photograph of the holotype. The species seems to be well established, it differs from *E. gracile* by the larger flowers and the straight, narrow spur; it differs from *E. floribundum* e.g. by the small number of lateral nerves, the glabrous adult leaves, etc.

section II ***Rixa*** Staffl.

Sect. II Warming Fl. Bras. 13(2): 108. 1875.

Bractae deciduae, parvae, exteriores flores insequentes ante evolutionem haud occultantes, interiores minimae vel nullae.

Holotypus: *Erisma uncinatum* Warm.

8. ***Erisma lanceolatum*** Staffl. nov. spec. (Fig. 3 *a* & *b*).

Erisma verisimiliter e sectione *Rixa* Staffl. petiolis nigris, gracilibus, laminis lanceolatis apice sensim acuto-acuminatis, fructibus ala majore elongato-elliptica instructis noscendum.

Arbor magna. Ramuli vetustiores cortice in squamulas parvas fisso instructi. Stipulae nullae. Folia opposita vel ternata, petiolo gracili, nigro, glabro, c. 12-15 mm longo; lamina subcoriacea, lanceolata, lanceolato-elliptica vel oblanceolata, 10-17 cm longa, $3\frac{1}{2}-5\frac{1}{2}$ cm lata, apice sensim acuto-acuminata, basi acuta vel obtusa, supra glabra nervis haud prominentibus, subtus parvissime pilosa; nervis lateralibus utrinque 6-8, curvatis, sub angulo c. 40-50° e costa ortis, subtus

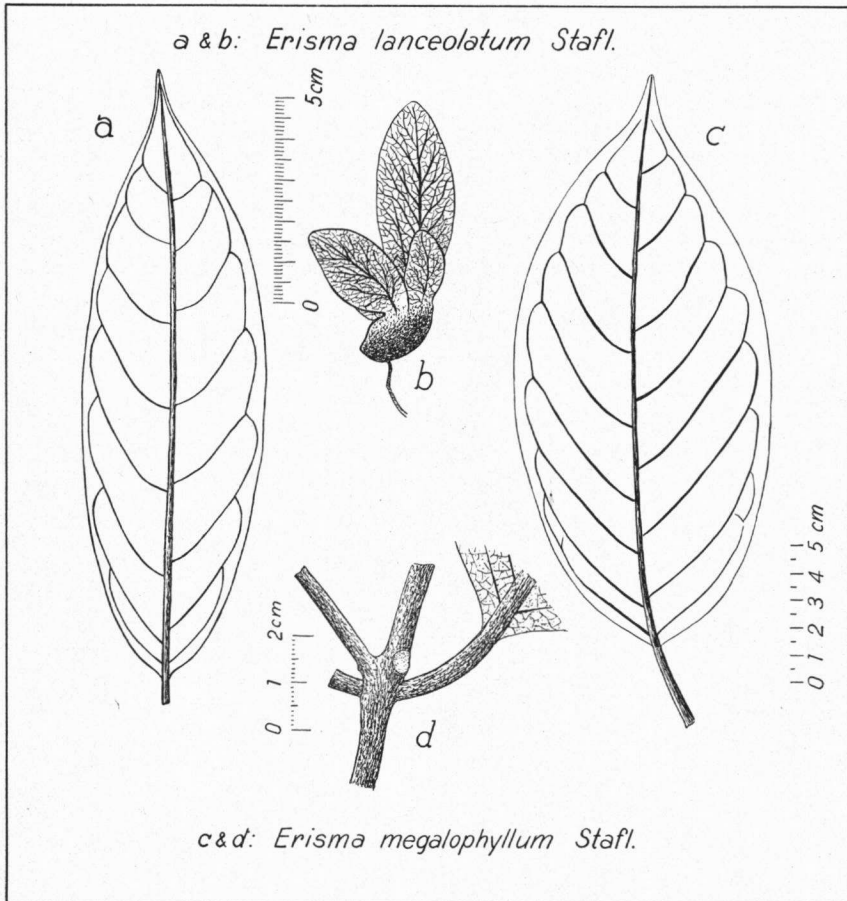


Fig. 3. a. & b.: *Erisma lanceolatum* Stafl., a. leaf, b. fruit; c. & d.: *Erisma megalophyllum* Stafl., c. leaf, d. petiole

prominentibus, prope marginem arcuatim conjunctis, neque nervo limbali junctis. Paniculae amplae, ramulis gracilibus fusco-pilosis instructae. Fructus alati, parcissime stellato-pilosi, ala majore elongato-elliptica, subrotundata, ad c. 3 cm longa et $1\frac{1}{2}$ cm lata instructi.

Holotypus: Fróes 12527/221 in A from Rio Castanha, affl. Rio Negro (Brazil, Amazonas), fl. 27-4-1942.

9. ***Erisma megalophyllum* Stafl. nov. spec.** (fig. 3 c & d).

Erisma verisimiliter e sectione *Rixa* Stafl. petiolis crassis, laminis fere glabris, magnis, apice acuto-acuminatis, nervis lateralibus utrinque 9 sub angulo c. 50° e costa ortis instructis noscendum.

Arbor media. Ramuli subpilosi demum glabrati, cortice in squamulas parvas fisso instructi. Folia ternata (irregulariter, verticem unicum vidi); petiolo crasso, c. 2 cm longo; lamina elliptica, ad 23 cm

longa et 11 cm lata, apice acuto-acuminata, basi subrotundata, supra glabra nervis haud prominentibus, subtus parcissime pilosa, nervis lateralibus utrinque 8–9, curvatis, sub angulo c. 50' e costa ortis, subtus fortiter prominentibus, prope marginem (6–9 mm) arcuatim conjunctis, neque nervo limbali junctis. Paniculæ amplae, ramulis modice, pedunculis, pedicellis, calyce dense fulvo-pilosis, cincinnis ad $2\frac{1}{2}$ cm longis, 3- vel 4-floris, pedunculis c. 6–9 mm longis, pedicellis c. 1 mm longis, bracteis ignotis sed cicatricibus parvis (ergo species verisimiliter e sectione *Rixa*) instructae. Calycis lacinae prima, secunda et tertia suboblongae, obtusae, c. 3, 4–5 et 5–6 mm longae, quinta acuta, c. 4–5 mm longa, quarta decidua, ignota. Stylus c. 5 mm longus, basi pilosus.

Holotypus: *Fróes* 23741 in U, from Igarapé Belém, Rio Solimões (Brazil, Amazonas), in terra firme, defl. 18–12–1948, dupl. in IAN.

10. ***Erisma fuscum*** Ducke, Arch. Jard. Bot. Rio 4: 105. 1925; Ducke 1938 p. 44.

Large tree. Branchlets, petioles, stipules and leaf-blades below sparsely brownish pilose. Stipules sublanceolate, acute, 5–10 mm long, the apex caducous, the base persistent. Leaves opposite; petioles firm, c. $\frac{1}{2}$ cm long; leaf-blades obovate, 10–20 $\times$ 7–12 cm, the apex rounded, obtuse or apiculate, the base narrowly cordate; the lateral nerves prominent below, 9–12 on each side, angle with the midrib c. 50–60', disappearing near the margin or anastomosing, no proper marginal nerve. Panicles provided with sparsely pilose branchlets and peduncles, the other parts densely dark-brown tomentose, the cincinni up to 2 cm long, 3–5 flowered, the peduncles up to 5 mm long, the pedicels $\frac{1}{2}$ –1 mm long, the outer bracts caducous, linear, c. $\frac{1}{2}$ –1 $\frac{1}{2}$ mm long, the flower-buds 5–6 mm long. Fourth calyx-lobe c. 6 $\times$ 8 mm, the spur strongly uncinately incurved, up to 8 $\times$ 4 mm. Petal violaceous, up to 9 $\times$ 9 mm, whitish pilose on the inner side near the tip. Staminodes 3–4, lanceolate, c. $\frac{1}{2}$ mm long, sometimes in serial pairs. Style c. 6 mm long, pilose at the base. Fruit winged, the major wing elongate-elliptic, up to 7 $\times$ 2 $\frac{1}{2}$ cm, the second wing elliptic, up to 1 $\frac{1}{2}$ cm long, the calyx-cup longitudinally ribbed.

Holotype: *Ducke* RB 17745 in RB from Antonio Lemos near the River Tajapurú (Brazil, Para) in terra firme forest, fl. Dec. fr. March, duplicates in G, K, P, S, U, US.

11. ***Erisma micranthum*** Spruce ex Warm. Fl. Bras. 13(2): 112. 1875.

Small tree. Branchlets and leaves glabrous. Stipules c. 1 mm long, the apex deciduous, the base incrassate and persistent. Leaves opposite; petioles 3–5 mm long; leaf-blades pergamentaceous, elongate-ovate or subelliptic, c. 9–16 $\times$ 3 $\frac{1}{2}$ –6 cm, the apex gradually acuminate or obtuse, the base more or less rounded; the lateral nerves slightly prominent, 7–11 on each side, angle with the midrib 60–80', curved upwards and anastomosing near the margin, no proper marginal nerve. Branchlets of the panicles and peduncles sparsely, the pedicels and the calyx densely greyish pilose; the cincinni up to 1 $\frac{1}{2}$ cm long,

2-5 flowered, the peduncles 2-4 mm long, the pedicels $\frac{1}{2}$ -1 mm long, the bracts caducous, the flower-buds up to 4 mm long. Fourth calyx-lobe $3-4 \times 4-4\frac{1}{2}$ mm, the spur subcylindrical, straight, c. $1\frac{1}{2}$ mm long. Petal yellow with a red base, pilose inside. Style c. 2-3 mm long, glabrous. Fruit winged, the major wing up to 10 mm long, the second wing up to 7 mm long, the calyx-cup longitudinally ribbed.

Holotype: *Spruce* 3767 in C from San Carlos, Rio Negro (Venezuela), duplicates in. BR, G, GH, GOET, K, OXF, P, W).

Distribution: Upper Amazonia.

VENEZUELA, Amazonas: San Carlos, Rio Negro, *Spruce* 3767.

BRAZIL, Amazonas: Rio Iá, Rio Negro, *Frédes* 22392; Içana, Rio Negro, *Frédes* 22276; Rio Curicuriary, Rio Negro, *Ducke* RB 34.684.

Ecology: On terra firme, in high forest along river banks; fl. Nov., Dec., June (3 reports), fr. May (1 report).

12. ***Erisma nitidum*** D.C. Prodr. 3: 30. 1828; Warming 1875 p. 112; Benoist 1915 p. 237, — 1931 p. 167; Stafleu 1951 p. 199; Lemée [1952 p. 243. *Qualea lutea* Martin ex D.C. 1828 p. 30 in *synon.*

Large tree. Branchlets and leaves glabrous. Stipules c. 2-3 mm long, the apex subulate, caducous, the base partly persistent. Leaves opposite; petioles 8-10 mm long; leaf-blades thinly coriaceous, shining above, elliptic, $11-15 \times 5-7$ cm, the apex shortly obtuse-acuminate, the base subobtusate, the major lateral nerves 7-9 on each side, subprominent below, angle with the midrib c. $60-70^\circ$, the marginal nerve undulate, at 5-7 mm from the margin. Branchlets and peduncles of the inflorescence sparsely, pedicels and calyx densely fulvous pilose, the cincinni up to 3 cm long, 3-6 flowered, the peduncles up to 7 mm long, the pedicels c. 1 mm long, the outer bracts ovate, 2-3 mm long, the flower-buds 5-6 mm long. Fourth calyx-lobe $6-7 \times 7-8$ mm, the spur straight, subconical, 4-5 mm long, obtuse. Petal white with a yellow centre. Stamines often in serial pairs, c. $\frac{1}{2}$ mm long. Style c. 6 mm long, lower half pilose. Fruit winged, the major wing subelliptic, c. 5×2 cm, the second wing subelliptic, c. $3\frac{1}{2} \times 1\frac{1}{2}$ cm, the calyx-cup longitudinally ribbed.

Holotype: *Joseph Martin* s.n. in FI, from Roura Mt., French Guiana, duplicate in P. This specimen is also the holotype of *Qualea lutea* Martin ex D.C. in *synon.*

Distribution: French and British Guiana.

FRENCH GUIANA: Mt. Roura, *Martin* s.n.; *Leprieur* 289.

BRITISH GUIANA: Potaro River, Cobanatur Falls, *Jenman* 7439; Potaro River, Mahdia, *For. Dept. Br. Gui.* 3743.

Ecology: In British Guiana in "Wallaba forest on white sand"; fl. Oct., Nov., fr. Nov. (one report).

Remarks: The specimens cited by *Ducke* (1933 p. 48; 1938 p. 43) as *Erisma nitidum* belong to 16 *Erisma splendens* q.v.

13. ***Erisma japura*** *Spruce* ex *Warm.* Fl. Bras. 13(2): 109. t. 21 fig. 1, 1875; *Petersen* 1896 fig. 173 G; *Ducke* 1938 p. 44.

Large tree. Branchlets, petioles, leaves below and inflorescence slightly, pedicels and calyx densely greyish pilose. Stipules small, subulate, deciduous. Leaves in tri- or tetramerous whorls; petioles $2\frac{1}{2}-4$ cm long; leaf-blades rigidly coriaceous, elliptic or obovate-elliptic, $10-23 \times 4-10$ cm, the apex rounded or nearly truncate,

emarginate, the base acute, the lateral nerves prominent below, 15–18 on each side, angle with the midrib 60–70°; the marginal nerve undulate, at 1–3 mm from the margin. Cincinni up to 5 cm long, 5–7 flowered, the peduncles 5–20 mm long, the pedicels 3–6 mm long, the outer bracts up to 10 × 5 mm, elliptic-ovate, the inner bracts absent, the flower-buds c. 12 mm long. Fourth calyx-lobe up to 14 × 18 mm, the spur bag-shaped, rounded, c. 3 × 3 mm. Petal yellow, c. 2–2½ × 2½–3½ cm. Stamines lanceolate, c. 3½ × 1 mm. Style c. 10–12 mm long. Fruit winged, the major wing up to 13 × 4 cm, the second wing up to 7 × 2½ cm, both oblong and provided with 6–8 parallel nerves; limb ellipsoid, smooth, up to 4½ × 2½ cm, seeds oblong, c. 3 × 1 cm.

Holotype: *Spruce* 2613 in C from Rio Vaupés (Brazil, Amazonas), see remarks below. Duplicates in: BR, F, G, GH, GOET, K, NY, OXF, P, S, W.

Distribution: Northern Upper Amazonia.

BRAZIL, Amazonas: Near Panuré on Rio Vaupés, *Spruce* 2613; São Gabriel, Rio Negro, *Ducke* RB 23798; Içana, Rio Negro, *Fröes* 22290; Marabitanas, Rio Negro, *Murça-Pires* 470; Rio Curicuriary, Rio Negro, *Ducke* RB 34678.

Ecology: On terra firme; fl. Oct., Nov. April (3 reports), fr. Febr., May (2 reports).

Vernacular names: Japura (Brazil, Rio Negro).

Remarks: The flowers of *Spruce* 2613 were collected in Nov. 1852, the fruits in Febr. 1853. These collections were made (apparently) from different trees. The flowers and fruits certainly belong to the same species.

Spruce, in a mss note on the Kew specimen, says that "the kernels are pleasant eating, both raw and boiled"... "The Japurá-butter is eaten along with fish and game People who can get over its vile smell (which is never lost) find it exceedingly savoury".

14. ***Erisma calcaratum*** (Link) Warm. Fl. Bras. 13(2): 111. 1875; Warming 1889 p. 28; Glaziou 1905 p. 31; *Ducke* 1915 p. 50, — 1922 p. 198, — 1925 p. 107 *pl. 13 a & b*, — 1938 p. 44; *Lecointe* 1934 p. 212; *Macbride* 1950 p. 873. *Qualea calcarata* Link 1820 p. 24; *Roem. & Schult.* 1822 p. 53. *Erisma violaceum* Mart. 1824 p. 137 *t. 82*; D.C. 1828 p. 30; A. Dietrich 1831 p. 102; D. Dietrich 1839 p. 21; *Schomburgk* 1848 p. 1099; *Baillon* 1874 p. 96 *fig. 135, 136*. *Debraea violacea* Steud. 1841 p. 486. *Ditmaria violacea* Spreng. 1827 p. 8.

Small or medium-sized tree. Branchlets and leaves glabrous. Stipules persistent, triangular, 3–5 mm long, the apex subulate, the bases widened, connate and constituting a ridge. Leaves opposite; petioles 3–6 mm long; leaf-blades generally elliptic or ovate-elliptic, 16–24 × 6–8½ cm, the apex acuminate, the base rounded or cordate; the lateral nerves subprominent below, 7–10(–12) on each side, angle with the midrib 60–80°, curved upwards, anastomosing or ending in the margin, no proper marginal nerve. Branchlets and peduncles of the inflorescence slightly, pedicels and calyx densely greyish pilose; the cincinni 3–5 mm long, 3–5 flowered, the peduncles up to 10 mm long; the pedicels 1–2 mm long, the outer bracts ovate, falling early, the inner bracts subulate, caducous, the flower-buds up to 10 mm long. Fourth calyx-lobe violaceous, c. 10 × 13 mm, the spur conical, 3–6 mm long, slightly incurved, stretched along the pedicel. Petal blue or violaceous, c. 18 × 18 mm. Stamines

linear, c. $\frac{1}{2}$ mm long. Style glabrous, up to 9 mm long. Fruits not winged, $4-6 \times 2-3$ mm, $\pm$ oblong, slightly curved, consisting of the enlarged woody calyx-cup which almost completely encloses the true fruit, cup longitudinally ribbed and provided with numerous warts; the calyx-lobes persistent but not enlarged.

Holotype: *Hoffmannsegg* s.n. from Para (Brazil) in herbarium Willdenow in B (preserved) (the true collector is probably *F. W. Sieber*, Hoffmannsegg's servant). Since *Erismia violaceum* is an avowed synonym of *Qualea calcarata*, its holotype is also this same specimen. *Debraea violacea* and *Ditmaria violacea* are in their turn avowed synonyms of *Erismia violaceum*.

Distribution: Amazonian basin.

BRAZIL, Para: *Hoffmannsegg* (*Sieber*) s.n.; *G. A. Black* 48-2951; *Ducke* PG 10144, PG 16536, RB 17765; *Fróes* 20296; *Guedes* PG 584, PG 1665, PG 2229; *Kuhlmann* RB 17771; *Martius* s.n.; *Mexia* 6056; *Schwacke* III 556; *Sigueira* PG 3772; *Spruce* 125. Amazonas: Manáos, *Spruce* 1798; —, *Ducke* 897; Upper Rio Negro, *Ro. Schomburgk* 868, 898; Padoauri, Rio Negro, *Fróes* 22677; Lower Rio Negro, *Ducke* 756; Foz do Jatahy, *Ducke* RB 20561.

PERU, Loreto: Iquitos, *Tessmann* 5330; Mishuyaca, *Klug* 1541.

Ecology: Typical varzea tree, fruits adapted to water transport; fl. May-Oct. from the middle of the dry season to the beginning of the "winter" fr. Nov.-Apr. Vernacular names: Para: Jaboty-araconha, Jaboty, Jaboty da Varzea, Cachimbo de jaboti, Caramurú, Aburána, Vergalho de jaboti.

Use: The fruit yields an industrial oil "jaboty" used e.g. for the manufacture of soap. The wood seems to be useless as timber but can be used for the manufacture of paper.

Remarks (1) The species is mentioned from French Guiana by Lemée (1952) but this is apparently erroneous since no specimen of this species collected by *Sagot* (as indicated by Lemée) is preserved in the Paris herbarium.

(2) The fruit has the shape of a pipe and its name "Cachimbo de jaboty" is derived from this characteristic: pipe of the jaboty, a kind of terrestrial tortoise (*Ducke*).

(3) All species of *Erismia*, except the present one, are found in terra firme forests. All terra firme species have winged "dipterocarpaceous" fruits; the present species, inhabiting the regularly inundated varzea woods, has wingless fruits specially adapted to water-transport. The figure of the fruit in Baillon (l.c. fig. 137) does not represent the fruit of *E. calcaratum*.

15. ***Erismia uncinatum*** Warm. Fl. Bras. 13(2): 110. 1875; Wille 1882 p. 181 (anat.); Warming 1889 p. 28; Pulle 1906 p. 134; *Ducke* 1915 p. 51, — 1922 p. 198, — 1925 p. 106, — 1938 p. 44; Benoist 1915 p. 237, — 1919 p. 319, — 1931 p. 167, 168; Pfeiffer 1926 p. 357; Lecointe 1934 p. 211; Amshoff 1948 p. 11; Mennega 1948 p. 47 (anat.); Macbride 1950 p. 875; Stafleu 1951 p. 197; Lemée 1952 p. 243. *Erismia pulverulentum* Poeppig ex Warm. 1889 p. 28 (in synonym.).

Large tree. Branchlets, petioles and leaves below slightly, inflorescence densely greyish (the calyx often violaceous) pilose. Stipules subulate, 1-2 mm long, the base incrassate. Leaves opposite or in tri- or tetramerous whorls; petioles 1-2 cm long; leaf-blades elongate-obovate or -oblong, $10-17 \times 4\frac{1}{2}-8$ cm, the apex rounded, obtuse or apiculate, the base cuneate, the lateral nerves 4-7(-10) on each side, angle with the midrib $40-70^\circ$, curved upwards near the margin, marginal nerve absent. Cincinni $1-3\frac{1}{2}$ cm long, 2-5 flowered, the peduncles 4-5 mm long, the pedicels c. 1 mm long, the outer bracts ovate, rounded or obtuse, 3-5 mm long, the inner bracts linear,

acute, 1–2 mm long, the flower-buds 5–7 mm long. Fourth calyx-lobe c. $5-7 \times 8-10$ mm, the spur strongly uncinately-incurved, compressed, often larger than the bud, $2-2\frac{1}{2}$ mm wide, apically rounded. Petal violaceous, $12-15 \times 12-15$ mm. Staminodes 0–4, filiform, $\frac{1}{2}-1\frac{1}{2}$ mm long, sometimes forked or in serial pairs. Style up to 7 mm long, the lower half pilose. Fruit winged, the major wings elliptic-oblong, $4-7 \times 1\frac{1}{2}-3$ and $2\frac{1}{2}-3 \times 1-1\frac{1}{2}$ cm respectively.

Typification: Warming mentions specimens collected by *Poeppig* and *Riedel*. *Poeppig* 2633 in W from Ega, Brazil, is here proposed as the lectotype. (Duplicates: BM, F, G, GOET, L, US).

Distribution: Amazonian basin and Guiana.

BRAZIL, Para: *Ducke* PG 15878, PG 16390, RB 13691; *Goeldi* PG 8322; *Guees* PG 2136; *Sigueira* PG 8827; *N.T. Silva* 136. Amazonas: *Ducke* RB 20560, RB 23797, 264 (= RB 34679); *Fróes* 23694; *Krukoff* 5603, 8084; *Poeppig* 2633; *Riedel* s.n.; *Spruce* s.n. Maranhão: Maracassumé River, *Fróes* 1939; *Assulina-Carutapera*, *Fróes* 11953.

SURINAME: *B.W.* (= *Boschwezen*) nos: 491, 1350, 1402, 1428, 2475, 3342, 3380, 3544, 3580, 4751, 5434, 5564; *Boschbeheer* 46; *Woodherbarium* 46. (Full details in *Stapleu* 1951 p. 198).

FRENCH GUIANA: *Benoist* 366, 1233, 1535; *Mélinon* s.n. div. coll.; *Gandoger* 8; *Wachenheim* 407.

BRITISH GUIANA: Kanuku Mts, *For. Dept. Br. G.* 5801, 5929.

Ecology: In primary forests on terra firme; fl. July–Nov., fr. Sept., Jan. (2 reports).

Vernacular names: BRAZIL, Para: Quaruba, Quaruba de flores roxas (Lecointe), Jaboty da terra firme. Maranhão: Bruto. BRITISH GUIANA: Pramaye. SURINAME: e.g. Singri-kwarrie (vide *Stapleu* 1951 p. 198).

16. *Erisma splendens* Stapf, nov. spec. (fig. 4).

Sectio *Rixa* Stapf. Ab *E. uncinato* Warm. foliis glabris, nervis lateralibus pluribus haud prominentibus, floribus indumento sordide flavescento, calcari subconico parum incurvo instructis, petalo intus albo-lanuginoso differt.

Arbor magna. Ramuli subpilosi demum glabrescentes, decorticantes. Stipulae 2–3 mm longae, basi incrassatae, apice subulato deciduo instructae. Folia glabra, opposita; petiolo 15–20 mm longo; lamina elliptica, 9–16 cm longa, $4-7\frac{1}{2}$ cm lata, apice valde acuminata, basi cuneata, supra nitida; nervis lateralibus haud prominentibus, majoribus utrinque 9–15, sub angulo c. $60-70^\circ$ e costa ortis, nervo limbali undulato margini proximo junctis. Ramuli paniculae, pedunculi parce pilosi, bractee, pedicelli, calyx dense sordide flavescenti-pilosi. Cincinni ad 15 mm longi, 3–5 flori, bracteis exterioribus subellipticis, c. 2 mm longis, interioribus lineari-subulatis, c. $\frac{1}{2}-1$ mm longis, pedunculis ad 5 mm, pedicellis ad 2 mm, alabastris c. 4 mm longis instructi. Calycis lacinia quarta c. 6 mm longa et 7 mm lata, calcari dependente, subconico, c. $2-2\frac{1}{2}$ mm longo et $1\frac{1}{2}-2$ mm lato parum incurvo instructa. Petalum extra album vel pallide lilacinum, intus flavum, dense albo-lanuginosum, c. 10–12 mm longum et latum. Petalum rudimentarium nonnunquam adest, spatulatum, dense lanuginosum, inter sep. 4 et 2 positum. Staminodia c. $\frac{1}{2}-1$ mm longa. Stylus basi pilosus. Ala major fructuum elongato-elliptica, ad c. 7 cm longa et $2\frac{1}{2}$ cm lata, ala secunda oblonga, ad c. $3\frac{1}{2}$ cm longa et c. 18 mm lata.

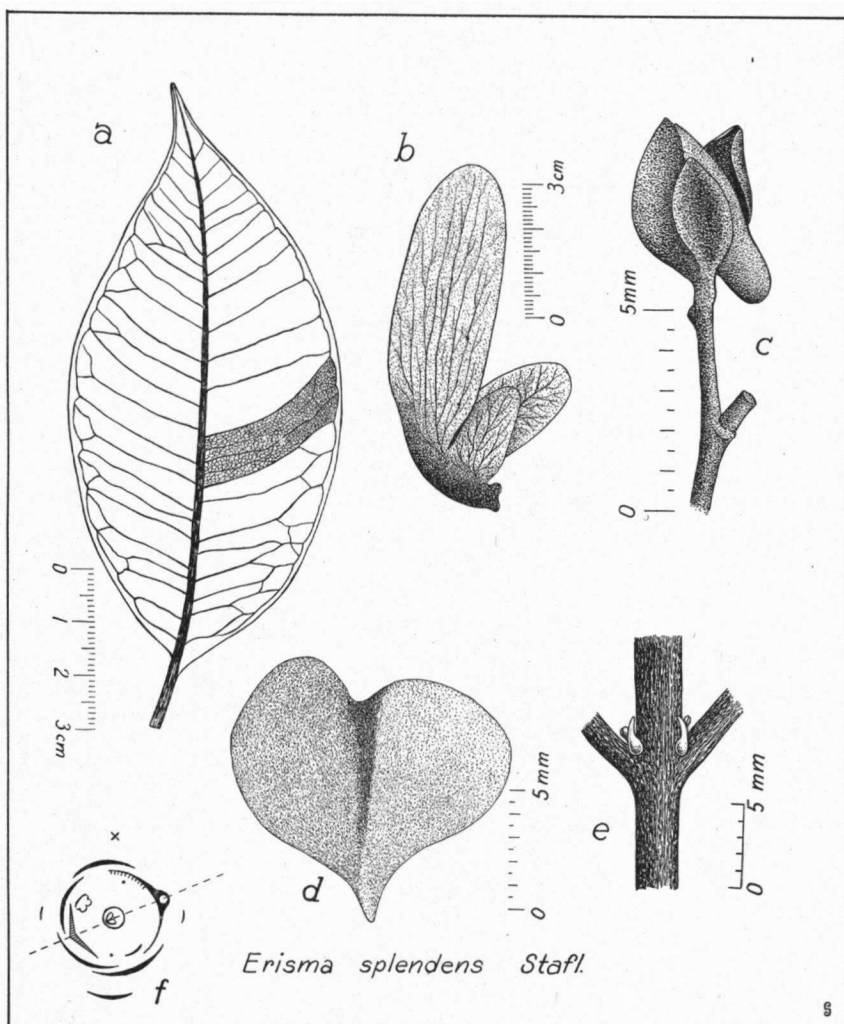


Fig. 4. *Erisma splendens* Stafl. a. leaf, b. fruit, c. flower-bud, d. petal, e. stipules, f. diagram

Holotypus: *Ducke* RB 34682 in U from Manáos (Brazil, Amazonas), duplicates in: G, K, P, S, U, US.

Distribution: Central Amazonia.

BRAZIL, Amazonas: Manáos, *Ducke* RB 34682, RB 23501, RB 34683, 96.

Ecology: In marshy forests on terra firme; fl. Nov.–Dec., fr. Feb.

Species dubiae

17. ***Erisma maliforme*** Link ex A. Dietrich, Sp. Pl. ed. 6. 102. 1831 (“maliformis”); Warming 1875 p. 114.

The description of this species does not enable us to run it down to one of the known species of *Erisma*. It is so incomplete that it is even uncertain whether Link's specimen was indeed an *Erisma*. The specimen was preserved in Link's herbarium and was destroyed with the other Berlin collections.

18. ***Erisma niveum*** Link ex A. Dietrich, Sp. Pl. ed. 6. 102. 1831 ("*nivea*"); Warming 1875 p. 114.

It is not possible to identify this species: the description is too incomplete and Link's original specimen was destroyed together with the Berlin collections.

Collectors' numbers

The numbers in parentheses refer to the serial numbers of the species of *Erisma*. The letter *a* refers to the subdivision containing the nomenclatural type of the species, the letter *b* to the second subdivision of that species.

BENOIST 366 (15), 1233 (15), 1535 (15). BLACK, G. A. 48-2951 (14). BOSCHBEHEER 46 (15). B.W. 491, 1350, 1402, 1428, 2475, 3342, 3380, 3544, 3580, 4751, 5434, 5564 (all 15). DUCKE 96 (16), 104 (4*b*), 264 (15), 371 (6), 756 (14), 897 (14), 1842 (3*a*), PG 10144 (14), PG 15878 (15), PG 16390 (15), PG 16536 (14), RB 13691 (15), RB 17745 (10), RB 17765 (14), RB 20560 (15), RB 20561 (14), RB 23500 (1*a*), RB 23501 (16), RB 23502 (5), RB 23796 (1*a*), RB 23797 (15), RB 23798 (13), RB 24037 (5), RB 24038 (5), RB 24100 (4*b*), RB 24101 (4*b*), RB 24102 (4*a*), RB 24103 (6), RB 32144 (4*a*), RB 34678 (13), RB 34679 (15), RB 34680 (2), RB 34681 (2), RB 34682 (16), RB 34683 (16), RB 34684 (11), RB 34685 (1*b*), RB 60347 (3*a*). FOREST DEPT. BR. GUI. 3743 (12), 5801 (15), 5929 (15). FRÖES 1939 (15), 11953 (15), 12527/221 (8), 20296 (14), 22276 (11), 22290 (13), 22392 (11), 22677 (14), 23694 (15), 23701 (5), 23741 (9), 23745 (2), 23921 (3*b*), 24014 (5). GANDOGER 8 (15). GOELDI PG 8322 (15). GUEDES PG 584 (14), PG 1665 (14), PG 2136 (15), PG 2229 (14). JENMAN 7439 (12). KLUG 1541 (14). KRUKOFF 1332 (4*a*), 1334 (1*a*), 1376 (1*a*), 1401 (4*a*), 1679 (4*a*), 5603 (15), 8084 (15), 8892 (1*b*). KUHLMANN RB 17771 (14). LEPRIEUR 289 (12). MEXIA 6056 (14). MURÇA Pires 470 (13). POEPPIG 2633 (15). SCHOMBURGK 868 or 898 (14). SCHWACKE III 556 (14). SIGUEIRA PG 3772 (14), PG 8827 (15). SILVA, N.T. 136 (15). SPRUCE 125 (14), 1798 (14), 2613 (13), 2889 (2), 3767 (11). TESSMANN 4932 (7), 5330 (14). WACHENHEIM 407 (15). WILLIAMS, LL. 14111 (4*a*). WOODHERBARIUM 46 (15).

Vernacular names

The numbers refer to the serial numbers of the species of *Erisma*.

Aburána	14	Jaboty da varzea	14
Bruto	15	Japura	13
Cachimbo de jaboti.	14	Quaruba	15
Caramurú	14	Quaruba de floras roxas	15
Jaboty or Jaboti	14	Prumaye.	15
Jaboty-aracanha	14	Singri-kwarrie	15
Jaboty da terra firme	15	Vergalho de jaboti	14

Specific and infraspecific names

The numbers refer to the serial numbers of *Erisma* under which the names are cited. Names printed in *italics* are synonyms; those printed in **bold face** type refer to new taxa.

Debraea

floribunda Roem & Schult. 4
violacea Steud. 14

Ditmaria

floribunda Spreng. 4
violacea Spreng. 14

Erisma

<i>bicolor</i> Ducke	1	<i>megalophyllum</i> Stafl.	9
var. <i>bicolor</i>	1a	<i>micranthum</i> Spruce ex Warm.	11
var. macrophyllum (Ducke)		<i>nitidum</i> D.C.	12
Stafl.	1b	<i>niveum</i> Link ex A. Dietrich	18
<i>bracteosum</i> Ducke	5	<i>pallidiflorum</i> Ducke	4a
<i>calcaratum</i> (Link) Warm.	14	<i>parvifolium</i> Gleason	4
costatum Stafl.	3	var. <i>pallidiflorum</i> Ducke	4a
var. costatum	3a	var. <i>tomentosum</i> Ducke	4b
var. gracilipes Stafl.	3b	<i>petiolatum</i> Gleason	1
<i>floribundum</i> Rudge	4	<i>pulverulentum</i> Poepp. ex Warm.	15
var. <i>floribundum</i>	4a	splendens Stafl.	16
var. tomentosum (Ducke)		<i>tessmannii</i> Pilger	7
Stafl.	4b	<i>tomentosum</i> Ducke	4b
<i>fussum</i> Ducke	10	<i>uncinatum</i> Warm.	15
<i>gracile</i> Ducke	6	<i>violaceum</i> Mart.	14
<i>japura</i> Spruce ex Warm.	13		
lanceolatum Stafl.	8	<i>Qualea</i>	
<i>laurifolium</i> Warm.	2	<i>calcarata</i> Link.	14
<i>macrophyllum</i> Ducke	1b	<i>laurifolia</i> Spruce ex Warm.	2
<i>maliforme</i> Link ex. A. Dietrich	17	<i>lutea</i> Martin ex D.C.	12

REFERENCES

- AMSHOFF, G. J. H. 1948. Enumeration of the herbarium specimens of a Suriname wood collection made by Prof. G. Stahel.
- BAILLON, J. B. C. F. 1874. *Histoire des Plantes* 5.
- BENTHAM, G. & J. D. HOOKER 1862-67. *Genera Plantarum* 1.
- BENOIST, R. 1915. *Bull. Soc. Bot. France* 62.
- BENOIST, R. 1919. *Bull. Soc. Bot. France* 66.
- BENOIST, R. 1931. *Arch. Botanique* 5. mém. 1.
- CANDOLLE, A. P. DE 1828. *Prodromus systematis naturalis regni vegetabilis* 3.
- CHEVALIER, A. & RUSSEL 1929. *Compt. Rend. Acad. Sci.* 188.
- DIETRICH, A. 1831. *Caroli a Linné Species Plantarum* ed. 6. 1.
- DIETRICH, D. 1839. *Synopsis Plantarum* 1.
- DUCKE, A. 1915. *Arch. Jard. Bot. Rio* 1.
- DUCKE, A. 1922. *Arch. Jard. Bot. Rio* 3.
- DUCKE, A. 1925. *Arch. Jard. Bot. Rio* 4.
- DUCKE, A. 1932. *Bull. Mus. Hist. Nat. Paris* II. 4.
- DUCKE, A. 1933. *Arch. Jard. Bot. Rio* 6.
- DUCKE, A. 1935. *Arch. Inst. Biol. Veg.* 2.
- DUCKE, A. 1938. *Arch. Inst. Biol. Veg.* 4.
- DUMORTIER, B. C. 1829. *Analyse des Familles des Plantes*.
- ENDLICHER, S. 1836-40. *Genera Plantarum*.
- GLAZIOU, A. F. M. 1905. *Bull. Soc. Bot. France* 52. mém. 3.
- GLEASON, H. A. 1933. *Bull. Torrey Bot. Cl.* 60.
- KEAY, R. W. J. & F. A. STAFLEU 1952. *Acta Bot. Neerl.* 1 (4); also in *Med. Bot. Mus. Utrecht* 114.
- LANJOUW, J. & F. A. STAFLEU 1954. *Index Herbariorum*, part. I: The Herbaria of the World, second ed., *Regnum Vegetabile* 2 (1).
- LECOINTE, P. 1934. *A Amazonia Brasileira* 3.
- LEMÉE, A. 1952. *Flore de la Guyane Française* 2.
- LINK, H. 1822. *Jahrb. Gewächskunde* 1 (3).
- MACBRIDE, J. F. 1950. *Fiediana Botany* 13 (3).
- MARTIUS, C. F. P. VON & J. G. ZUCCHARINI 1824. *Nova Genera et Species Plantarum* 1.
- MEISNER, K. F. 1836-43. *Plantarum vascularium genera* 1.
- MENNEGA, A. M. W. 1948. *Suriname Timbers* 1.
- MEYER, E. 1825. *Nov. Act. Leop.* 12.
- PETERSEN, O. G. 1896. *Vochysiaceae* in Engler & Prantl, *Nat. Pfl. fam.* 3 (4).
- PILGER, R. 1931. *Notizbl. Berlin* 11.

- PFEIFFER, J. PH. 1926. De Houtsoorten van Suriname I. Med. Kol. Inst. 1926.
POEPPIG, E. F. 1833. Frorieps Notizen 35 (8).
PULLE, A. A. 1906. An enumeration of the vascular plants known from Surinam.
ROEMER, J. J. & J. A. SCHULTES. 1817. Caroli a Linné Systema Vegetabilium 1.
ROEMER, J. J. & J. A. SCHULTES 1822. Mantissa 1.
RUDGE, E. 1805. Plantae Guianenses 1.
SCHOMBURGK, R. I. 1848. Reisen in British Guiana 3.
SPRENGEL, C. (K.) 1818. Anleitung etc. 2 (2).
SPRENGEL, C. (K.) 1825. Syst. Veg. ed. 16. 1.
SPRENGEL, C. (K.) 1827. Idem 4, Cur. Post.
STAFLEU, F. A. 1948. A Monograph I, Rec. Trav. Bot. Néerl. 41; also in Med. Bot. Mus. Utrecht 95.
STAFLEU, F. A. 1951. Vochysiaceae in Pulle, Flora of Suriname 3 (2).
STAFLEU, F. A. 1952. A Monograph II, Acta Bot. Néerl. 1, also in Med. Bot. Mus. Utrecht 108.
STAFLEU, F. A. 1953. A Monograph III, Acta Bot. Neerl. 2, also in Med. Bot. Mus. Utrecht 116.
STAFLEU, F. A. cf. KEAY, R. W. J. & F. A. STAFLEU, 1952 and LANJOUW, J. & F. A. STAFLEU 1954.
STEUDEL, E. G. 1841. Nomenclator Botanicus, ed. 1.
TRATTINICK, L. 1811. Observationes botanicae 3.
WARMING, E. 1875. Flora Brasiliensis 13 (2).
WARMING, E. 1889. Vid. Med. Nat. För. 1889.
WILLE, N. 1882. Overs. Kgl. Dansk. Vid. Selsk. För. 1882.