

STUDIES ON NEOTROPICAL VIOLACEAE TRIBE RINOREAE I .
NEW TAXA AND SYNONYMY IN GLOEOSPERMUM AND RINOREA .

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New taxa of Gloeospermum Triana et Planchon and Rinorea Aublet are published here in anticipation of a revision in Flora Neotropica. Gloeospermum and Rinorea are related to each other and belong to the subfamily Violoideae, tribe Rinoreae, subtribe Rinoreinae (Melchior 1925).

In Gloeospermum the phyllotaxy is distichous and the inflorescences are cymose, mono-, di- or pleiochasial. The ovaries contain 3 x (8-22) ovules. Their capsula is indehiscent. In Rinorea the leaves are alternate or secondary opposite. The inflorescences are paniculate, thyrsoid or (pseudo)racemose. The ovaries contain only 3 x (1-3(4)) ovules. Their capsula is dehiscent into 3 valves. The distribution of Gloeospermum is confined to the neotropics; Rinorea is also recorded in tropical Africa and Asia. Taxa in both genera are shrubs or small trees, usually occurring in the understory of humid tropical forests from sealevel up to submountainous regions. New taxa are described, one species is transferred from Rinorea to Gloeospermum and some species in Rinorea are united or reduced to synonymy. The descriptions and transfers are usually followed by differential notes and discussions.

Gloeospermum grandifolium Hekking sp. nov., pl. 1, f. 1.

Arbuscula. Folia disticha; laminis ellipticis vel obovatis; venis lateralibus 9-13 (apice excluso); marginibus subintegris, apice subcrenatis vel subserratis; basi rotundata abrupte breviter attenuata in petiolum. Inflorescentia cymosa vel dichotoma. Sepala subinaequalia. Petala aequalia carnosa, versus basin leviter ciliolata. Stamina filamentis fere liberis; squamis ellipticis translucidis, $1/2$ x longioribus quam thecis. Pistillum + 2.5 x staminibus longius; ovario subgloboso, glabro, 3 x ... ovulis; stylo versus basin inflato. Capsula subglobosa, sublignosa, indehiscens; seminibus 12-30, subglobosis, viscosis, amylaceis.

Shrub or tree 15-20 m tall, stem 25 cm diameter. Branchlets glabrate with subligneous lenticels. Leaves distichous; stipules deciduous, narrowly deltoid, 7.0-12.0 mm long, 1.0-2.0 mm wide, herbaceous, glabrous, ciliolate near the base; petioles 3.0-9.0 mm long, minutely pilosellous; lamina chartaceous to subcoriaceous, elliptic to obovate, acuminate to cuspidate, glabrous, 8.5-21.0 cm long, 3.0-8.5 cm wide; costa above minutely pilosellous only near the base, underneath

completely glabrous; lateral veins 9-13 (apex excluded); veinlets + scalariform; apex 1.2-2.0 cm long, obtusish; margin subcrenate to subserrate especially near the apex; base rounded, abruptly short decurrent into the petiole. Inflorescence cymose or dichotomous, glabrate to minutely pilosellous, green; pedunculus 3.0 mm long, green; pedicels articulate near the base, + 10.0 mm long, green; bracts ovate or deltoid/, 1.0 mm long, + 0.7 mm wide, coriaceous, minutely pilosellous, ciliolate, mucronate. Buds ovoid, obtuse; sepals, petals, stamens and style whitish. Sepals slightly unequal, 2.5-3.0 mm long and wide, carnosae, glabrous, ciliolate; outer ones ovate, obtuse; inner ones orbicular. Petals (un?)equal, in buds + 6.0 mm long, + 3.0 mm wide, ovate, obtuse, carnosae, glabrous, ciliolate near the base; inner ones probably boat shaped and smaller. Stamens with filaments nearly completely free, equal or slightly shorter than the thecae; glands subulate, carnosae, adnate on the dorsal side of the filament, apical part free; filamental tube minute, surmounted by small linear scales between some filaments; the larger ones ciliolate at the apex; thecae elliptic; connective scales subulate to narrowly deltoid or lineary, transparent, 0.5 x as long as the thecae. Pistillum + 2.5 x longer than the stamens; ovary subglobose, glabrous; style erect, inflate at the base, filiform near the apex; stigma truncate. Capsula subglobose, ligneous, 3.5-5.5 cm long, 2.3 cm wide, glabrous; seeds 12-30, subglobose, 6.0-7.0 mm long, 5.0-6.0 mm wide, glabrous, viscosae, amylaceosae.

Type: Little Jr 6405, 30 April 1943, (alab.) (holotype US; isotype F), "2 km S. of the Playa de Oro, Prov. Esmeraldas, Ecuador." Paratype: Romero-Castañeda 5401, 17 October 1955, (fr.) (COL), Monte Alto, al Sur de Tumaco, prov. Nariño, Colombia."

Distribution: Colombia and Ecuador, submountainous.

Vernacular name: "Cortillo" (Ecuador).

Uses: Wood hard "as rock", used for oars.

Gl. grandifolium Hekking sp. nov. is closely related to Gl. andinum (Tulasne) Melchior and Gl. sclerophyllum Cuatrecasas. In these species the filaments are + free while in the other species of this genus the filaments are united to a distinct tube at least near the base. In Gl. sclerophyllum the pistillum is equaling the stamens, while in Gl. andinum it is 2.0 x and in Gl. grandifolium even 2.5 x as long as the stamens. The shape and the colour of the connective scales are characteristic for each species. In Gl. grandifolium they are transparent, narrowly deltoid, 1/2 x as long as the thecae; in Gl. andinum orange brown, elliptic, equaling the thecae or slightly longer and in Gl. sclerophyllum narrowly ovate, 2 x as long as the thecae, transparent, only tinged with brown at the apex. From Gl. andinum and Gl. grandifolium only flower buds could be observed, since flowers in Gloeospermum are soon deciduous and therefore scarce

or even wanting. In Gl. grandifolium and Gl. andinum the seeds are globose, in Gl. sclerophyllum however discoid. Differences are also seen in the leaves, which in Gl. grandifolium and Gl. andinum have respectively 9-13 and 11-14 lateral veins (exclusive apex), in Gl. sclerophyllum only 4-9.

All three species occur in Colombia or in adjacent Ecuador. Gl. grandifolium is only known from the type localities in the Pacific area in Colombia (Nariño) and Ecuador (Esmeraldas) + at sealevel. The only known specimen of Gl. andinum was collected in the eastern sub-andean region of the Central Cordillera in Colombia (Tolimá) at 400-500 m. altitude. Gl. sclerophyllum is known from two collections near the Pacific Coast in Colombia (Valle) at 0-50 m. altitude.

Gloeospermum eneidense Hekking sp. nov., pl. 1, f. 2.

Arbuscula. Folia disticha; laminis ellipticis vel (ob)ovatis, subtus dense albido- et porphyreostictis; venis lateralibus 10-14 (apice excluso); marginibus subintegris. Inflorescentia cymosa, 1-3 x furcata, subsessilis. Sepala subaequalia. Petala inaequalia carnosae; exteriora 3 ovato-obtusa; interiora 2 anguste ovata, obtusiuscula, carinata. Stamina filamentis in tubo connatis; squamis superpositis, fuscis, apice obtusis vel truncatis et dentatis vel fimbriatis. Ovarium subglobosum, glabrum, ovulis 3 x (10-12). Stylus versus basin inflatus. Capsula ignota.

Tree + 5 m tall. Branchlets sparsely pilosellous, whitish punctate and striate. Leaves distichous; stipules deciduous; narrowly deltoid to lineary, acuminate, 8.0 mm long, 1.5-3.0 mm wide, herbaceous, glabrous, ciliolate near the base; petioles 2.0-7.0 mm long, minutely pilosellous; lamina coriaceous, elliptic to (ob)ovate, acuminate, glabrous, 7.5-17.2 cm long, 3.7-6.8 cm wide, (in sicco) underneath mixed purplish-white punctate; costa and veins glabrous on both sides; lateral veins 10-14 (apex excluded), veinlets scalariform; apex 0.8-1.0 cm obtusish or acutish; margin subentire; base rounded to cuneate. Inflorescence subsessile, cymose, 1-3 x branched; peduncle 0.3 mm, glabrate; lateral branchlets 2.5-5.0 mm long; pedicels articulate; basal part 1.0-2.0 mm long, sparsely pilosellous; apical part 2.0-3.0 mm long, glabrate; bracts deltoid to ovate, obtusish, mucronate, 0.8-1.0 mm long, 1.0-1.2 mm wide, coriaceous, minutely pilosellous, ciliolate. Buds ovoid, obtusish; flowers probably whitish. Sepals subequal, ovate, obtuse, 2.2-2.5 mm long and wide, carnosae at the base, minutely ciliolate. Petals inequal; outer 3 ovate, obtuse, 5.0 mm long, 2.5 mm wide (in older buds), carnosae at the basal and median part; margin scarious, glabrous; inner 2 narrowly ovate, obtusish, + 4.5 mm long, 2.2 mm wide, boatshaped, keeled, carnosae, not ciliolate. Stamens (in older buds) 3.0-3.7 mm long; filaments connate to a tube, 0.2-0.8 mm high, glabrous, with suborbicular lobes behind the thecae; thecae 1.2-1.5 mm long, 0.8-1.1 mm wide; connective scales ovate, 1.5-1.7 mm long, 0.8-1.2 mm wide, fuscous; apex obtuse or truncate, dentate or fringed. Ovary widely subglobose, 0.8-1.0 mm long, 1.0-1.2 mm wide, glabrous, containing 3 x (10-12) ovules. Style erect, 3.0 mm, conical inflate, only at the very apex

filiform, completely glabrous, 0.3 mm exceeding the stamens. Stigma truncate. Fruit unknown.

Type: Dwyer 8225, 17 January 1968, (alab., fl.)(holotype F), "Cerro Jefe and Eneida, Province Panama, Panama. Altitude: 650-900 m."

The taxonomic relationship of Gl. eneidense is discussed under the next species.

Gloeospermum equatoriense Hekking sp. nov., pl. 1, f. 3.

Arbuscula. Folia disticha; laminis ellipticis subtus porphyrestictis; venis lateralibus 6-8 (apice excluso); marginibus (sub)-integris. Inflorescentia mono- vel dichasialis. Sepala subaequalia. Petala inaequalia carnosae; exteriora 3 ovata acuminata; interiora 2 anguste ovata, carinata, acuminata vel obtusiuscula. Stamina filamentis in tubo connatis; squamis superpositis, anguste ovato-deltoides translucidis. Ovarium trapezioideo-subglobosum, glabrum, ovulis 3 x (+ 12). Stylus versus basin inflatus. Capsula juvenilis subglobosa vel subpyriformis. Seminum numerus ignotus.

Shrub. Branchlets sparsely minutely pilosellous with subligneous lenticels. Leaves distichous; stipules deciduous; lineary, acuminate, acutish, 5.0-6.5 mm long, 1.0 mm wide, herbaceous, sparsely minutely pilosellous ciliolate; petioles 4.0-9.0 mm long, minutely pilosellous, later on glabrous; lamina papery, elliptic, acuminate to cuspidate, glabrous, 4.0-11.2 cm long, 2.5-5.0 cm wide; costa minutely pilosellous near the base on both sides, purple striate especially underneath; lateral veins 6-8 (apex excluded), veinlets + scalariform; apex 0.4-1.0 cm obtuse, mucronate; margin subentire; base rounded to cuneate, minutely decurrent into the petiole. Inflorescence mono- or dichasial; peduncle 2.0 mm, minutely pilosellous to glabrate; lateral branchlets 2.0-18.0 mm long, minutely pilosellous; pedicels articulate, minutely erect pilosellous, densely purple striate, basal part 0.3 mm, apical part 1.5-2.0 mm; bracts widely ovate or deltoid, 0.6-1.5 mm long and wide, coriaceous, sparsely pilosellous, ciliolate. Buds ovoid, conical, obtusish; flowers white. Sepals subequal, ovate to orbicular, 2.0-2.5 mm long and wide, herbaceous, carinose near the base and in median part, densely purple punctate, glabrous; margin scariosa, ciliolate. Petals unequal, carinose, densely purple punctate, glabrous, ciliolate; outer ones ovate, acuminate, obtusish, 7.0 mm long, 2.5 mm wide (in older buds); inner ones narrowly ovate 7.0 mm long, 2.0 mm wide, boat shaped, keeled, acuminate, obtusish. Stamens 3.0 mm long (in older buds); filaments connate to a tube 0.6-0.8 mm high, ciliolate, with orbicular lobes behind the thecae; thecae 1.3 mm long, 0.7 mm wide; connective scales narrowly ovate to deltoid, acuminate, transparent, erose to dentate, + 1.2 mm long, 0.5 mm wide; apex acutish. Ovary trapezoid-globose, 1.0 mm long and wide, glabrous, containing 3 x (+ 12) ovules. Style erect, 3.0 mm long, inflate, only 1/3 apical part filiform, 1.2 mm exceeding the stamens. Stigma truncate. Capsula of juvenile fruit

subglobose to slightly pyriform, 1 cm diameter, glabrous, sparsely punctate, sepals subpersistent.

Type: Manuel Lugo 39, 8 February 1940, (fl., fr.) (holotype S), "Mera, Prov. Pastaza, Ecuador." Altitude 1000-1100 m.

In Gl. diversipetalum L. Williams, Gl. eneidense Hekking sp. nov. and Gl. equatoriense Hekking sp. nov. the filaments are distinctly connate. The three species are related to each other and are characterized by their unequal petals; the three outer petals are more or less flat or slightly curved, the two inner ones are boat-shaped and carinate near the apex. In Gl. eneidense and Gl. diversipetalum they are 2 x longer than wide and not punctate or only slightly so near the apex; their margin is glabrous. In Gl. equatoriense however they are 3 x longer than wide and densely purple punctate; their margin is densely ciliolate from the base to the apex. Moreover, the filamental tube of Gl. equatoriense is ciliolate and the connective scales are transparent, narrowly ovate to deltoid and shorter as well as narrower than the thecae. In the other two species the filamental tube is not ciliolate and the connective scales are brown, elliptic to (ob)ovate and about as long as wide as the thecae. Colour and shape of the connective scales are also different in Gl. eneidense and Gl. diversipetalum. In Gl. eneidense they are fuscous, although at the base less intensely coloured; their apex is truncate and strongly erose to fringed, but the margin is subentire. In Gl. diversipetalum they are orange brown and transparent at the base; their apex is acuminate to acutish and their margin tends to become erose especially near the apex. Fruits are still insufficiently known; in Gl. equatoriense only juvenile ones have been observed while in Gl. eneidense fruits remain entirely unknown. The leaves of Gl. eneidense contain 10-14 lateral veins, those of Gl. equatoriense only 6-8; in Gl. diversipetalum this number is 7-12. Only in Gl. diversipetalum the margin of the leaves is distinctly serrate or crenate, especially near the apex; in the other species the margin is (sub)entire. The underside of the lamina has a different punctation in each species. It is purple to white in Gl. diversipetalum, mixed purplish-white in Gl. eneidense and purple only in Gl. equatoriense. Gl. diversipetalum and Gl. equatoriense have similar punctation and striation on the pedicels (observations made in dried material).

Gl. eneidense and Gl. diversipetalum seem to be confined to Central America. The only known specimen of the former species originates from a submountainous area, while the latter is known from several localities in Costa Rica, at altitudes varying from sealevel to 800 m. Gl. equatoriense is only known from the type locality in Ecuador, where it was collected on the eastern side of the Eastern Cordillera at an altitude of 1000-1100 m. Gl. diversipetalum and also the other species occur in the understory of tropical forests.

Gloeospermum falcatum Hekking sp. nov., pl. 1, f. 4.

Arbuscula. Folia disticha; laminis anguste ellipticis; venis

lateralibus 8-11 (apice excluso); marginibus subcrenatis. Inflorescentia cincinnis (1-2) x dichotomis. Sepala aequialia. Petala aequalia incrassata. Stamina filamentis in tubo connatis; squamis superpositis, cinnamomeis, parte basali translucidis, praesertim apice dentatis. Ovarium subglobosum, glabrum, ovulis 3 x 12. Stylus versus basin inflatus. Capsula subglobosa, sublignosa, indehiscens, verrucosa; seminibus 12-20, subglobosis, viscosis, amylaceis.

Treelet 13 m tall, stem 3.3 cm diameter. Branchlets glabrous with subligneous lenticels. Leaves distichous; stipules deciduous, subulate or lineary, acuminate, 6.0-12.0 mm long, 1.0-2.0 mm wide, herbaceous to coriaceous, scarious near the margin, glabrous, ciliolate; petioles 3.0-5.0 mm long, glabrous; lamina papery, narrowly elliptic, acuminate 6.5-19.2 cm long, 1.3-5.6 cm wide, glabrous, costa also glabrous on both sides; lateral veins 6-8 (apex excluded), veinlets reticulate; apex 1.0-2.5 cm acutish; margin subcrenate, mucronulate; base rounded to cuneate. Inflorescence consisting of 1-2 x bifid cincinni, minutely pilosellous; peduncles 1.0-2.5 mm long; branchlets 0.3-1.0 mm long; pedicels articulate; basal part 1.0-2.5 mm long, minutely pilosellous; apical part 8.5-10.0 mm glabrous; bracts ovate to deltoid, obtusish, 0.8-1.0 mm long, 0.6-0.8 mm wide, coriaceous, minutely pilosellous to glabrous; margin scarious, ciliolate. Buds ovoid to conical, obtusish; flowers whitish. Sepals subequal, widely ovate, obtusish to acutish, 1.5-2.2 mm long, 1.5-2.5 mm wide, herbaceous to coriaceous, glabrous; margin scarious, minutely ciliolate. Petals equal, ovate to deltoid, acuminate, obtusish, 4.5-5.5 mm long, 2.2 mm wide, incrassate, glabrous, not ciliolate. Stamens 3.0 mm long; apical parts of filaments free, 0.3 mm long, 0.3-0.4 mm wide; basal part connate to a tube, 0.2-0.5 mm high, glabrous, with deltoid lobes between the stamens; thecae + 1.2 mm long, 0.8 mm wide; connective scales elliptic to narrowly ovate, 1.5-2.0 mm long, 0.4-0.9 mm wide, orange brown, at the base transparent; margin erose to dentate especially near the apex. Ovary subglobose 1.2-1.5 mm long and wide, glabrous, containing 3 x 12 ovules. Style erect 4.0 mm, glabrous, inflate near the base, 0.4-1.0 mm exceeding the stamens. Stigma obtuse. Capsula indehiscent, (in vivo) green to yellow, ligneous, 3.0-3.5 mm diameter, glabrous, verrucose, style subpersistent; seeds + 12-20, pyriform, 12.0 mm long, 7.0 mm wide, glabrous, densely purple punctate (in sicco) amylaceous.

Type: Little Jr 6528, 18 May 1943, (fl., fr. juv.) (holotype US, isotype F), "common in undergrowth of wet tropical forest, collected in old cacao plantation at Phichilingue, prov. Los Ríos, Ecuador." Paratype: Acosta Solís 13643, 1 September 1941, (fr.) (F), Loc.: "Km 170-175, vía Sto Domingo-Guinindé, prov. de Los Ríos, Ecuador. Alt. 300 m."

Distribution: Ecuador.

Vernacular name: "Naranjilla de monte."

Additional material: ECUADOR, Los Ríos, Dodson & Gentry 6297 (alab.)(AAU); Little Jr 6438 (fr.)(F, K, US).

The taxonomic relationship of Gl. falcatum is discussed under the next species.

Gloeospermum longifolium Hekking sp. nov., pl. 1, f. 5.

Folia disticha; laminis anguste ellipticis; venis lateralibus 9-11 (apica excluso); marginibus (sub)integris. Inflorescentia cincinnis (1-2) x dichotomis. Sepala subequalia. Petala aequalia herbacea. Stamina filamentis in tubo connatis; squamis superpositis, cinnamomeis. Ovarium trapezioideo-subglobosum, glabrum, ovulis 3 x 8. Stylus versus basin inflatus. Capsula ignota.

Tree. Branchlets glabrous with subligneous lenticels. Leaves distichous; stipules soon deciduous; petioles 9.0-11.0 mm long, glabrous; lamina papery, narrow elliptic, acuminate, glabrous, 14.7-23.0 cm long, 5.7-7.5 cm wide; costa glabrous on both sides; lateral veins 9-11 (apex excluded); veinlets scalariform; apex 0.5-1.5 cm, acutish to obtusish, mucronate; margin subentire; base rounded to cuneate. Inflorescence consisting of 1-2 x bifid cincinni, minutely pilosellous; peduncles 2.0 mm; branchlets 0.5-3.0 mm; pedicels articulate, erect minutely pilosellous; basal part 1.0-1.5 mm, apical part + 4.0 mm long; bracts ovoid to deltoid, acutish, mucronate, 1.2 mm long and wide, herbaceous, erect minutely pilosellous; margin scarious, ciliolate. Buds conical, obtusish; flowers whitish. Sepals subequal, (widely) ovate to orbicular, 2.5-3.0 mm long, partly carnose, minutely pilosellous, ciliolate. Petals equal, elliptic, obtuse, 7.0 mm long, 3.0 mm wide, partly ciliolate. Stamens 4.0 mm long; apical parts of filaments free, 0.2 mm long, 0.4-0.8 mm wide; basal part connate to a tube, 0.8-1.0 mm high, glabrous, with large obtuse lobes behind the thecae and sometimes with smaller ones between them; thecae + 1.2 mm long, + 0.9 mm wide; connective scales 0.8-1.0 mm long, 0.4 mm wide, narrowly elliptic, orange brown also at the base; margin erose to dentate only at the apex. Ovary trapezioideo-conical to subglobose, 1.5 mm long, + 1.2 mm wide, glabrous, containing 3 x 8 ovules. Style erect, 3.0 mm, inflate near the base, apical parts filiform, glabrous, 1.5 mm exceeding the stamens. Stigma truncate. Fruit unknown.

Type: Cuatrecasas 11143, 11 December 1940, (fl.)(holotype COL, isotypes F, NY) "Selvo higrófilo del río San Miguel en el afluyente izquierda. Quebrada de la Hormiga, 290 m. Comisaría del Putumayo, Colombia."

The type specimen Cuatrecasas 11143 has been determinated as Gl. gossypium by Smith & Fernández (1954), who noted the aberrant character of the leaves. Those of Gl. gossypium are much wider ovate to elliptic with 13-20 lateral veins.

Gl. dichotomum (Rusby) Melchior, Gl. falcatum Hekking sp. nov. and Gl. longifolium Hekking sp. nov. are related to each other. The petals in these species are equal. The filaments are connate to a tube. Floral characters mainly serve to distinguish the species. In Gl. falcatum and Gl. dichotomum the pedicels are 8.0-14.0 mm long, surpassing those of Gl. longifolium, which are only 5.0-5.5 mm long. On the other hand Gl. longifolium has longer sepals, which are 2.5-3.0 mm long in Gl. longifolium and only 1.5-2.2 mm in the other species. In Gl. dichotomum the petals are + carnose, + 8.5 mm long and 2.7 mm wide, in Gl. longifolium they are herbaceous, + 7.0 mm long, + 3.0 mm wide and in Gl. falcatum incrassate, + 5.0 mm long, + 2.2 mm wide. Inside the flowers the location of the apical deltoid lobes of the filamental tube is different in each species. In Gl. dichotomum they are placed behind the stamens, in Gl. falcatum between them and in Gl. longifolium the larger ones behind and the smaller ones usually between the stamens. The thecae of Gl. falcatum and Gl. longifolium are + 1.5 x longer than wide; those of Gl. dichotomum 2 x. The connective scales are brown, but in Gl. falcatum and Gl. dichotomum they become transparent at the very base. Connective scales of Gl. longifolium are 0.8-1.0 mm long, + 0.4 mm wide, subentire and only erose-dentate at the apex; those of Gl. dichotomum 1.2-1.5 mm long, + 0.8 mm wide, subentire, bi-acuminate and in Gl. falcatum 1.5-2.0 mm long, 0.6-0.9 mm wide, erose to dentate especially near the apex. In Gl. longifolium, Gl. falcatum and Gl. dichotomum the style is respectively + 3.0 mm, + 4.0 mm and + 4.5 mm long. Dried fruits of Gl. falcatum are verrucose, while in Gl. dichotomum they are smooth and with whitish spots. Fruits of Gl. longifolium are unknown till yet. A few distinguishing characters are also found in the vegetative parts. The petioles of the apical leaves are 9.0-11.0 mm long in Gl. longifolium and only 2.2-6.0 mm in the other species. Moreover, in Gl. longifolium the veinlets are distinctly scalariform, in Gl. dichotomum they are less distinctly scalariform and in Gl. falcatum they tend to become reticulate.

Gl. longifolium was recorded along a frontier river between Colombia and Ecuador, without any indication of altitude. Specimens of Gl. falcatum originate from warm tropical forests at 150-300 m on the eastern slope of the Eastern Cordillera in Ecuador. Some specimens of Gl. dichotomum were collected in mountainous forests of the Sierra Nevada de Santa Marta (Colombia) at an altitude of 1300-1800 m. Another specimen has recently been collected in lower submountainous forest at 300 m on the East side of the Eastern Cordillera in Ecuador.

Gloeospermum blakeanum (Standley) Hekking comb. nov., pl. 1, f. 6.
Rinorea blakeanum Standley, Publ. 392. Field Mus. Nat. Hist.
22(15): 349. 1940; Robijns Jr, Ann. Missouri Bot. Gard. 54:
71. 1967; type: Terry & Terry 1513, 12 March 1940, (fl.)
(holotype F, isotypes A, MO), Cana-Cuasi. Trails. Chepigana-
District, Darien Province, Panama. Altitude: ca 1500 m.

Standley (1910) described this species in Rinorea, but Robijns (1967) stated that the systematic position of this species was uncertain. The alternate "probably" distichous leaves and the contracted "racemose" inflorescences (or cincinni) suggested relationship to Gloeospermum, but by lack of fruits Robijns hesitated to make the transfer. The phyllotaxy, the inflorescence, the incrassate petals, the characters of the androecium and the ovary bearing 3 x 8 ovules indicate indeed that this species belongs in Gloeospermum, where it is related to Gl. sphaerocarpum Triana & Planchon and Gl. pilosum Melchior. The petals in the three species are equal and the stamens are connate forming a tube. This tube is ciliolate and deeply rounded sinuate in Gl. blakeanum, while the rounded lobes are located behind the stamens. In Gl. sphaerocarpum and Gl. pilosum the tube is not ciliolate and less distinctly and more irregularly sinuate. In Gl. blakeanum the thecae are only 1.2-1.5 x longer than wide, while in the latter two they are 2.0 x. The connective scales of Gl. blakeanum are strongly fringed and tinged brown at the apex, but in both other species they are completely transparent and (sub)erose to fringed. The ovary in Gl. blakeanum has 3 x 8 ovules, in Gl. sphaerocarpum 3 x 12 and in Gl. pilosum probably 3 x 9. The leaves of Gl. blakeanum tend to be smaller and long tapering; the upper side of the costa is pilosellous. In Gl. sphaerocarpum and Gl. pilosum the leaves are acuminate-cuspidate with the costa glabrous above. Moreover in Gl. pilosum the underside of the lamina is distinctly pilose (name!).

Gl. blakeanum is only known from a mountainous area at 1500 m. in Panama (Darien) close to the border with Colombia. Gl. sphaerocarpum has the largest area of distribution in this genus and is widely dispersed over French Guiana, Venezuela, Colombia, Ecuador, northern Peru and upper Amazonian Brazil. Gl. pilosum is only recorded from northern Peru.

Rinorea crenata Blake, Contr. U.S. Nat. Herb. 20 (13): 500. 1924;
Standley, Field Mus. Nat. Hist. Bot. 18 (2): 715. 1937

Rinorea roureoides Woodson, Ann. Missouri Bot. Gard. 37: 403. 1950

R. roureoides from Central America appeared to be synonymous with R. crenata from Colombia.

Rinorea apiculatus Hekking sp. nov., pl. 2, f. 7.

Arbor parva. Folia alternantia; laminis elliptico-ovatis; costis glabris; venis lateralibus 7-11 (apice excluso); marginibus subintegris vel subcrenatis. Inflorescentia thyrsis 1-3 fasciculatis, axillaribus vel terminalibus; cymulis 1-3 floribus. Sepala (sub)aequalia. Petala aequalia herbacea et scariosa, ciliolata. Stamina filamentis basali parte in tubo carnoso connatis; squamis superpositis, cinnamomeis. Ovarium subglobosum glabrum, ovulis 3 x 1. Stylus 1.5 mm longus, curvatus, glaber. Fructus juvenilis glaber.

Tree 5 m tall. Branchlets minutely pilosellous or pruinose, later on glabrous. Leaves alternate; stipules deciduous, ovate, 3.0-5.5 mm long, 1.0-3.0 mm wide, herbaceous, glabrate, ciliolate; apex purple mucronate; petioles 7.0-13.0 mm long, minutely pilosellous, later on laneous; lamina subcoriaceous, elliptic to ovate, acuminate to cuspidate, glabrous, 8.5-20.0 cm long, 4.0-7.7 cm wide. Costa and veins densely minutely pilosellous underneath; lateral veins 7-11 (apex excluded); veinlets + scalariform; apex 0.7-1.0 cm long, obtuse, purple mucronate; margin subentire to subcrenate, purple mucronulate; base rounded to obtuse. Inflorescence thyrsoïd, 1-3 fasciculate, axillary or terminal, 4.5-9.0 cm long, + 1.5 mm wide, pilosellous; cymules with 1-3 flowers; peduncles 2.0-6.0 mm long, pilosellous; pedicels 1.0-2.5 mm long, articulate, pilosellous; bract(let)s ovate to deltoid, acuminate, acutish, purple mucronate, herbaceous; margin scarious, ciliolate; bracts 0.7-1.0 mm long, 0.4-0.8 mm wide; bractlets 0.3-0.8 mm long, 0.3-0.5 mm wide, subopposite or alternate. Buds orbicular; flowers greenish to whitish. Sepals subequal 1.0-1.5 mm long, 0.8-1.2 mm wide, ovate, obtuse, herbaceous, obscurely 1-3 venose; margin scarious, ciliolate. Petals 2.5 mm long, 1.5 mm wide, ovate, obtuse, herbaceous; margin scarious, ciliolate. Stamens + 2.0 mm long; apical parts of filaments free, 0.2-0.4 mm long, 0.1 mm wide; basal part connate to a tube, 0.4-0.5 mm high, carnosé, glandular, 5- sinuate; thecae 0.8-1.0 mm long, 0.6-1.0 mm wide, obtuse, sometimes 2 - mucronate, barbate at the base; connective outside + 0.5 mm long, 0.1-0.2 mm wide, barbate; connective scales apical, ovate or elliptic, fringed or erose, orange brown, 0.7-1.0 mm long and wide, equaling the thecae. Ovary subglobose, 0.8-1.0 mm long and wide, glabrous, containing 3 x 1 ovules. Style 1.5 mm long, slightly curved, glabrous, 0.5-0.7 mm exceeding the stamens. Stigma truncate, pulvinate. Juvenile fruit glabrous.

Type: Woytkowski 7536, 18 September 1962 (alab., fl., fr. juv.) (holotype F, isotypes MO, K) "in forest, altitude 900 m., Pendencia, dept. Huánaco, Perú."

Paratypes: Gentry 10164, 24 February 1974, (alab.)(GB, U) "wet forest, half way between Quevado and Santo Domingo de los Colorados, Río Palenque Field Station, elevation ca 200 m., prov. Los Ríos, Ecuador"; Harling, Eliasson & Andersson 14781, 22 January 1977, (alab., fl.)(GB, U) "secondary vegetation and disturbed rain forest, road Coca (Puerto Francisco de Orellana) Armenia Vieja, ca 15 km. S. of Coca, altitude ca 250 m. s.m., prov. Napo, Ecuador".

Distribution: Ecuador and Perú.

R. apiculatus is named after its apical connective scales just as in the two related species R. crenata Blake and R. oraria Steyermark & Fernández. The inflorescences of these species are terminal or axillary with 1-3 fasciculated in the axils of the leaves. In R. apiculatus and in R. crenata however they are

thyrsoid with cymules of 1-3 flowers and in R. oraria they are corymbose with cymes of 1-7 flowers or even more. The pedicels in R. apiculatus are mostly shorter than in R. crenata and R. oraria (respectively 1.0-2.5 mm, 2.0-5.0 mm and 1.5-6.0 mm long). In R. oraria and R. apiculatus the stamens are 2.5 mm long or less, in R. crenata 2.5 mm or more. The connective scales on the thecae are respectively + 0.6 mm, + 0.9 mm, + 1.5 mm long and + 0.5 mm, + 0.8 mm, and + 0.9 mm wide; in R. oraria they tend to be shorter, in R. apiculatus equaling and in R. crenata longer than the thecae. The filaments are at the base united into a tube of glandular character. This tube is in R. apiculatus and R. crenata 5-sinuate, in R. oraria 10-sinuate. The styles in R. apiculatus and R. oraria are + 1.5 mm long, but in R. crenata 2.0 mm or more. Fruits of R. apiculatus and R. crenata are glabrous, those of R. oraria are still unknown. The leaves are alternate in all three species, but they are distinctly more crenate in R. crenata (name!) than in the other ones.

The areas of distribution are well separated from each other: R. apiculatus is recorded from the eastern as well as from the western side of the Cordilleras in Ecuador (altitude 200-250 m) and from the Peruvian Andes (altitude 900 m); R. crenata is known from Costa Rica and Panama (altitude 10-100 m), while R. oraria was collected on the northern slope of the Coastal Cordillera near Caracas, Venezuela (altitude 700-900 m).

Rinorea longistipulata Hekking sp. nov., pl. 2, f. 8.

Arbor parva. Folia alternantia; laminis elliptico-ovatis; costis glabris; venis lateralibus 11-15 (apice excluso); marginibus subcrenatis; basi rotundo-cuneata abrupte in petiolum attenuata. Inflorescentia pseudoracemis 1-3 fasciculatis, axillaribus, terminalibus; cymulis 1-3 floribus. Sepala (sub)aequalia. Petala equalia, exteriora versus basin subcordata, carnosa, intus pilosella. Stamina subsessilia; filamentis brevibus + liberis; connectivo dorsaliter glabro, producto in squama ovata, acuminata cinnamomea. Ovarium subglobosum, leviter trilobatum, pilosum, ovulis 3 x 2. Stylus erectus sive leviter curvatus. Fructus juvenilis pilosus.

Tree 6-8 m tall. Branchlets glabrate, younger ones pilosellous. Leaves alternate; stipules deciduous, narrowly deltoid, acutish 6.0-9.0 mm long, 1.0-2.0 mm wide, herbaceous, multi-striate, near the base pilosellous, margin minutely ciliolate; petioles 5.0-12.0 mm glabrous; lamina subcoriaceous to papery, glabrous, 6.0-14.5 cm long, 3.2-7.0 cm wide, elliptic to ovate, acuminate; costa glabrous on both sides; lateral veins 11-15 (apex excluded); veinlets + scalariform; apex 0.5-2.0 cm, acutish to obtusish; margin subcrenate, purple mucronulate; base rounded to cuneate, abruptly short decurrent into the petiole; inflorescence pseudoracemose, 1-3 fasciculate, axillary or terminal, 3.0-10.0 cm long, 1.0-2.5 cm wide, pilosellous; cymules with 1-3 flowers, sometimes 1-2 rudimentary buds also present;

peduncles if not wanting 3.0-4.0 mm long, pilosellous; pedicels 2.0-6.0 mm long, articulate near the middle, pilosellous; bract (let)s deltoid, ovate or elliptic, acutish to obtusish, herbaceous, pilosellous, ciliolate; bracts 1.2-1.8 mm long, 0.6-0.8 mm wide, 3-5 venose; bractlets 0.7-1.0 mm long, + 0.6 mm wide, 1-3 venose, subopposite or alternate. Buds ovoid, conical to the apex; flowers whitish. Sepals (sub)equal, 2.0-2.5 mm long, 1.2-1.7 mm wide, elliptic to ovate, obtuse, herbaceous, 3(5)-venose, glabrous, margin scarious, ciliolate. Petals 5.0-6.3 mm long, 2.0-2.5 mm wide, ovate, acuminate, obtusish, herbaceous; margin scarious, only slightly pilosellous at the apex; outer petals at the base subcordate, carnose, pilosellous only inside. Stamens 3.5-4.5 mm long, subsessile; filaments + free, 0.3-0.4 mm long, 0.3-0.5 mm wide, slightly pilose on the ventral side; dorsal glands on some filaments, free, conical, callose, erected outward; thecae 1.5-1.8 mm long, + 0.8 mm wide, glabrous; connective dorsally 1.2 mm long, 0.3-4.0 mm wide, narrowly deltoid, glabrous; connective scales 3.0-4.0 mm long, 0.8-1.3 mm wide, ovate, acuminate, acutish to obtusish, orange brown, erose to lacerate at the base. Ovary subglobose or slightly trilobed, 1.2-1.5 mm long, + 1.0 mm wide, (in sicco) goldish pilose, containing 3 x 2 ovules. Style 3.0-4.0 mm long, erect or slightly curved near the base, glabrous, 0.3-0.5 mm exceeding the stamens; stigma truncate. Young fruits, pilose, green.

Type: Prance, Ramos & Farias 7623, 14 September 1968, (alab. fl., fr. juv.)(holotype U, isotypes A, C, COL, F, G, K, INPA, MG, MICH, MO, NY, US, VEN)"forest on terra firme, vicinity of Taraucá, State of Acre, Brazil."

Paratype: Prance, Ramos & Farias 7529, 21 September 1968, (alab., fl., fr. juv.)(A, C, COL, F, G, K, INPA, MG, MICH, MO, NY, US, VEN)"1-3 km. E. of Río Taraucá, State of Acre, Brazil."

The taxonomic relationship is discussed under the next species.

Rinorea multivenosa Hekking sp. nov., pl. 2, f. 9.

Arbuscula. Folia alternantia; laminis elliptico-ovatis; costis glabris; venis lateralibus 15-19 (apice excluso); marginibus (sub)serratis; basi obtuso-rotundata. Inflorescentia pseudoracemis 1-3 fasciculatis, axillaribus vel terminalibus; cymulis 1-3 floribus. Sepala subaequalia. Petala aequalia, versus basin carnosae, extus minute pilosella, intus dense villosa. Stamina subsessile; filamentis brevibus + liberis; connectivo dorsaliter piloso, producto in squama anguste ovata acuminata cinnamomea. Ovarium subglobosum, villosum, ovulis 3 x 1. Stylus ad basin sigmoideo-curvatus. Fructus capsula ovata, glabrata, dehiscens in 3 valvis subaequalibus. Semina globosa, glabra, 3 x 1.

Tree. Branchlets sparsely minutely pilosellous to glabrate. Leaves alternate; stipules deciduous, narrowly deltoid to ovate, acutish, 4.0-5.0 mm long, 0.2-1.8 mm wide, herbaceous, multivenose, sparsely pilosellous, ciliolate; petioles 5.0-9.0 mm long, glabrate

to sparsely pilosellous; lamina papery to herbaceous, glabrous, 8.0-20.5 cm long, 4.5-10.2 cm wide, elliptic to ovate, acuminate; costa glabrous on both sides; lateral veins 15-19 (apex excluded), veinlets + scalariform; apex 0.6-1.5 cm acutish; margin (sub)-serrate, purple mucronulate; obtuse at the very base.

Inflorescences pseudoracemose, 1-2 fasciculate, axillary or terminal, 5.0-13.0 cm long, 1.0-2.0 cm wide, strigillose, laxiflorous near the base; cymules with 1-2(3?) flowers; peduncles, 1.0-2.5 mm strigillose; pedicels 2.5-2.7 mm long, articulate near the middle, strigillose; bract(let)s ovate, acuminate, acutish, herbaceous, 1-venose, strigillose, ciliolate; bracts 0.8-1.0 mm long, 0.5-0.6 mm wide; bractlets 0.5-0.8 mm long, 0.3-0.6 mm, subopposite or alternate. Buds ovoid, conical near the apex; flowers whitish. Sepals subequal, 1.3-2.0 mm long, 0.6-1.0 mm wide, ovate to deltoid, herbaceous, 3-venose, strigillose, ciliolate. Petals 5.0-5.2 mm long, 1.3-1.5 mm wide, narrowly ovate, acuminate, herbaceous, at the base carnose, outside minutely pilosellous, inside densely villose; margin glabrous; apex obtusish, pilosellous. Stamens 2.0 mm long; filaments + free, 0.3-0.7 mm long, 0.2-0.4 mm wide, villose near the thecae, connate at the very base over 0.1 mm; dorsal glands 0.2-0.4 mm, free, conical, callose, pilosellous or glabrate, extending outward; thecae 1.3 mm long, 0.7-0.8 mm wide; connective inside erect pilosellous near the base, outside 1.0-1.2 mm long, 0.2-0.3 mm wide, whitish villose; connective scales 3.5 mm long, 1.0 mm wide, ovate, obtuse or acutish, orange brown, suberose near the base. Ovary subglobose + 1.2 mm long, 1.0-1.2 mm wide, containing 3 x 1 ovules, goldish villose in sicco, greenish white in vivo. Style 3.0 mm long, at the base sigmoid, glabrous, whitish, 0.6 mm exceeding the stamens. Capsula ovate, obtusate, coriaceous or subligneous, dehiscent into 3 subequal valves, 8.5-9.5 mm long, 3.0-4.0 mm wide, glabrate. Semina 3 x 1, globose, + 4.5 mm, glabrous.

Type: Traill 22, 30 September 1874, (alab., fl.)(holotype K, isotype P) "low tree in varzea at Sapatini, R  o Purus, upper Amazon and tributaries, Amazonas, Brazil."

Paratype: Traill 23, 29 January 1875, (fr.)(K, P) "Inambu Kisawa, R  o Jutahi (= Jut  i), 5  12'S, upper Amazon and tributaries, Amazon, Brazil."

Distribution: Brazil (Amazonas, Rio de Janeiro)

Additional material: BRAZIL, Rio de Janeiro, Quinta de S. Christov  o, 18 October 1874, (fl.), Herbar de Glaziou s.n. (P).

R. multivenosa and R. longistipulata are closely related because of the following common characters: (1) leaves alternately arranged, (2) inflorescences terminal or axillary with 1-3 pseudoracemes fasciculated in the axils of the leaves, (3) flowers solitary or arranged in cymules of 2-3 flowers and (4) connective scales covering the dorsal side of the thecae nearly completely. The two species can easily be distinguished from each other. R. longistipulata has

longer stipules (6.0-9.0 mm!), bracts, sepals and petals than R. multivenosa. The length of the stipules in R. longistipulata is in fact longer than in other neotropical species of Rinorea. On the other hand R. multivenosa is characterized by the high number (15-19) of lateral veins, which is the highest number in neotropical species of Rinorea (also occurring in R. ulmifolia (HBK) Kuntze). In R. longistipulata only 11-15 lateral veins are observed. The dorsal side of the connectives (not the scales!) is villose in R. multivenosa and glabrous in R. longistipulata. In the former species the style is sigmoid at the base, in the latter + erect. The ovary in R. multivenosa contains 3 x 1 ovules and in R. longistipulata 3 x 2 ovules. Fruits of R. multivenosa are dehiscent into 3 subequal valves; its capsula is glabrate. The capsula of juvenile fruits of R. longistipulata is pilose.

Distribution of the two species is only known from the type localities in Acre and adjacent Amazonia in Brazil. One additional specimen of R. multivenosa is recorded from Rio de Janeiro and probably cultivated (?).

Rinorea bicornuta Hekking sp. nov., pl. 2, f. 10.

Arbor seu arbuscula. Folia alternantia; laminis obovatis; costis pilosis; venis lateralibus 10-13 (apice excluso); marginibus subintegris vel subcrenatis, sparse ciliolatis. Inflorescentia thyrsis solitariis, axillaribus vel terminalibus; cymulis 1-5 floribus. Sepala aequalia. Petala aequalia, carnosa et pilosa in mediana et basali parte, sparsim ciliolata. Stamina filamentis connatis in tubo carnoso; thecis ventraliter appendiculatis squamula bicornuta; connectivo dorsali glabro, producto in squama ovata acuminata pallide cinnamomea. Ovarium subconicum, apice pilosum, ovulis 3 x 1. Stylus erectus apice leviter curvatus. Fructus ignotus.

Tree or shrub; branchlets densely strigillose. Leaves alternate; stipules deciduous, narrowly deltoid 4.0-5.0 mm long, 1.0-1.5 mm wide, herbaceous, striate, costa pilose, margin ciliolate; petioles 3.0-11.0 mm long, pilose; lamina papery, 10.0-20.0 cm long, 4.0-8.2 cm wide, obovate, acuminate, glabrous; costa sparsely pilose (lous) on both sides; lateral veins 10-13 (apex excluded); apex 0.5-2.2 cm, acutish; margin subentire to subcrenate, sparsely ciliate; base rounded to cuneate. Thyrses solitary, terminal, axillary, strigillose, 9.0 cm long, 1.0-1.5 cm wide; cymules with 3-5(?) flowers; peduncles 1.2-2.5 cm, pilose; pedicels 1.0-1.3 cm long, articulate in + 1/3 basal part, pilose; bract(let)s ovate to deltoid, herbaceous, pilose in median part, ciliolate; bracts + 1.2 mm long, + 0.8 mm wide; bractlets subopposite, 0.8-1.0 mm long, + 0.6 mm wide. Buds conical, acutish; flowers cernuous, whitish. Sepals + equal, 2.0-2.2 mm long, 1.5-1.8 mm wide, ovate to deltoid, obtusish, herbaceous, carnosose and pilose near the base and along the costa; margin ciliate. Petals 3.2 mm long, + 1.5 mm wide, ovate to

deltoid, obtuse, herbaceous, carnose and pilose near the base and along the costa; margin sparsely ciliolate. Stamens 2.5 mm long; filaments connate to a tube, 0.2 mm high, glandular, carnose, glabrous; thecae 0.8 mm long, 0.4 mm wide, appendiculate by a two horned mucro, 0.4-0.8 mm long, 0.3 mm wide; connective outside + 0.6 mm long, 0.2 mm wide, glabrous; connective scales 2.0-2.2 mm long, 0.7 mm wide, ovate, acuminate, acutish, subentire, brownish. Ovary subconical, 0.8 mm long, 0.4 mm wide, pilose near the apex, containing 3 x 1 ovules. Style + 2.0 mm long, erect or slightly curved near the apex, + 0.5 mm exceeding the stamens. Fruit unknown.

Type : Ducke s.n. RB 21.353, 9 November 1927 (alab., fl.) (holotype RB) "Mata de terra firme, Tocantins, Solimões, Amazonas, Brazil."

R. bicornuta is named after its two long and fringed cusps on the ventral side of the apical part of the thecae: these cusps are connate at the base. The new species is related to R. paniculata (Martius) Kuntze, R. guianensis Aublet and R. bahiensis (Moriciand) Kuntze. In all the species the leaves are alternate, the inflorescences are solitary and terminal or axillary, the connective scales cover the thecae nearly completely, the filaments are connate and the ovaries contain 3 x 1 ovules. Fruits of R. bicornuta are unknown. Differences are the following. The inflorescence of R. bicornuta is thyrsoid with cymes of only 1-5 flowers; in the other species they are paniculate with cymes of 3-11 flowers (up to 21 in R. paniculata !). The flower buds are conical in R. bicornuta, tolpoïd in R. guianensis and R. bahiensis and elliptoid in R. paniculata. Buds and flowers are strongly deflexed only in R. bicornuta. R. bicornuta and R. paniculata differ from the two other species by shorter petals (1.7-3.2 mm long), by shorter thecae (less than 1.0 mm) and by shorter connective scales (distinctly shorter than 2.5 mm). In R. guianensis and R. bahiensis these floral parts are distinctly larger (e.g. petals 3.5-5.5 mm long). R. bicornuta is subsequently to distinguish from R. paniculata by its floral parts as follows. Pedicels of R. bicornuta are only 1.0-3.0 mm long, those of R. paniculata 2.5-5.0 mm. The petals are respectively + 3.2 mm and 1.7-3.0 mm long. The connective scales in R. bicornuta are 2.0-2.2 mm long and (2.5-3.0) x longer than the thecae, but in R. paniculata only 1.2-1.5 mm long and only (1.5-2.0) x longer than thecae.

The areas of distribution of these four species comprise three tropical lowland regions of S. America, separated from each other by mountain ranges: (1) N. Venezuela and Guianas, (2) Amazonia and (3) coastal region of S.E. Brazil. Only R. guianensis is recorded from all the three regions. R. bahiensis has a similar somewhat disjunct dispersion covering a more restricted area. It is not yet recorded from N. Venezuela nor from Amazonia, but was only collected on one locality of French Guiana and in a restricted area in S.E. Brazil. R. paniculata and R. bicornuta are so far only known from Amazonia. All the species occur along rivers and creeks and in humid forests from sealevel to submountainous regions.

Rinorea amapensis Hekking sp. nov., pl. 3, f. 11.

Arbor seu arbuscula. Folia opposita; laminis ellipticis; costis glabratiss; venis lateralibus 7-13 (apice excluso); marginibus subintegris, subserratis vel subcrenatis, versus basin rotundis vel cuneatis. Inflorescentia racemis solitariis, axillaribus, terminalibus. Sepala subaequalia. Petala aequalia, dorsaliter pilos(ell)a in mediana parte, apice ciliolata. Stamina filamentis liberis; thecis ventraliter 0-7 set(ul)is appendiculatis, dorsaliter in squamis erosis cinnamomeis productis. Ovarium subglobosum pilos(ell)um ovulis 3 x (1)2. Stylus erectus, ad basin leviter pilosellus. Fructus capsula dehiscens in 3 valvis subaequalibus pilos(ell)is, leviter venosis. Semina subglobosa, pilosella, 3 x (1)2.

Tree or shrub, 2.0-10.0 m tall, 2.0-15.0 cm diameter, bark greyish-maroon, wood creamy to brightly maroon; branchlets erect pilosellous and less densely pilose; porphyreous (in sicco), later on to greyish. Leaves opposite; stipules deciduous, deltoid, 1.0-4.0 mm long, 1.0-2.0 mm wide, herbaceous, appressed pilosellous, ciliate; petioles 2.0-7.0 mm long, erect pilosellous above, appressed pilosellous underneath; lamina papery, (2.5)5.0-13.7 cm long, 1.8-5.0 cm wide, elliptic to obovate, glabrous; costa above glabrous, underneath glabrate, occasionally sparsely appressed pilose; lateral veins (7)9-11(13) (apex excluded); veinlets reticulate; apex 0.3-1.8 cm, acutish, mucronate; margin subentire, subserrate to subcrenate; base rounded to cuneate. Racemes solitary, axillary or terminal, 5.0-8.5 cm long, erect pilosellous; pedicels 4.0-4.5 mm, articulate in 1/5-2/5 basal part; bract(let)s ovate to deltoid, herbaceous, 1-3 venose, pilosellous along the median part, ciliate; bracts + 1.2 mm long, 1.0-1.2 mm wide; bractlets + 1.0 mm long and wide, subopposite, close to the bracts but still separated from them. Buds ovoid-tolpoid, flowers whitish. Sepals subequal, 1.5-2.3 mm long, 1.3-2.0 mm wide, ovate to orbicular, obtuse to rounded, herbaceous, whitish pilosellous, whitish ciliate; petals 3.0-4.2 mm long, 1.3-1.8 mm wide, narrowly ovate, obtuse, herbaceous, carinose near the base, scarious near the margin, appressed brownish pilosellous in median part; apex sometimes ciliate. Stamens 2.5-3.0 mm long; filaments free, 0.5-0.8 mm long, 0.2-0.5 mm wide (occasionally two filaments connected by connate glands); glands elliptic 0.3-0.8 mm long, 0.2-0.4 mm wide, occasionally wanting, carinose, glabrous; thecae 1.2-1.4 mm long, (0.4)0.6-0.8 mm wide, sometimes 1-7 set(ul)ose; connective outside 0.8 mm long, 0.2 mm wide, glabrate or pilosellous; connective scales + 2.3 mm long, + 0.8 mm wide, (sub)erose, fringed at the very base, orange brown. Ovary subglobose, 0.8-1.3 mm long, 0.6-0.9 mm wide, pilose, containing 3 x 1 ovules; style 2.0-2.7 mm long, erect, slightly pilosellous at the base, 0.2-0.5 mm exceeding the stamens; stigma truncate. Capsula ovate, coriaceous or ligneous, in vivo green with a flush of pink on one side, venose, pilosellous, dehiscent into 3 subequal valves, 0.8-3.2 mm long, 0.3-1.0 mm wide, Seeds 3 x 2, subglobose, 5.0-7.0 mm long and wide, pilosellous, brownish.

Type: Cowan 38121, 4 November 1954, (alab., fl., fr.) (holotype NY, isotype A, MICH, MO, NY, S, U, UC, W) "frequent in forest on Fritz Akerman Ore Body on heavily forested hills, altitude 300 m, R  o Amapari, Serro de Navio, Amap  , Brazil."

Paratype: Cowan 38254, 11 December 1954, (fl. fr.) (A, K, NY, P, RB) "frequent in forest on laterite in vicinity of camp, 275 m alt. Montagne in Kaw (= Caux), French Guiana."

Habitat: undergrowth in dense forest, on slopes of hills, along rivers and creeks, on "mata virgem de terra firme", preference for clayish, lateritic and granitic soil. Altitude: 0-550 m.

Distribution: Brazil (Amap  , Par  ), basin of the lower Amazon; French Guiana: Surinam, S.W. Venezuela; S.E. Colombia.

Vernacular names: "l  le-tiki" (Surinam); "wayau" (French Guiana, nom ayampi).

Additional material: BRAZIL, Amap  : Cowan 38276 (fl., fr. juv.) (COL, NY); 38337 (fl.) (LIL, M, NY); Amazonas: Chagas 1279 (fl.) (COL); Don  sio s.n. (fl.) (INPA 4043); Mello 1998 (fl.) (COL, INPA, MG, U); Prance, Ramos, Steward & Pinheiro 11417 (fr.) (U); Rodrigues s.n. (= Pessoal de C.P.F. 1810 = Xyl. no X. 779) (fr.) (INPA, U); Rodrigues & Chagas 1825 (fl.) (INPA, U); Rodrigues, Co  lho & Chagas 4810 (fr.) (INPA, U); Rodrigues, Osmarino 8206 (fl.) (INPA, U); Par  : herb. Schwacke 3489 (alab) (RB); COLOMB  A, Vaup  s: Schultes, Baker & Cabrera 17933 (alab) (A, GH, US); FRENCH GUIANA: Cowan 38735 (fr.) (NY, P, U); Deward 149 (fr.) (CAY); de Granville 679 (alab., fr.) (CAY, P); Hall   1066 (fr.) (P); Leeuwenberg 11650 (fr.) (CAY, U, WAG); Oldeman 1100 (fr.) (CAY); 1580 (fl.) (CAY); 1727 (fl.) (CAY); 1807 (fr.) (CAY); 2129 (st.) (CAY); 2136 (st.) (CAY); B-2282 (fr.) (CAY); B-4040 (alab.) (CAY); T-854 (fl.) (CAY); Oldeman & Sastre 294 (fr.) (CAY); Sastre 294 (alab., fr.) (CAY); SURINAM: Cowan & Lindeman 39034 (fr.) (NY, U); Maas & Tawjoeran s.n. = LBB 10899 (alab.) (BBS, U); s.n. LBB 10969 (st.) (BBS, U).

R. amapensis is closely related to R. passoura (D.C.) Kuntze and to R. brevipes (Benth) Blake. In these species the leaves are (secondary) opposite and the inflorescences are racemose, solitary, axillary or terminal. Dried branchlets of R. amapensis are porphyreous to greyish, those of R. passoura ferrugineous; in R. brevipes they are reddish, shiny and covered by small white lenticels. In R. brevipes and R. passoura the costa of the leaves is puberulous above and appressed pilose underneath; domatia* are present. In R. amapensis the the costa is glabrous on both sides or nearly so and domatia are wanting. In this specis the bractlets stand close together

* = erect tufted hairs in the axils of the costa and of some of the lateral veins on the underside of the lamina.

with the bracts; in R. passoura and R. brevipes bractlets are distinctly separated from the bracts. The indument, especially in the floral parts, tends to become white in R. amapensis and R. brevipes and ferrugineous in R. passoura. Dried sepals in R. brevipes and particularly in R. passoura are ribbed, but those of R. amapensis remain smooth. The petals of R. amapensis are brownish pilose (lous) along the median parts, those of R. passoura are ferrugineous strigose only along the costa. In R. brevipes they are glabrous. In R. passoura and R. brevipes stamens are 3.0-5.5 mm long, but in R. amapensis they are only 2.5-3.0 mm. In all the species the filaments and glands are free. The style of R. brevipes being 4.0-5.0 mm long, exceeds the surrounding stamens by 0.7-1.3 mm; those of R. passoura and R. amapensis are only 2.0-2.7 mm long, while 0.-0.5 mm exceeding the stamens. There are 3 x (1-2) ovules and seeds in R. amapensis and R. brevipes, but 3 x (2-4) in R. passoura. The seeds of R. amapensis and R. passoura are pilosellous, those of R. brevipes glabrous. R. amapensis is also related, though more remotely, to R. riana (D.C.) Kuntze as well as to the complex of R. camptoneura (Radelk.) Melchior, R. falcata (Martius) Kuntze and R. flavescens (Aublet) Kuntze. Dried branchlets of R. riana are mostly reddish shiny as in R. brevipes, but they are covered by larger whitish lenticels. The ovary of R. riana is erect strigose, which gives its characteristic "spiny" habit. Fruits of R. riana seem to be velvety since they are covered by dense short and loose long hairs; in R. amapensis they are only loosely pilose. In dried specimens of R. riana the indument is mostly chestnut brown, while the ovary is sometimes goldish. In R. amapensis the indument varies from whitish to dirty brownish. R. camptoneura, R. falcata and R. flavescens finally differ from R. amapensis by their glabrous petals and seeds.

All these mentioned species are dispersed over tropical South America, north of 15° S and occur as an undershrub in humid forests on slopes, along creeks and rivers from sealevel to submountainous areas. R. passoura has the largest area of distribution, reaching to the Panama Canal Zone. R. brevipes is dispersed over N. Brazil (Pará, Amazonas, Rio Branco), Guyana and Surinam, while R. amapensis has an almost similar distribution, occupying N. Brazil (Amapá, Pará), French Guiana, Surinam and S.W. Venezuela. These areas of distribution are rather small in comparison with other related species.

Most of the specimens in the Paris Herbarium (P) belonging to R. amapensis were erroneously determined as R. martini (Turcz.) Blake, which appears to be a synonym of R. passoura (D.C.) Kuntze (fide holotype of Alsodeja martini Turcz. in KW: Martin s.n., (fl.), Cayenne, French Guiana). The complete synonymy of R. passoura is now as follows:

Rinorea passoura (A.P. de Candolle mss. ex Gingins) Kuntze, Rev. Gen. Pl. 1: 42. 1891, cited as Rinorea passura Kuntze; Blake, Contr. U.S. Nat. Herb. 20(13): 507. 1924; Melchior, Nat. Pflanzenfam. ed. 2. 21: 452. 1925; Baehni & Weibel, Candollea 8: 195. Mai 1941;

Field Mus. Nat. Hist. Bot. 13(4(1)): 61. 30 June 1941.

Conohoria? passoura (A.P. de Candolle mss. ex Gingins in D.C. Prodr. 1: 312; 1824

Passoura guianensis (Aublet, Pl. Guian. 2 suppl. 21. t. 380. 1775.

type: Aublet s.n. s.d., alab.fl. fr. (lectotype, P Herbier Jussieu 12797+B), Habitat in sylvis Timoutou'French Guiana; non Rinorea guianensis Aublet!

Alsodeia guianensis (Aublet) Eichler in Martius Fl. Bras. 13(1): 387. t. 28. f. 2. 1871, pro parte, ex vars;

Alsodeia pubiflora Benth in Journ. Bot. Hook 4: 106. 1842;

type: R.H. Schomburgk 573 (holotype, K Herbarium Benthmiamum, cited as Alsodeia pubeflora)

Rinorea pubiflora (Benth) Sprague & Sandwith in Sandwith, Kew Bull. 1931(4): 171. 1931; Lémee, Fl. Guian. Franç. 3: 60. 1953; Smith et Fernández, Caldasia 6(28): 107. 1954

Alsodeja martini Turczaninoff, Bull. Soc. Imp. Nat. Moscou 36(1): 557. 1863

type: Martin s.n. s.d., fl., (holotype & isotype KW), Cayenne, French Guiana; syn. nov.

Rinorea martini (Turczaninoff) Blake, Contr. U.S. Nat. Herb. 20(13): 506. 1924; Lémee, Fl. Guian. Franç. 3: 59. 1953; syn. nov.

Distribution: map 1.; Illustration: pl. 3, f. 12.

Rinorea passoura (D.C.) Kuntze var. andersonii Sandwith ex Hekking var. nov. forma andersonii, pl. 3, f. 13.

Rinorea pulleana Melchior nomen nudum, Nat. Pflanzenfam. ed. 2. 21: 352. 1925; Lémee, Fl. Guian. Franç 3: 60. 1953.

Type: Fanshawe F 2463 = FDG 5199, 8 April 1945, (fl. fr.) (holotype K, isotypes NY, P, U, US) "Apparently a var. of pubiflora (= synonym of passoura). Leaves longer acuminate, more strongly + intricately reticulate underneath. Sepals + Petals more glabrescent (manuscript of Sandwith, in K)."

Habitat: In low bushes to dense humid forests; between rocks, on slopes of hills and along creeks; on clayish soils. Altitude: 0-500 m.

Distribution (map 1): Northern Brazil, Guianas, Venezuela, Colombia.

Vernacular names: "Mamusaré" (Guyana); "Pate grulla, Pate de paují" (Venezuela, Bolívar).

Additional material: BRAZIL, Amapá: Cowan 38525 (fl., fr.) (NY, P, S, W); Pará: Pires & Silva 4617 (fl., fr.juv.) (US); COLOMBIA,

Meta: Idrobo & Jaramillo 2059 (fl., fr.)(COL); Karsten s.n. (LE, W); Killip 34268 (alab., fr.)(COL, US); Triana s.n. (1851-1857) (alab., fl., fr. juv.)(G, K, NY, W); Vaupés: Fernández 1975 (fr.)(US); FRENCH GUIANA: Granville 22 (fr.)(P); GUYANA: Andersson 617 (fl., fr.)(K); de la Cruz 1437 (alab., fr.)(A, F); 2991 (fl., fr.)(A, F, MO, NY, PENN, UC, US); 3176 (fl., fr.)(A, F, MO, NY, PENN, UC, US); 3297 (fr.)(F, MO, NY, PENN, UC, US); Forest Department BG (= FDG) 2548 (fr.)(K); JB 2893 (fr.)(FHO, K); SURINAM: Maguire 22942 (fl., fr.)(F, MO, NY, P, U, US, VEN); 24122 p.p. (alab., fr.)(BR, K); VENEZUELA, Bolivar: Cardona 483 (fl., fr. juv.)(US, VEN 8730); Killip 37305 (fl., fr.)(VEN 8723); 37436 (fr.)(LIL, NY, US, VEN 8724); Williams, Ll 11498 (fl., fr.)(MICH, US, VEN, 8728).

A varietate passoura differt racemis magis laxifloris; staminibus reductis; thecis reductis sive absentibus; stylo pilosello sive strigilloso in basali parte; sepalis, petalis et staminibus subpersistentibus in fructu.

Habit similar as in var. passoura, but indument less dense. Treelet or shrub, up to 7.5 m tall; bark bright greyish; wood white. Lamina usually longer and wider, (5.0)9.2-20.5 cm long, (1.8)4.0-8.5 cm wide; apex longer tapering, erect or falcate, (0.8)1.0-3.5 cm long. Racemes more laxiflorous, 1.0-20.5 cm long, (2.0)4.0-8.5 cm wide, tending to be longer than usual in var. passoura. Flowers and floral parts whitish or creamy with reddish brown indument, tending also to be longer than in var. passoura. Petals (4.0)4.5-6.5 mm long, 1.5-2.0 mm wide. Stamens 3.0-4.0 mm long; filaments reduced to filiform, 0.6-1.5 mm long, 0.1-0.4 mm wide; thecae reduced or even wanting, 0.0-1.5 mm long, 0.0-0.7 mm wide; glands reduced or wanting, 0.0-1.2 mm long, 0.0-0.3 mm wide; connective scales narrowed or if not than thecae reduced, 1.0-2.2 mm long, 0.2-1.3 mm wide. Style always strigillose near the base, 2.0-3.5 mm long. Capsula relatively less long and more elliptic ovate than usually in var. passoura; valves 2.0-2.8 mm long, 0.5-1.0 mm wide, green, sometimes deep red; seeds sometimes larger (3.0)4.0-7.0 mm long and wide, brownish pilosellous.

Rinorea passoura (D.C.) Kuntze var. andersonii Sandwith ex Hekking fo. leiosperma Hekking forma nova.

Alsodeia falcata Martius ex Eichler var. grandifolia Eichler in Martius Fl. Bras. 13(1): 386. 1871.

Type: Martius s.n. s.d. (alab., fr.)(lectotype Martius (123) M, isoelectotypes Martius (124), (125), (126), (127) M)

"Habitat in sylvis ad Ega (= Teffe), Provincia Rio Negro, Brasilia."

Rinorea scandens Ule, Verh. Bot. Ver. Brandenburg 47: 157.

1905(1906); Blake, Contr. U.S. Nat. Herb. 20(13): 515. 1924.

Type: Ule 5018, October 1900, (alab., fl., fr.)(holotype B (burned), lectotype HBG, isoelectotypes F (photograph + fragment), G, L) "Kletterstrauch, Blüten strohgelb, Itanga (Marary), Juruá, Estado de Amazonas, Brasilien."

A forma andersonii differt seminibus glabris.

This form differs by its glabrous seeds from forma andersonii. It is a small shrub or tree, up to 10 m. Flowers white to straw-yellow. Fruits green.

Type: Duque Jaramillo 2015, November 1945, (fragm.fl., fr.) (holotype COL) "Trapezio Amazónico entre ríos Loretoyacu y Hamacayacu, orilla del Loretoyacu, 250 m. alt. "Dep. Amazonas, Colombia.

Habitat: along rivers up to submountainous areas; altitude 50-250 m.

Distribution (map 1): N.W. Brazil, Colombia, Venezuela.
Vernacular names: "Amé" (Venezuela, Apure); "Salao" (Venezuela, Bolivar).

Additional material: BRAZIL, Amazonas: Martius (123), (124), (125), (126), (127), (alab., fr.)(M); Ule 5018 (fl., fr.) (HBG, F, G, L); VENEZUELA, Apure: Velez 2337 (fl.)(VEN); 2438 (fr.)(VEN); 2448 (fl., fr.)(US, VEN); COLOMBIA, Amazonas: Duque Jaramillo 3202 (fl., fr.); Schultes 6918 (fr.)(COL); Caquetá: Romero Castañeda 4085 (alab., fr.)(COL); 4087 (fl.)(COL); Chocó: Duke 11286 (fr.)(U).

Additional material of var. andersonii s.l. (adult seeds wanting or not seen): BRAZIL, Río Branco: Prance, Steward, Ramos, Farias & Monteiro 9519 (fruct.juv.)(U); COLOMBIA, Meta: Pinto & Sastre 945 (alab., fr. juv.)(COL); Triana s.n. (1856)(fl.)(COL); Vaupés: Allen 3324 (fl.)(MO, US); Cuatrecasas 7331 (fl., fr.juv.)(F, US); FRENCH GUIANA: Granville B-4494 (fr.)(P); GUYANA: Martijn 280 (fl., fr. juv.)(K); Schomburgk 774 p.p. (fl.)(CGE, G, K); SURINAM: BW(= Gonggrijp) 2088 (fr.juv.)(U); Irwin, Prance, Soderstrom, Holmgren 55497 (fl., fr.juv.)(COL, F, U); Tresling 463 (alab.)(MG, U); VENEZUELA, Bolivar: Blanco 679 (fr.)(VEN); Cardona 878 (fl.)(F, NY, US, VEN 8731); Killip 37271 (fl.)(A, F, K, NY, US, S, VEN 8722); 37305 (fl.)(US, VEN 8723); Williams, L1 11546 (alab., fr.juv.)(US, VEN).

Var. andersonii can be recognized by its slightly deviating habit. The leaves tend to be larger, stiffer, more shining and tapering with the margin more crenate or serrate. On the other hand the indument of all parts tends to be less dense. Stamens are gradually reduced to narrow ones with slenderized thecae or even to slender staminodes. This gradual reduction of the stamens is not yet understood, but a comparison can be made with the tropical Asiatic species R. virgata (Thw.) Kuntze which has reduction of the androecium as well as of the gynoecium. Gynoecium reduction is not observed in R. passoura var. andersonii.

R. scandens Ule is here reduced to synonymy under R. passoura var. andersonii fo. leiosperma, although in all the specimens seen of R. scandens seeds are wanting. However, in the original description the seeds were described as "glabris".

The distribution of the varieties and formae of R. passoura is given on map 1.

Rinorea lindeniana (Tulasne) Kuntze var. fernandeziana Hekking
var. nov., pl. 3, f. 14.

Rinorea riana auct. (p.p.), Smith & Fernández, *Caldasia* 6(28):
108. 1954.

Differt a varietate lindeniana basi foliorum symmetrica;
inflorescentia solum racemosa, brevior et latior, 3.0-6.5 cm
longa, 0.8 cm lata; sepalis longioribus 1.5-2.0 mm longis et latis.

It differs from var. lindeniana by its symmetric leaf bases;
its inflorescences only racemose, relatively shorter and wider,
3.0-6.5 cm long, 0.8 cm wide. Flowers and floral parts tend to be
larger e.g. the sepals in younger flowers are already larger,
1.5-2.0 mm long and wide; the petals are elliptic, already 3.0
mm long, 1.8 mm wide. The style is more or less clubshaped,
slightly curved at the very base, completely glabrous, 1.2-1.5
mm long. Fruits are not seen. Shrub or small tree of $\pm$ 3 m,
flowers white.

Type: Fernández 365, 16 June 1950, (alab., fl.juv.)(holotype
COL, isotype US) "Corédo, costa del Páifico, Departamento del
Chocó, Colombia."

Habitat: in rain forest; altitude 200-300 m. Distribution:
Colombia (Chocó).

Additional material: COLOMBIA, Chocó. Rain forest on hill N. of
Alto Curiche, Duke 11216(3), 19 May 1967, (fl.)(U); probably also:
Hydro Camp no 14, R. Salaqui, 6 days upstream from R. Sucio, elev.
ca 200 m, Duke 11374(3), 23 May 1967, inflorescence without flowers,
(U).

The variety has often been determinated as R. riana (D.C.) Kuntze.
Although the habit at first glance is similar, most of the
characters point at R. lindeniana, e.g. venation, absence of
lenticels, bracts up to 1.0 mm (1.5 mm or more in R. riana),
stamens up to 2.5 mm (longer in R. riana), ovary not erect strigo-
se and style curved and glabrous at base (erect and pilosellous
in R. riana). It is unfortunate that fruits of var. fernandeziana
are unknown since those of R. lindeniana var. lindeniana and
R. riana are quite different too.

Rinorea lindeniana (Tulasne) Kuntze var lindeniana is widely
distributed over N. Bolivia, Peru, Colombia, Guyana, Surinam and
Brazil (Acre, Rondonia, Ríó Branco and adjacent regions in
Amazonas). Var. fernandeziana occurs only in Chocó, Colombia, and
is separated from var. lindeniana by the Western Cordillera of the
Andes. Var. lindeniana occurs as a small tree or shrub in rain- or
submountainous forests, on slopes, between rocks and along creek-
and river banks. The altitude varies from 100-1100 m.

Var. fernandeziana is reported to tropical rain forest of 200-300
m high, presumably the same habitat as the preceeding variety.

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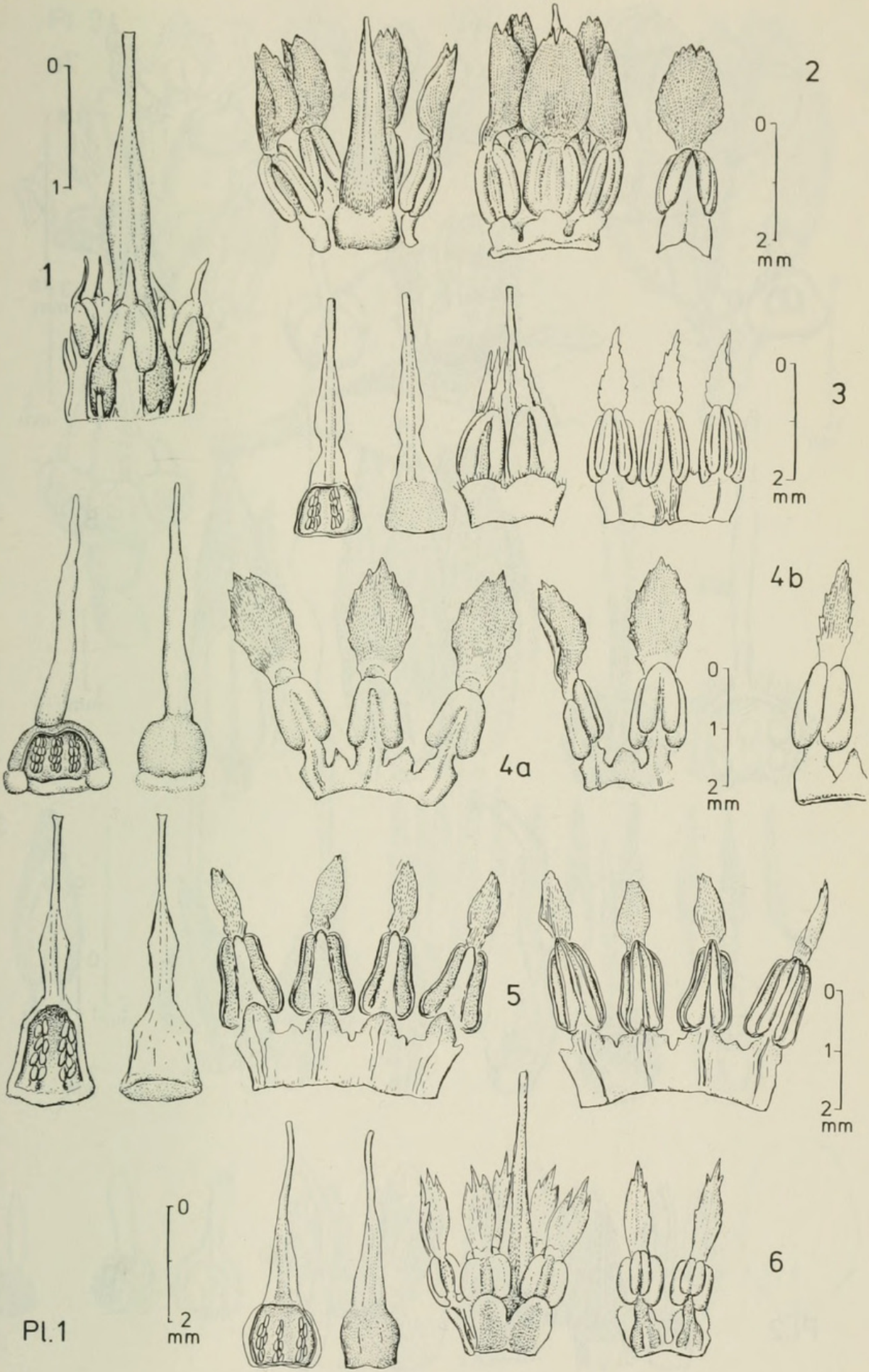
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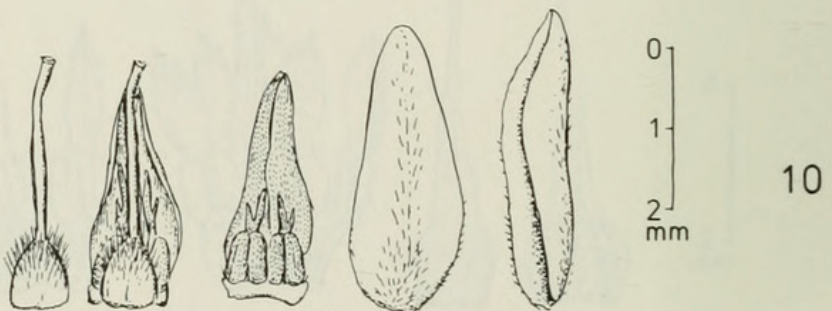
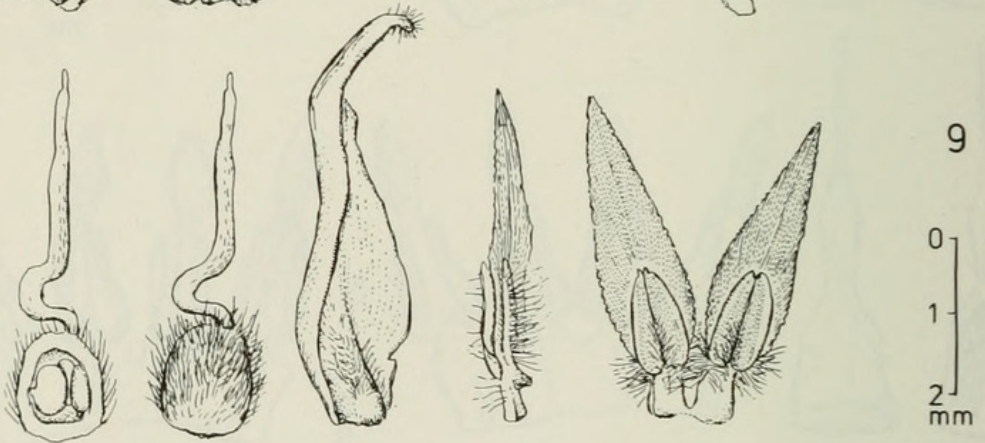
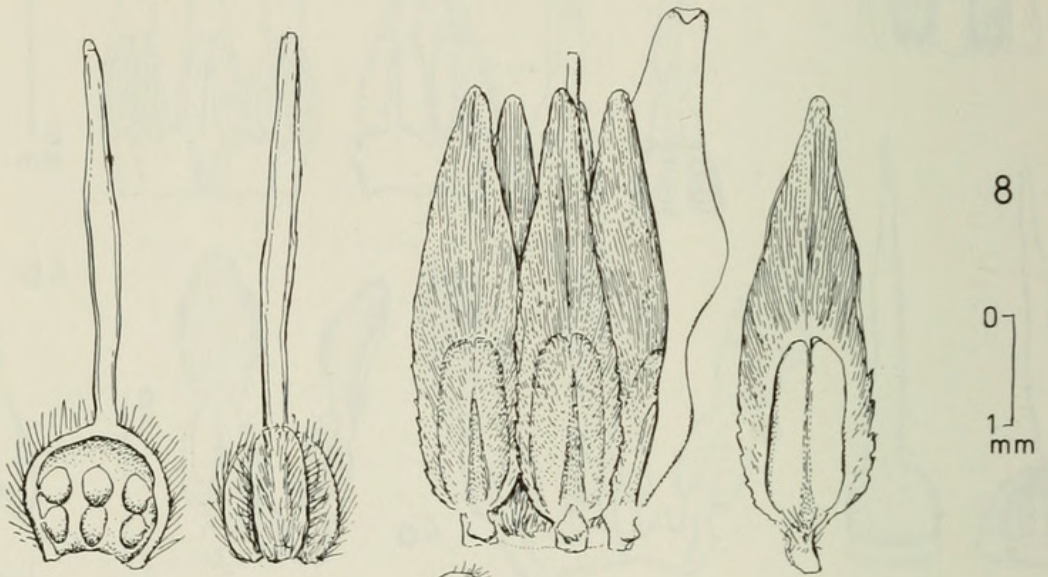
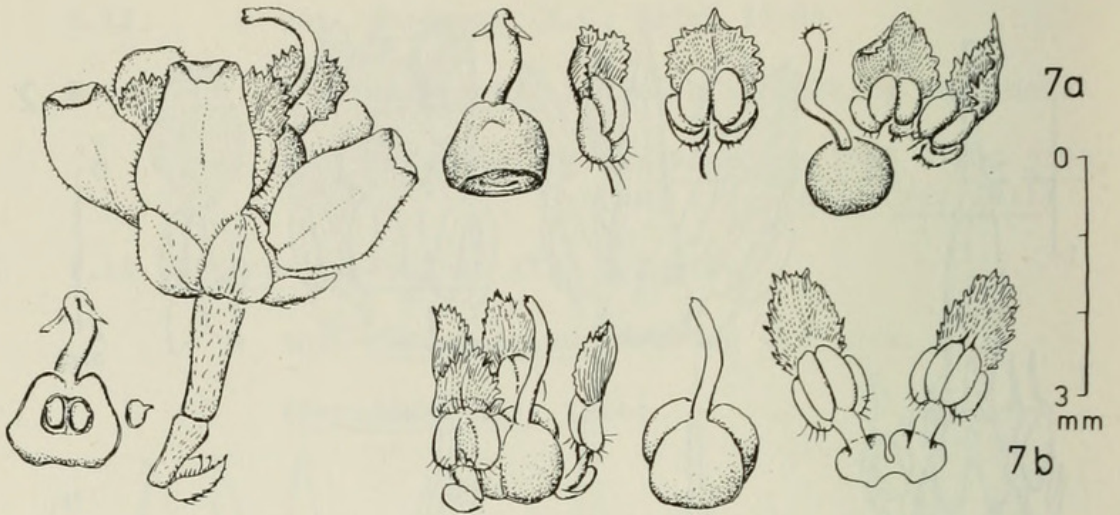
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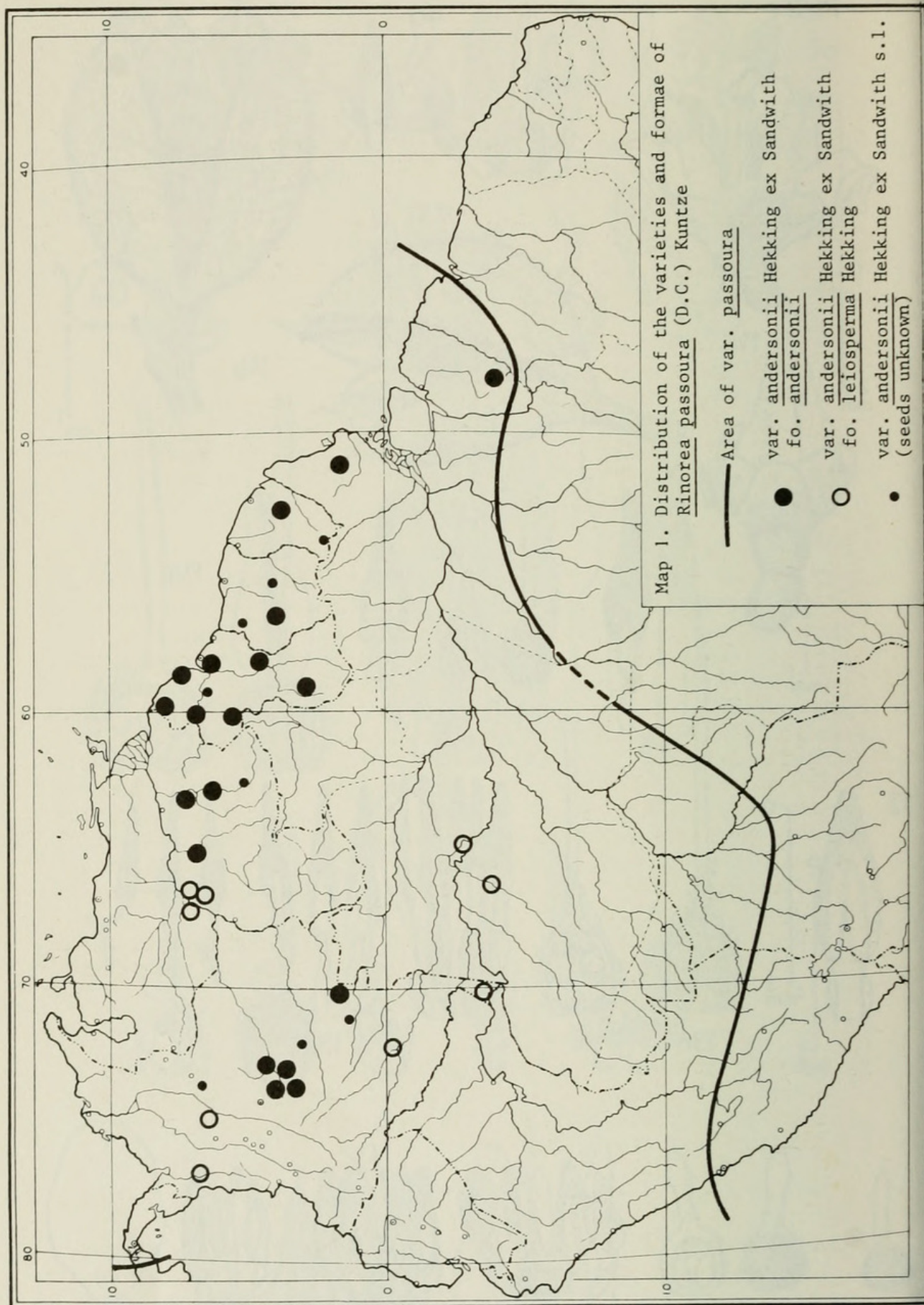
ILLUSTRATIONS (by the author)

- Pl. 1., f.1. Gloeospermum grandifolium Hekking sp. nov.
(Little Jr 6405, type)
- f.2. Gloeospermum eneidense Hekking sp. nov.
(Dwyer 8225, type)
- f.3. Gloeospermum equatoriense Hekking sp. nov.
(Manuel Lugo 39, type)
- f.4. Gloeospermum falcatum Hekking sp. nov.
(4a: Little Jr 6528, type; 4b: Dodson & Gentry 6297)
- f.5. Gloeospermum longifolium Hekking sp. nov.
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- f.6. Gloeospermum blakeanum (Robijns) Hekking comb. nov.
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- Pl. 2., f.7. Rinorea apiculatus Hekking sp. nov.
(7a: Woytkowsky 7536, type; 7b: Harling, Eliasson & Andersson 14781, paratype)
- f.8. Rinorea longistipulata Hekking sp. nov.
(Prance, Ramos & Farias 7623, type)
- f.9. Rinorea multivenosa Hekking sp. nov.
(Traill 22, type)
- f.10. Rinorea bicornuta Hekking sp. nov.
(Ducke s.n. RB 21.353, type)
- Pl. 3., f.11. Rinorea amapensis Hekking sp. nov.
(11a: Cowan 38121, type; 11b: Cowan 38254, paratype)
- Rinorea passoura (D.C.) Kuntze

- f.12. var. passoura (A.C. Smith 2738)
- f.13. var. andersonii Sandwith ex Hekking var. nov.
fo. andersonii (13a: Fanshawe 2463 = FDG 5199,
type; 13b: de la Cruz 2911)
- f.14. Rinorea lindeniana (Tul.) Kuntze
var. fernandeziana Hekking var. nov.
(Fernández 365, type)









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