

The woody Rubiaceae of Aldabra Island (Indian Ocean)

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The Rubiaceae of Aldabra have appeared baffling, even to one who claims some special knowledge of the family. The herbaceous members have been dealt with in another paper (Kew Bull. 33: 136-140, 1978). The woody species, of which there are eight, require some more detailed comment than is appropriate in the flora, and one troublesome new species should be described, and placed on record.

With two exceptions these species are principally components of the mixed scrub vegetation type, common on the "platin" and "pavé" limestone surfaces. This is a sclerophyllous scrub and many of its members show a striking similarity in habit, leaf form and texture, presumably related to the severe climate and drainage environment in which they live, perhaps also to the highly calcareous substrate. A related problem is that many of the available specimens were collected when not at their best, as much of the field work has been done in dry seasons, or, as in the 1968 field season, when expected rains failed. Hence the characters useful in taxonomic investigations are not well exhibited.

In addition to these local sources of difficulty, the classification of the Rubiaceae, especially of the Ixoreae and related tribes, has undergone some drastic overhauling by Bremekamp, Verdcourt and recently by Tirvengadam, which is probably not yet finished. The distinctions between the genera Pavetta, Tarenna, Ixora, Myonima and others seem very tenuous, even after the lengthy exposition by Bremekamp in his monograph of the genus Pavetta L. (Fedde, Repert. 37: 1-208, 1934). This is not an appropriate place to go into these problems, but it does seem advisable to describe the Aldabra species in more than ordinary detail and to discuss their peculiarities. This study casts some doubt even on the assignment of the genus Tricalysia A. Rich. to the tribe Ixoreae. The development of the fruiting placenta, with the seeds deeply embedded in it, suggests that it might equally well go into the Gardenieae, though not all characters support this.

To make the account of the nomenclature complete, all the woody species of the Aldabra group are listed and described with their synonymy and notes of interest, even though, as in Guettarda speciosa and Canthium bibracteatum, no particular taxonomic difficulties are evident. Guettarda speciosa proves to be clearly heterostylous.

Canthium Lam., Encycl. Meth. 1: 602, 1785.

Pllectronia sensu DC. et auct., non L., Mant. Pl. 6, 1767.

Shrubs or trees; stipules ovate, cuspidate or acuminate; inflorescences axillary cymes, often much reduced, even to small fascicles; flowers 4-5-merous; corolla with short cylindrical tube, usually pilose within, especially at throat, lobes valvate, spreading; stamens inserted in throat, filaments short; ovary usually 2-loculed, with one pendulous ovule in each locule, style 1, stigma cylindric, 2-4 lobed, included or exserted; fruit a drupe with one 2-loculed or two 1-loculed stones.

A principally African but also Indo-Pacific genus with one species in Aldabra.

Canthium bibracteatum (Baker) Hiern in Oliver, Fl. Trop. Afr.

3: 145, 1877; Fosberg, Phil. Tr. R. S., B, 260: 218, 1971; Renvoize, Phil. Tr. R.S., B, 260: 231, 1971.

Pllectronia bibracteatum Baker, Fl. Maur. & Seychelles 146, 1877; Hemsley, Kew Bull. 1919: 123, 1919.

Glabrous shrub 1-2 (rarely 3-4) m tall, much-branched, branchlets gray, internodes often short, rather stiff, nodes prominent; leaves elliptic to oblong, rarely ovate, 4-8(-9) x 1.5-2.5(-4) cm, apex obtuse to blunt-acute or slightly acuminate, base rounded to acute, midrib tending to be dull orange when dry, a narrow pale zone on either side of it frequent, 4-7 veins on a side, obscure above, distinct but not prominent beneath, small sparsely hirsute domatia in their axils beneath, petiole several mm long; stipules firm, ovate-long-acuminate, 3-5 mm long, tardily caducous, a row of oblong erect glands in their axils, these also early caducous; cymes much reduced, pedunculate, umbelloid, 5-20 flowered, congested when many-flowered, 10-15 mm long, peduncle about 1/3 to 1/2 of this, at its summit a pair of large somewhat gibbous stipular bracts subtending the slender pedicels; flowers white, 3-4 mm long; calyx shallow, somewhat 4-dentate; corolla tube cylindric to slightly dilated, 2.5 mm long, lobes ovate, 1.5 mm, throat choked with wool; anthers broadly ovate, pointed, exserted on short filaments; style shorter than corolla tube but elongating until capitate stigma is exserted just beyond anthers; drupe compressed globose to slightly obcordate, slightly geminate, 3-4 x 4-2 mm, ripening yellow to red and finally black.

Specimens examined:

Aldabra.--s.l., Dupont 204 (K); Fryer 54 (K), 74 (K).

West Is. (Ile Picard): Back of settlement, Fosberg 49509 (US); Renvoize 747 (K, US); Bassin Cabri, Wood 1615 (E, US).

Middle Is.: Gionnet Channel Camp area, Fosberg 49588 (US); east end of Middle Island, Fosberg 49094 (US), 49095 (US).

South Is.: Appr. 3 km NW of Cinq cases Camp, Fosberg, Grubb & Graham 49178 (US); Takamaka Well, Fosberg 49253 (US); Takamaka area, lagoon side, Fosberg 49056 (US), 49055 (US); Takamaka Camp area, Renvoize 874 (US K).

Guettarda L., Sp. Pl. 991-992, 1753; Gen. Pl. ed. 5, 428, 1754. [1753].

Cadamba Sonnerat, Voy. 2: 228, t. 128, 1776.

Trees and shrubs, sometimes spiny (ours not), leaves simple, opposite or rarely ternate; stipules obovate or (elsewhere) ovate or lanceolate, apex (in ours) obtuse, often recurved; cymes axillary, dichotomous or rarely flowers reduced to 2 or 3, or 1, often secund; flowers bisexual, rarely polygamo-dioecious (-4)5-8(-9)-merous; calyx tubular, truncate to dentate; corolla salverform, lobes imbricate or their membranous margins infolded, undulate or crenulate; anthers sessile or subsessile, inserted in corolla throat, included or slightly exerted; ovary 2-9 celled, with 1 pendulous ovule in each cell, style filiform with a cylindro-capitate stigma; fruit a drupe with 2-9 pyrenes united into a woody or bony stone, in ours corky and floating.

Originally described in Genera Plantarum and Species Plantarum as monoecious.

A principally American genus with one widely distributed strand or lowland species, which has been regarded as constituting a separate section, Cadamba (Sonn.) DC. (=sect. Guettarda). This species is found on Aldabra.

Guettarda speciosa L., Sp. Pl. 991, 1753; Schinz, Abh. Senckenb. Nat. Gesellsch. 21: 91, 1879; Voeltzkow, Abh. Senckenb. Nat. Gesellsch. 26: 552, 1902; Hemsley, Kew Bull. 1919: 213, 1919; Vesey-Fitzgerald, Jour. Ecol. 30: 13, 1942; Stoddart & Wright, Atoll Res. Bull. 118: 29, 1967; Stoddart, op.cit. 59, 1967; Renvoize, Phil. Tr. R.S., B, 260: 230, 1971; Fosberg, Phil. Tr. R.S., B, 260: 217-219, 1971.

Large shrub to small or medium-sized tree, very bushy, much branched in habit; twigs about 1 cm thick, subterete, pubescent with short incurved hairs which turn golden on about the second or third internode; leaves broadly oblong to somewhat ovate or obovate, on short thick petioles about 1-2 cm long, 5 mm thick, terete, blades heavy chartaceous, nerves pinnate, 10-11 pairs spreading widely, curving gradually into the margin, connected by irregularly ladder-like cross-nerves, the spaces filled with several orders of close network, main nerves slightly puberulent above, densely short-pilose beneath, smaller nerves less so, apex obtuse with

slight acumen, base cordate; stipules large, strongly acuminate, shortly sheathing, carinate where united at sides, sparsely strigose, caducous from all but first 1-3 nodes, leaving a row of small hairs in axils; leaf scars orbicular slightly flattened distally, with a narrow horseshoe of bundle scars; cymes axillary from second node from apex, prominently pedunculate, peduncles strongly ascending, about 10 cm long, branching crowded, twice dichotomous, a sessile flower in each fork, with an oblong acute bract subtending it externally, each branch with about 5 alternately disposed flowers in 2 rows, each subtended by a lanceolate bract; whole inflorescence appressed puberulent; calyx deeply cup-shaped, longer than wide, margin irregular or very shallowly 3-lobed, with a purplish rudiment very poorly developed in each sinus; corolla salverform, tube much longer than the obovate lobes, very slightly dilated gradually upward, 3-5 cm long, about 1.5 mm diam. below, to 4 mm at top, pilose within, lobes 7-8, even on same plant, lobes and tube puberulent without, lobes papillate within, tube pilose within except basal few mm; anthers same number as corolla lobes, linear, attached several mm below sinuses, dorsally but almost basally; style single, filiform, of 2 lengths, on brevistylous plants about 1/2-2/3 lengths of corolla, on longistylous plants stigma slightly exerted, stigma short cylindrical, truncate on top, exuding a drop of sticky liquid; corolla opening in evening, strongly fragrant, dropping before noon next day, leaving the style which usually falls somewhat later; both longistylous and brevistylous plants fruit abundantly; young fruit globose, mature ones depressed globose, drupaceous, with white flesh containing stiff fibers which persist after flesh rots or is eaten by hermit crabs; stone corky, floating, with 5-6 cells.

Specimens examined:

Aldabra. -- s.l., Dupont 281 (K); Fryer 51 (K).

West Is.: Vesey-Fitzgerald 6034 (K).

South Is.: Anse Cèdres, Stoddart 718 (K, US); Cinq Cases, Fosberg 48971 (US), 48910 (US); Stoddart 1016 (K, US); Renvoize 959 (US, K); Takamaka Camp, Renvoize 1110 (US, K); Trou Nenez, Stoddart 975 (K, US); Rhyne 1035 (US); Anse Mais, Stoddart 953 (US); Wood 1691 (US).

Cosmoledo Atoll. -- Menai Is., south part of Menai Islet, Fosberg 49842 (US); Vesey-Fitzgerald 5987 (K); Renvoize 1250 (US, K).

Astove Island: s.l., Ridgway 85 (US); Gwynne & Wood 1321 (EA) (leaves very tomentose beneath, resembling f. taitensis); west side, Stoddart & Poore 1265 (K); Grand Anse, Fosberg 49685 (US).

Polysphaeria Hook. f. in Benth. & Hook. f., Gen. Pl. 108, 1873.

--Hiern in Oliver, Fl. Trop. Afr. 3: 127, 1877.

Shrubs, stem erect, branching, branches producing terminally dense clusters of slender "supra-axillary" flowering branchlets

bearing flowers in dense small axillary sessile or pedunculate glomerules, flowers with small cup-shaped bracteoles; leaves of flowering branchlets opposite, often differing from those subtending the branchlets; stipules caducous, short and broad; flowers with a turbinate or campanulate hypanthium, its limb truncate or shortly 4-dentate; corolla funnellform, tube short, throat densely bearded, lobes 4, contorted; stamens 4, inserted in mouth of corolla tube, filaments short, anthers linear dorsifixed near base; ovary 2-locular, with one pendant ovule in each cell, style exserted, stigma fusiform; fruit baccate, 1-2-celled, 1-2 seeded; seeds suborbicular, plano-convex, testa striate-sulcate, endosperm ruminant.

A small African genus of 10-12 species, one of them found in the Aldabra Group.

Polysphaeria multiflora Hiern in Oliver, Fl. Trop. Afr. 3: 127-128, 1877.

Glabrous shrubs, rarely small trees, bark shreddy, branchlets sharply different from, and congested toward tips of branches, diverging at a very wide angle from the stem, in axils of leaves, or of much reduced leaves, becoming supra-axillary on slightly older wood, leaves elliptic, lance-elliptic, or oblong-elliptic, acute or acuminate with blunt tip, shortly petiolate, conspicuously downward-pointing, stipules triangular, slightly acuminate, caducous, carinate; flowers in very close sessile cymose axillary glomerules with stipular scales at base, glomerules composed of triads closely packed, of different ages, individual flowers subtended by calyx-like cupules of united bracteoles, appressed pilose within; ovaries very small, calyx a cup slightly lobed or toothed on margin, glabrous; corolla white, 5-6 mm long, salverform to funnellform or campanulate, 4-parted, lobes slightly imbricate, not or slightly contorted in bud, becoming recurved after opening, glabrous without, copiously white bearded in throat, glabrous in tube, anthers lanceolate, sessile in throat, ovary 2-locular, ovules 1 in each locule; style longer than corolla, puberulent except near base, stigma well-exserted, slightly lobed; fruit globose, 6-7 mm diameter, black when ripe (fleshy?), with 2 hemispheric stones each 1-seeded.

Specimens examined:

Aldabra.--

West Is. (Ile Picard): 50 m E of Station, Wood 1660 (US, E); path just north of Settlement, Fosberg 48725 (US), 48751 (US, K); back of settlement, Fosberg 49502 (US); grove behind Settlement, Renvoize 714 (US, K).

South Is.: 2nd pool on route west of Hodoul Point, Renvoize 935 (US, K); coast northwest of Pt. Hodoul, Fosberg 49051 (US); Point Hodoul, Renvoize 903 (US, K); Cinq Cases Camp, Fosberg 48916 (US); Cinq Cases inland, R. Hnatiuk 732055 (US); on plain

near Camp at Cinq Cases, Renvoize 818 (US, K); 2 km NW of Cinq Cases Camp, Fosberg & Grubb 48917 (US); appr. 3 km NW of Cinq Cases Camp, Fosberg, Grubb & Graham 49181 (US); near coast, south of Takamaka, Renvoize 1131 (US, K); Takamaka Grove, Fosberg 49297 (US); Takamaka, Stoddart 1036 (US); Takamaka well, Fosberg 49260, 49350, 49324 (all US); Dune Jean Louis, 300 m north of south coast, near path of lagoon, Frazier 55 (US); 350 m from south coast near trail to lagoon, Frazier 59 (US); Trou Nenez, Stoddart 987 (US); Dune D'Messe, Renvoize 1387 (US, K).

Cosmoledo Atoll. -- Menai Is.: North end, Fosberg & Grubb 49772 (US).

Astove Atoll: s.l. Veevers-Carter 37 (EA); Ridgway 37 (US); Grand Anse, Fosberg 49725 (US); South of Grand Anse, south part of west arm of atoll, Fosberg & McKenzie 49760 (US).

Psychotria L., Syst. Nat., ed. 10, 929, 1759.

Mostly shrubs, rarely trees or vines; leaves often obovate, sometimes with domatia in vein axils, often turning purplish on drying; stipules caducous or persistent, separate or united, often forming a calyptra enclosing the terminal bud, this usually with 2 or 4 appendages or "ears" at the tip, axils of stipules with a row of erect hair-like glands; inflorescences cymose or thyrsoïd, rarely reduced to a fascicle or a single flower, open to capitate, terminal or axillary; flowers bisexual or dioecious, 4-6-merous, usually small, calyx usually short, lobed, toothed or truncate; corolla with cylindric or slightly dilated tube, this from very short to rarely 1-2 cm long, usually with lobes from as long as to much longer than tube, spreading to reflexed; stamens inserted in throat just below sinuses, anthers attached basally or dorsally, style shorter than to exceeding tube, bifid, ovary 2-celled, ovules solitary, erect, basifixed; fruit a drupe with 2 pyrenes, these often dorsally 1-several times carinate, flat on ventral surface, seed filling cavity, endosperm entire, ventrally grooved or ruminant.

A very large tropical genus, sometimes variously subdivided, with species in all except the driest tropical wooded areas, difficult to classify. All Aldabra specimens seen seem to belong to one species.

Psychotria pervillei Baker, Fl. Maur. & Seych. 155, 1877.

--Hemsley, Kew Bull. 1919: 123, 1919.--Fosberg, Phil. Tr.

R.S., B, 260: 220-225, 1971. --Renvoize, Phil. Tr. R.S., B, 260: 231, 1971.

Psychotria spp. Baker, Kew Bull. 1894: 148, 1894.

--Schinz, Abh. Senckenb. Naturf. Gesellsch. 21: 291, 1897. --Voeltzkow, Abh. Senckenb. Naturf. Gesellsch.

26: 552, 1902. --Hemsley, Jour. Bot. 54 (Suppl.): 19, 20, 1916.--Kew Bull. 1919: 123, 1919.

Shrub to 3 m tall, glabrous; leaves dark green, elliptic to obovate, blades to 13 x 4.5 cm, usually much smaller, apex acuminate, base rather cuneately contracted into a petiole about 1, rarely 1.5 cm long, venation not prominent, main veins 9-11 on a side arching to near the margin where they anastomose into an undulate submarginal vein; cymes 1-3 at terminal node, sometimes becoming axillary by development of a bud at same node, pedunculate, slender, 3-5 cm long, a whorl of 3 or usually 4, rarely 5, branches at the first node, each branch up to 3 times dichotomous but with a sessile flower (or fruit) in each fork, branchlets puberulent, bractlets minute, ciliolate, ultimate triads with center flower sessile; calyx lobes 5, low-triangular; corolla tube 3-4 mm long, lobes oblong-ovate, about 1.5-2 mm long, apex slightly hooked, inner surface densely papillate-puberulent; anther tips exerted, style with bifid stigma exerted; fruits globose or depressed globose, slightly compressed, sub-geminate when dry, 3 x 3 mm, pyrenes dorsally ribbed, fleshy, bluish-gray or slightly purplish.

Found also in the Seychelles; very rare in Aldabra, greatly reduced or possibly eliminated in recent years by attacks of a coccid.

Specimens examined:

Aldabra.--s.l., Fryer 56 (K); Dupont 24 (K), 115 (K).

Ile Michel: Dupont 223 (K).

South Is.: 3.5 km W of Point Hodoul, Fosberg 49210 (US, K); 3 km NW of Cinq Cases camp, Fosberg, Grubb & Graham 49180 (US, K); Takamaka Grove, Fosberg 49273 (US, K), 49274 (US, K); Renvoize 1062 (K, US); Merton 7079 (US); Hnatiuk 731317, 731320, 73052, 732056 (all US); near Takamaka Well, Fosberg 49290 (US, K); behind first pool on route from Takamaka camp to coast, Renvoize 1056 (K, US).

Tarenna Gaertn., Fruct. 1: 139, 1788.

Shrubs, rarely trees; leaves simple, opposite, usually petiolate; stipules ovate, caducous; inflorescence terminal or becoming lateral, cymose; flowers usually 5-6-merous, in one small group 4-merous; calyx usually lobed; corolla hypocrateriform to somewhat funnel-form with spreading lobes imbricate in bud; stamens inserted in corolla throat below sinuses, filaments short, anthers linear; style elongating, stigma becoming strongly exerted, clavate to linear, ovary 2-loculed, placentae fleshy, bearing 1-several or more ovules, or these rarely colateral on small placentae; fruit fleshy, with thin or sclerified endocarps, seeds in fruit tending to be subglobose or rarely globose with a cavity on one side, or prismatic without a hilar cavity, or compressed and having a linear excavation on one edge.

A large African-Indo-Pacific genus with 3 very distinct Aldabra species. Earlier Aldabra records of Pavetta species

belong here.

Key to Aldabra species

1. Inflorescence and flowers, except for corolla limb, glabrous
 2. Cymes in pairs, soon becoming axillary--T. supra-axillaris
 2. Cymes 3, terminal-----T. verdcourtiana
1. Inflorescence and flowers notably pubescent, cymes remaining terminal, leaves usually at least slightly hairy beneath-----T. trichantha

Tarenna supra-axillaris (Hemsley) Bremekamp, in Fedde, Repert. Sp. Nov. 37: 206, 1934.

Pavetta supra-axillaris Hemsley, Jour. Bot. 54, suppl. 2: 19, 1916. --Kew Bull. 1919: 123, 1919.

Shrub to 3 m tall, glabrous except in inflorescence, branchlets slender, pale, terete, diverging widely from branches, usually without a shortened first internode; leaves elliptic or lance-elliptic to narrowly ovate or lance-ovate, often somewhat falcate, often somewhat folded, up to 10 x 3 cm but mostly much smaller, apex acute to usually acuminate, point usually blunt, base acute, somewhat attenuate, blade thinly coriaceous, veins 10-11 on a side, usually quite obscure, especially above, petiole slender, 4-8 mm long; stipules ovate, somewhat acuminate, rounded at tip, somewhat sheathing at base but soon separated by growth of lateral branchlets or inflorescences; cymes borne in pairs at terminal nodes, but soon becoming lateral by elongation of stem, 2-3 cm long, or shorter, peduncle slender, arcuate so the cyme is usually pendent, branching rather congested, 2 or 3 times trichotomous, a cupule of 4 more or less united scale-like bractlets subtending each ramification and each flower bud, their margins closely ciliate, distal parts and sometimes entire inflorescence liberally covered by a somewhat granular resinous secretion, possibly from axils of stipular bractlets; flowers pentamerous, calyx lobes sub--orbicular, densely white-ciliate, imbricate at base, puberulent within, in fruit tending to close inward, corolla with tube glabrous, slightly dilated upward, limb clavate in bud, strongly papillate externally, puberulent toward tips, lobes strongly but minutely ciliolate, pilose-bearded at base, narrowly oblong elliptic; anthers exserted, linear, 3.5 mm long; style at maturity long--exserted, stigma narrowly fusiform or paddle-shaped (perhaps by collapse), tardily becoming apically bifid, ovary bilocular, with one ovule in each cell; fruit globose, 2.5-3.0 mm in diameter, crowned with a conical ring of slightly indurate imbricate calyx lobes, fleshy, black, endocarp sclerified, globose, with one cell containing a single globose seed with a chestnut-brown minutely cellular reticulate surface and with a deep somewhat irregular cavity in one side.

Specimens examined:

Aldabra.--s.l., Hnatiuk 732025 (US).

West Is.: vicinity of settlement, Stoddart 947 (US, K);
Hnatiuk 731755 (US); Fosberg 48812 (US, K); Wood 1625 (US);
 1/2 mi. [0.8 km] N of West Pt. village, Rhyne 867 (US).

Middle Is. (Malabar Island): Vesey-Fitzgerald 6020 (K);
 Gionnet Channel camp area, Fosberg 49587 (US, K); Anse Porceau,
 small cove 0.5 km E of Gionnet Channel, Fosberg 49565 (US, K),
49566 (US).

South Is.: Takamaka Well, Fosberg 49318 (US), 49323 (US, K);
 Anse Mais, Fosberg 49650 (US).

Ile Esprit: Fryer s.n. (K, holotype).

This species, found in Madagascar and coastal East Africa as well as Aldabra Atoll, is somewhat anomalous in Tarenna, as its cymes are borne 2 at a terminal node and soon become apparently truly axillary. The origin and development of these inflorescences need further investigation on the ground, where living plants can be studied over a period of time.

The species may be, as Hemsley suggested, close to T. nigrescens (Hook. f.) Hiern, but not to the Aldabra species that Hemsley referred to T. nigrescens.

Tarenna trichantha (Baker) Bremekamp, in Fedde, Repert. Sp. Nov. 37: 207, 1934.

Pavetta trichantha, Baker, Kew Bull. 1893: 148, 1893.--Schinz, Abh. Senckenb. Naturf. Gesellsch. 21: 91, 1897.--Voeltzkow, ibid. 26: 552, 1902.--Hemsley, Kew Bull. 1919: 123, 1919.
 --Fosberg, Phil. Tr. R.S., B, 260: 218, 225, 1971.--Renoize, ibid., 231, 1971.

Rutidea coriacea sensu Hemsley, Kew Bull. 1919: 124, 1919, non Baker, Fl. Maur. & Seych. 149, 1877.

Shrub or small tree to 4 m tall, with hard wood, young growth usually more or less pubescent, branches pale brownish gray, internodes varied in length; leaves broadly obovate to oval or broadly elliptic, apex rounded or obtuse, base broadly cuneate to rounded, upper surface puberulent or scabrous to glabrous, lower surface shortly pilose to almost glabrous, main veins 5-8 on a side, more prominent beneath, petiole rather slender, mostly 0.5-1 cm long; stipules triangular-ovate, acuminate, carinate, almost glabrous to, more usually, densely strigose; cymes dense, corymbiform, borne singly or in 3's at terminal nodes of branchlets, conspicuously pubescent, sub-thyrsoid, 4-5 times ramified tending to be very rounded on top, or hemispherical, ultimate branching either in irregular triads or subscorpioid cymules, bracteoles at

ramifications strap-shaped with broad base or distally, merely strap-shaped or subulate, pubescence white, appressed; flowers whitish, fragrant, inferior ovary and calyx densely white tomentose, calyx teeth 5, triangular; corolla salverform, tube cylindric, about 5 mm long, appressed puberulent, somewhat dilated at top, limb in bud clavate, rounded at apex, densely appressed puberulent without, glabrous within, lobes 5, broadly oblong, about 1.5 x 1 mm, glabrous within, reflexed, rounded or obtuse at apex, throat not bearded; anthers ovate-oblong, about 2 mm long, erect, apex bluntly mucronulate, base sagittate; style exerted 3-5 mm, included portion thinly puberulent, exerted part glabrous, distal part fluted, somewhat fusiform; fruit globose, 3-5 mm diameter, sparsely appressed puberulent, crowned by minute persistent calyx-lobes surrounding a thickened ring-like disk, endocarp very thin paper-like, brittle, seeds 2, 3 or 4 even on same plant, somewhat compressed-globose, about 2 mm across, dark brown, glossy, minutely rugulose making a hammered appearance under strong magnification, a deep linear scar excavated on one edge.

Specimens examined:

Aldabra.--s.l., Abbott s.n. (K, holotype, US, isotype); Dupont 87 (K); Fryer 86 (K); Hnatiuk 732022 (US), 732026 (US).

West Is.: Vicinity of settlement, Hnatiuk 731508 (US); Renvoize 739 (US, K); N of Settlement, Renvoize 1204 (US, K); path to Bassin Cabri, Hnatiuk 732043 (US), 732063 (US); Bassin Cabri, Wood 1664 (US).

Ile Polymnie: Hnatiuk 731314 (US).

Middle Is. (Ile Malabar): Hnatiuk 732028 (US); 250 m W of Middle Camp, Wood 1636 (US); E end of island, Fosberg 49073 (US).

South Is.: Near coast 1/4 mi. [0.4 km] N of Point Hodoul, Renvoize 1006 (US, K); 3.5 km W of Pt. Hodoul, Fosberg 49209 (US), 49210 (US); Pt. Hodoul, Fosberg 49048 (US); Cinq Cases, Fosberg & Grubb 48885 (US); vicinity of Cinq Cases camp, Fosberg 48911 (US), 48921 (US), 49023 (US), 48924 (US); Cinq Cases dune, Renvoize 914 (US, K), 915 (US, K); SE coast, 0.6 km E of Au Bord de la Mer, Takamaka area, Renvoize 873 (US, K); Fosberg 49249 (US); Takamaka Well, Fosberg 49259 (US), 49346 (US), Takamaka Grove, Hnatiuk 731706 (US); near Takamaka Grove, Hnatiuk 732054 (US); S of Takamaka Grove, Fosberg 49383 (US); near Wilson's Well, Hnatiuk 731899 (US); vicinity of Dune Jean-Louis Renvoize 1308 (US, K); Fosberg 49387 (US), 49388 (US); Hnatiuk 731506 (US); Dune d'Messe, Renvoize 1394 (US, K); Trou Nenez, Stoddart 976 (US); N of Dune Blanc, Hnatiuk 731504 (US).

Ile Esprit (Euphrates I.): Fosberg 488770 (US); Hnatiuk s.n.s.d. (US).

Ile Michel: Fosberg 49352 (US), 49355 (US); Renvoize 1045 (US, K).

Assumption I.--- center of W coast, Frazier 608 (US); center of island, Frazier 747 (US); 200 m inland of South Settlement,

Frazier 716 (US); s.l., Dupont 116 (K).

Cosmoledo Atoll: s.l. Dupont 279 (K).

Astove Island: Ridgway 92 (US); Grand Anse, Fosberg 49720 (US); north of settlement, Renvoize 1204 (US, K).

This species, found in the Aldabra Group, the Comoros, and coastal East Africa, can be recognized by its densely congested whitish or gray pubescent cymes. In vegetative characters, especially leaf shape and hairiness, it is quite variable. A specimen from Assumption, Frazier 608, has the corollas and hypanthia almost glabrous.

Tarenna verdcourtiana Fosberg, n. sp.

Tarenna nigrescens sensu auct. Aldab., non (Hook. f.) Hiern
in Oliver, Fl. Trop. Afr. 3: 92, 1877.

Frutex vel arbuscula glabra, foliis plerumque ellipticis, stipulis ovato-acuminatis, cymis terni terminalibus subthyrsoideis ramulis dichasioideis, floribus tetrameris, corollae fauce vix barbata, ovario 2-4 locularibus, placenta carnosa uni-ovulata, endocarpo tenuissimo, seminibus 1-4 hilo excavato.

Glabrous shrub to 4 m tall, usually much smaller, branchlets gray, slender, diverging at about 45°-50° from larger branches, branching may be slightly supra-axillary, basal internode may be much reduced, with only a pair of stipules at its summit; leaves elliptic to slightly obovate, to lance-elliptic or rarely very broadly elliptic, mostly 4-7 x 1.5-2.5 cm or smaller, rarely larger, apex acute to somewhat acuminate, base acute to obtuse, blade firm-chartaceous to subcoriaceous, venation pinnate but usually rather obscure, petiole 5-8 mm or shorter; stipules ovate, usually long-acuminate; cymes 3, terminal (or 1, trichotomous with peduncle suppressed), when well developed each branch thyrsoid with 2 internodes and 3 triads of prominently pedicellate flowers, branched portion often much reduced, and triads represented by a single pedicel with two scale-like bracts near base, whole inflorescence at most 2-4 cm long, in many specimens much smaller (possibly due to drought); pedicels sometimes elongate to as much as 1 or even 1.5 cm; calyx campanulate, 1.5 mm long, shallowly 4-lobed, lobes obtuse to rounded tending to be somewhat erose or ciliolate; corolla tube about 4-5 mm long, somewhat dilated upward, glabrous without, throat lightly bearded, limb bluntly fusiform in bud, lobes 4, spreading to somewhat reflexed, oblong, about 7 mm long, margins revolute, apex rounded; anthers broadly linear, about 6 mm long, exserted from sinuses, strongly curved after dehiscence; style somewhat longer than corolla tube after elongation, slightly pubescent, stigma linear, flattened or slightly fusiform, about 7 mm long, somewhat papillose-puberulent; fruit globose, 5-6 mm in diameter; seeds 1-4, arranged radially, with convex surface dull brown, gently rugose, a deep pit on inner

angle.

Specimens examined:

Aldabra.--

West Is.: back path, Renvoize 2736 (US, K); vicinity of settlement, Hnatiuk 731756 (US); Wood 1631 (US, holotype); Renvoize 746 (US, K); path to Bassin Cabri, Hnatiuk 731310 (US), 731496 (US); Anse Var, Hnatiuk 731306 (US).

Polymnie: Hnatiuk 731309 (US).

Middle Is.: Gionnet Channel Camp area, Fosberg 49585 (US, K), 49586 (US, K), 496682 (US); Renvoize 1167 (US, K).

South Is.: Bassin Frigate, in the groves, Merton 7091 (US); Anse Mais, Renvoize 2722 (US).

Assumption.--center of island, 0 m, Frazier 785 (US), 786 (US).

This species has been commonly referred to Tarenna nigrescens (Hook. f.) Hiern (Coptosperma nigrescens Hook. f.) but has tetramerous flowers and differs in various other respects, such as a 2-4 celled ovary. It has, even on the same plant, an inconstant number of ovary-cells and seeds. With some hesitation I place it in Tarenna in spite of its tetramerous flowers, single ovule per cell sunken in a fleshy placenta, and radially arranged seeds. Its very thin, almost unsclerified endocarp, and especially its frequently tri- or even quadriloculate ovaries are certainly out-of-place in Pavetta. I know too little of Myonima, but it seems to have 5 corolla lobes, polygamo-dioecious flowers and bony or cartilaginous pyrenes. This species merits much further study.

It is dedicated to Dr. Bernard Verdcourt, of Kew, able student of African Rubiaceae and other families.

Triainolepis Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 126, 1873.

--Hiern, in Oliver, Fl. Trop. Afr. 3: 219, 1877.--Bremekamp, Proc. K. Nederl. Akad. Wetensch. C, 59: 1-21, 1956.

Shrubs or scrubby trees; leaves opposite, usually conspicuously nerved; stipules usually tricuspidate; cymes terminal, small; calyx campanulate, with 5-7 unequal teeth; corolla tomentose without, tube glabrous within, bearded in throat, lobes 5, spreading, glabrous within, valvate in bud; anthers oblong, dorsifixed on short filaments; ovary (4-) 5-10-loculate, with one or two erect ovules in a cell; fruit globose, fleshy, with 5-7 (-10) bony united pyrenes each with one seed, with fleshy endosperm.

Small principally Madagascar genus with two African species; one species in Aldabra, also in the Comoros and Madagascar.

Triainolepis africana subsp. hildebrandtii (Vatke) Verdc., Kew Bull. 30: 282, 1975.--Fl. E. Trop. Afr., Rub. (pt.1): 150, 1976.

Triainolepis fryeri (Hemsley) Bremekamp, Proc. K. Nederl. Akad. Wetensch. C, 59: 12, 1956.--Fosberg, Phil. Tr. R.S. B, 260: 218, 225, 1971.--Renvoize, *ibid.* p. 231.

Psathura fryeri Hemsley, Jour. Bot. 54, suppl. 2: 20, 1916.

Triainolepis hildebrandtii Vatke, Oesterr. Bot. Zeitschr. 25: 230, 1875.--Hemsley, Kew Bull. 1919: 123, 1919.

Shrub 1-4 m tall, twigs glabrous or youngest growth lightly strigulose, light brown to greenish, orange or pinkish, internodes from 3 cm to usually much shorter; leaves lance-elliptic to lanceolate, up to 13 x 4 cm, usually much smaller, notably acuminate, base acute, somewhat decurrent on petiole, nerves distinct, about 10 on a side, small domatia in their axils, nerves pubescent beneath, petiole 5-10 mm long, slender; stipules low, strigulose, somewhat sheathing, each side with a low obtuse lobe with 3-5 linear processes on margin; cymes 3, rarely 1 or 5, at terminal node, sometimes one in each axil at the next node down from terminal one, sparsely to densely puberulent; slender, loosely branched 4-7 times, mostly 2.5-4(-5) cm long, central one tending to be smaller or strongly reduced, branching trichotomous to quite irregular, or becoming somewhat helicoid, central flower or branchlet tending to be reduced or abortive, a very small linear bractlet at each ramification; flowers white, hypanthium hemispheric, longitudinally rugose and granulate-puberulent, calyx broadly cylindrical or somewhat campanulate, rugose without, puberulent, sinuses each with a conspicuous gland and a dense tuft of hair, lobes 5-6, unequal, triangular to almost strap-shaped with broad base, apex blunt, hirsute, especially within and on margins; corolla densely tomentulose-pubescent without, less so on lobes, tube cylindrical, 7-8.5 mm long, upper 1-1.5 mm abruptly strongly dilated, limb truncate in bud, lobes 5, linear-oblong, spreading to recurved, with a strong hook-like appendage subapically within, throat and bases of lobes densely bearded; anthers 5, exserted in short-styled flowers subexserted in long-styled, lanceolate, erect; heterostylous, style glabrous, filiform, 4-5 mm long in short-styled, 10-11 mm in long-styled, 7-10-branched at apex ovary 7-10 celled; fruit a globose or depressed globose, white to pink drupe, sulcate without when dry, endocarps united into a sulcate bony pyrene 6 mm or less in diameter, single seeds developed in some locules, in others abortive.

Specimens examined:

Aldabra.--s.l., Abbott in 1892 (K); Dupont 31, 44, 91 (all K); Fryer 44 (Type K, 2 sheets); Thomasset in 1903 (K), 240 (K);

Hnatiuk 732058 (US).

West Is. (Ile Picard): Fox 284 (K); Settlement, Renvoize 725 (K, US), 743 (K, US) 839 (K, US); Fosberg 48833 (US); back of settlement, Fosberg 48695, 48700, 48808, 48810 (all US); Bassin Cabri, Hnatiuk in 1974 (US).

Middle Is.: Mixed scrub, W of East Channel, Renvoize (Grubb) 1343 (K, US).

South Is.: 3/4 mi. [1.2 km] W of Flamingo Pool, Renvoize 994 (K, US); 1.5 km N of Cinq Cases Camp, Fosberg 48993 (US); Takamaka Camp, Renvoize 872 (K, US); near Takamaka Well, Fosberg 49292 (US). Dune Jean Louis, Fosberg 49399 (US).

Ile Esprit (Euphrates I.): Fosberg 48753 (US), 48754 (US), 48768 (US); Wood 1654 (K, US), 1655 (K, US).

Ile Michel: Hnatiuk 731318 (US); Fosberg 49365 (US); Renvoize 1040 (K, US).

Assumption.--Coeur de Boeuf, Dupont 259 (K); Fryer 761 (US).
Cosmoledo.--Thomasset 242 (K).

This species in Aldabra is variable, depending on the conditions, such as available moisture and quality of soil. In dry conditions its leaves point strongly downward. It is common in mixed scrub and on platin. It is also found in East Africa, Madagascar and the Comoros. Verdcourt, Fl. Trop. E. Africa, Rubiaceae (Part I) 150, 1976, reduces T. fryeri outright to T. africana ssp. hildebrandtii (Vatke) Verdc., which may be the best final disposition of it and is followed above.

Tricalysia A. Richard ex DC., Prodr. 4: 445, 1830 (Oct.).--A.

Richard, Mém. Fam. Rubiacées...: 224, 1829 [1830, Dec.] .

--Mém. Soc. Hist. Nat. Paris 5: 224, 1834.

Shrubs or small trees; leaves elliptic or lanceolate; stipules subulate; flowers in few-flowered small axillary bracteate cymes; flowers 4-8-merous; calyx toothed or rarely bilabiate; corolla with lobes imbricate or contorted in bud; anthers linear, exserted on short filaments from corolla throat; ovary 2-celled, ovules 2 or more in a cell, collateral or in 2 vertical rows on a fleshy placenta, style exserted, stigma 2-lobed; fruit fleshy, globose; seeds 1-9 (or 12?), more or less rounded or irregularly obtusely angular, deeply sunken in the remains of the fleshy placenta.

A small African-Indo-Pacific genus with one species in Aldabra, which also occurs in Africa.

Tricalysia sonderiana Hiern, in Oliver, Fl. Trop. Afr. 3: 119, 1877.

--Fosberg, Phil. Tr. R.S. B, 260: 218, 225, 1971.--Renvoize, ibid. 231.

Tricalysia cuneifolia Baker, Kew Bull. 1894: 148, 1894.--Schinz,

Abh. Senckenb. Naturf. Gesellsch. 21: 91, 1897.--Voeltzkow,

ibid, 26: 552, 1902.--Hemsley, Jour. Bot. 54: 18, 1916;

Kew Bull. 1919: 123, 1919.

Shrub or small tree 1-5 m tall, branchlets pale yellowish gray, tending to be elongate, rarely even somewhat scandent, youngest internodes glabrous or slightly puberulent; leaves ovate to elliptic or narrowly so, up to 10 x 4 cm, usually smaller, glabrous, apex acute to slightly acuminate, base acute to somewhat abruptly contracted, veins 6-9 on a side, distinct but not prominent beneath, petiole 1-3 mm; stipules ovate, sheathing, abruptly acuminate, acumen spine-like, tending to diverge somewhat from stem, subsistent; cymes very condensed, once or twice branched, or reduced to single triads, conspicuously scaly-bracteate in ramified part; pedicels varying greatly in length, usually with one to several scattered scale-like bractlets, flowers white, hypanthium glabrous, very slightly contracted at base of calyx, calyx very broadly campanulate to saucer-shaped, 2-2.5 mm wide, shallowly 5-lobed, lobes low-triangular; corolla about 10 mm long just before opening, tube and limb subequal, tube dilated upward, limb in bud conical, basal part of lobes strongly imbricate, upper part somewhat less so, lobes becoming reflexed, broadly oblong, somewhat exceeding tube, glabrous within and without except at base, bases of lobes and throat usually copiously and conspicuously bearded; anthers completely exerted and reflexed, 4 mm long, linear, the cells 3 mm, the apical 1 mm of the connective enlarged into an oblong fleshy appendage; style glabrous, well exerted beyond the beard, divided at apex into two strongly flattened lanceolate somewhat recurved branches, stigmatic and papillate on inner faces; ovary 2-(-3) locular, ovules up to 6 in a cell, borne on fleshy placentae; fruits globose, black, 6-7 mm diameter, endocarp crustaceous, seeds deeply sunken in fleshy placentae, 6-9 (-12?) in a fruit, sub-peltately attached, irregularly compressed subangular, attached on one angle, with an irregular cavity on one side near attachment, separated by the thin remains of the placenta, surface dark chestnut brown, cellular-alveolate.

Specimens examined.

Aldabra.--s.l. Abbott in 1894 (K, type, US, isotype); Dupont 3 (K), 132 (K); Dupont in 1906 (K); Fryer 91 (K); Thomasset in 1903 (K).

West Is.: Settlement, Renvoize 745 (US, K), 749 (US, K), 1177 (US, K); Fosberg 48696 (US); 48698 (US); 400 m SW of Bassin Cabri, Wood 1614 (US, K).

Polymnie: Hnatiuk 731315 (US), 731505 (US).

Middle Is.: Hnatiuk 791305 (US); Gionnet Channel Camp area, Fosberg 49581 (US); 49668 (US); Anse Porceau, 1/4 mi. [0.4 km] E of Passe Gionnet, Renvoize 1169 (US, K); E Ile Malabar, near Middle Camp, Hnatiuk 731900, 731901, 731902, 731903, 731904 (all US); E end of island, Fosberg 49066 (US); W of East Channel, Renvoize 1322 (US, K), 1442 (US, K).

South Is.: 3.5 km W of Pt. Hodoul, Fosberg 49204 (US); 3 km

NW of Cinq Cases Camp, Fosberg, Grubb & Graham 49179 (US); 1.5 km NW of Cinq Cases Camp, Fosberg & Grubb 49007 (US); W of Takamaka Pool, Renvoize 1114 (US, K); Takamaka Grove, Hnatiuk 731503 (US), 731895 (US), 731896 (US), 731897 (US); Takamaka (Wilson's) Well, Fosberg 49378 (US); Hnatiuk 731898 (US); vicinity of Takamaka Camp, Renvoize 1022 (US, K), 1074 (US, K); Takamaka Platin, Stoddart 1037 (US, K).

Ile Esprit: Fosberg 48761 (US), 48769 (US), 48776 (US).

Ile Egret: Renvoize 1291 (US, K).

Assumption...Center of island, Frazier 778 (US).

One flowering specimen, Wood 1614, has the bases of the corolla lobes and throat only slightly bearded, but otherwise does not differ significantly.

This species is distributed fairly widely in South and East Africa, as well as on Aldabra and Assumption. It is found in mixed scrub and in small areas or clumps of scrub in platin.

The inclusion of its seeds embedded in the developed fleshy placentae suggests that the genus may belong in the Gardeniae rather than in the Ixoriae, where it seems to be placed in recent classifications of Rubiaceae.

Some doubt has been expressed as to whether T. cuneifolia Baker is properly referred to the mainland African species. The latter is enormously variable over its wide range in Africa. The Aldabra plant, which is much less variable, seems well within the range of variation of T. sonderiana.

CALLICARPA ERIOCLONA SCHAUER (SENSU STRICTO)

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We discuss the taxon Callicarpa erioclona Schauer, describe its remarkable pubescence, and restrict its circumscription to plants having such pubescence, excluding Micronesian plants referred to this species.

Callicarpa erioclona Schauer, in DC Prodr. 11: 643, 1847.

This name has been applied in recent years by some workers to plants from Micronesia and other parts of the western Pacific and Malesia, that have otherwise been called C. cana L. or C. candicans (Burm. f.) Hochr., and even to those called C. paucinervia Merr. However, the remarkable pubescence noted by Schauer (l.c.) as "pube ramulosa rufa lanatis subterque pube farinosa alba tomentosis" and "Tomentum singulare, duplex, superum floccoso lanatum, postea sensim abolescens rufum, subjectum farinaeum densum subpersistens candidum" does not occur on any Micronesian material seen by us, nor on the general run of C. candicans sensu lato throughout its range.

The indument referred to occurs on the young twigs, petioles, peduncles, principal cyme branches, and occasionally is slightly developed on the principal veins on the under-sides of the leaves. It consists of a dense white layer of closely matted stellate hairs, towering above which are tall erect strong hairs which are closely covered by whorls of stiff short secondary hairs. This tall pubescence is of a dull brownish or dirty-reddish color, is rather easily rubbed off, and gives the branchlets a shaggy sordid appearance.

It seems best to restrict the application of the name Callicarpa erioclona to plants with this sort of indument, and to choose as lectotype Cuming 911 of the two collections cited. The Lesson New Guinea collection also cited by Schauer does not seem to be present, at least in the C. erioclona cover, in the Geneva Herbarium. Neither collection is represented in the Prodromus Herbarium, and Schauer only mentions having seen them "in h. reg. berol. Kunth et Lucae." Probably they were destroyed in Berlin in World War II. We here designate as the actual lectotype sheet the Cuming 911 sheet received in Geneva in 1841. The locality given is simply "Philippines."

We have examined an ample series of mostly Philippine specimens similar to this in the US and Geneva herbaria.

The plant is a shrub or small tree, with long internodes and curving sordid-pubescent branchlets; large elliptic strongly acuminate shortly petiolate leaves, white and somewhat brownish re-

ticulate-veined beneath, glabrous or nearly so above, margins subentire in lower part, serrate, to dentate, often very sharply so, distally (completely subentire in Ramos 42770); cymes dense to somewhat open, reniform in outline, intricately branched, sordid-pubescent, flowers pink (Steiner 418) or almost white (Williams 2964); fruits globose, about 2 mm in diameter.

Plants of this type seem to be commonest in the Philippines, but we have seen one sheet from Sabah. There is a somewhat similar plant from Cochinchina (Gaudichaud 126) which has the pubescence sparser and shorter, and which has the secondary hairs on the erect hairs much longer, less numerous, and almost white. This plant also has somewhat more prominent dentation on leaf margins than is usual, and with the other non-Philippine specimens cited below, may ultimately turn out to belong to a different species.

Several varieties and forms have been recognized by Lam (1919) and Bakhuizen (1921) but in the Philippine material studied the variation scarcely seems to warrant segregation (but see remarks below on Javanese, Chinese, and Indochinese specimens).

Specimens examined:

Philippines: s.l. Cuming 911 (G, 3 sheets, lectotype and 2 isolectotypes)

Luzon: Macaharing, (Manila), Loher 4449 (US)

Bataan Prov.: Lamao R., Mt. Mariveles, Borden 1595 (US); Whitford 487 (US); Merrill 2536 (US); Elmer 6647 (G).

Balanga Prov.: s.l. Ramos 1901 (US, G).

Cayagan Prov.: Littoc, vic. Peñablanca, Adduru 150 (US)

Laguna Prov.: s.l. McGregor 22910 (US): San Antonio, Ramos 23798 (US); Los Baños, Mt. Maquiling (Makiling), Elmer 17508 (US, G); Whitford 19757 (US); Foxworthy in 1914 (US); Steiner 418 (US); Galutera 33358 (US).

Nueva Ecija Prov.: Mt. Umingan, Ramos & Edaña 26417 (US).

Nueva Vizcaya Prov.: s.l. Ramos 8176 (US) Bosoboso, Ramos 1039 (US).

Sorsogon Prov.: Irosin, Mt. Rulusan, Elmer 15124 (US), 15082 (US, G).

Bohol: s.l. Ramos 42770 (G, US)

(leaf pubescence thinner, margins subentire in both, cymes larger and looser than usual in Geneva sheet only.)

Leyte: s.l. Wenzel 1479 (G)

(leaves less dentate than usual, pubescence thinner and closer.)

Catanduanes I.: s.l., Ramos & Edaño 75120 (US).

Mindoro I.: vic. San José, Lambert & Brunson 69 (US); Baco, Merrill 1667 (US); Polo, Merrill 2245 (US).

Mindanao: Davao Prov., Mati, Ramos & Edaño 40314 (G); Todaya, Mt. Apo, Elmer 11190 (US,G); Santa Cruz, Williams 2964 (US).

Zamboanga Prov.: Zamboanga, Ahern's collector 540 (US); Tetuan, Quadras 335 (US)

Borneo: Sabah (British North Borneo): Banguey Island, Castro & Melegrito 1714 (G).

Nova Guinea: Lesson (not seen, cited by Schauer).

Cochinchine: Touraine, Gaudichaud 126 (G) (pubescence atypical).

China: Kwangsi Prov., Ta Tseh Tsuen, Yung Hsien, Steward & Cheo 876 (G). (Pas rather similar erect, more barbellate, hairs on stems, but large reticulate serrate leaves, greenish beneath).

Java: s.l. "Herb. Labill" (G); Perrottet in 1820 (G)

These two sheets resemble C. candicans but show on their stems a rather depressed pubescence of short erect hairs similar to those of Gaudichaud 126 (above) but so short as to be almost intermediate with stellate hairs.

We would not include these Java specimens, not Gaudichaud 126 nor Steward and Cheo 876 in C. erioclona but have at present no satisfactory disposition for them.