

THE MALESIAN SPECIES OF MELANOLEPIS (EUPHORBIACEAE)

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SUMMARY

The Southeast Asian genus *Melanolepis* comprises two species, the very variable and widespread *M. multiglandulosa* (Reinw. ex Blume) Rchb.f. & Zoll. (from Taiwan and the Ryukyu Islands throughout Malesia up to Papua New Guinea and the Bismarck Archipelago) and *M. vitifolia* (Kuntze) Gagnep., endemic in Cambodia. The two species differ in dentation, incision, and hairiness of the leaves.

Key words: *Melanolepis*, Acalyphoideae, Chrozophorinae, Doryxylinae, Euphorbiaceae, Malesia.

INTRODUCTION

Reichenbach & Zollinger (1856) established the genus *Melanolepis*, which was based on *Rottlera multiglandulosa* described by Blume (1825). The name *Melanolepis* refers to the black gland on the back of the stamen connectives, while the name *multiglandulosa* relates to the many glands at the base of the leaf. A second species was described as *Mallotus vitifolius* by Kuntze (1891) and referred to *Melanolepis* by Gagnepain (1925).

Melanolepis vitifolia is endemic in Cambodia (Kampuchea), while *M. multiglandulosa* is very widespread, from Peninsular Thailand into the Western Pacific and up to Papua New Guinea (Bismarck Archipelago). The two species are hardly distinct. The basic difference is in the teeth along the leaf margin, which are coarse and very distinct in *M. multiglandulosa* and hardly noticeable in *M. vitifolia*. The latter always has more deeply divided 3-palmatifid leaves, while *M. multiglandulosa* occasionally shows 3 lobes. *Melanolepis vitifolia* is also more hairy than *M. multiglandulosa*. Gagnepain (1925) mentions two other differences, but the distinction in 2 or 3 stigmas versus 3–5 is non-existent as the stigmas of *M. multiglandulosa* may also be split. The difference in dehiscence of the fruits could not be verified (*M. vitifolia* should dehisce very tardily).

Melanolepis multiglandulosa is also known as *M. moluccana*, a name introduced by Müller Argoviensis (1865) and based on the name *Croton moluccana* by Linnaeus (1753). Müller Argoviensis assumed that the specimen in the Linnean herbarium in London constituted the type of Linnaeus' name. However, Linnaeus received this specimen after 1753, thus it could not be a type. In fact Linnaeus' description is based

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on several elements. One part indirectly (via Fl. Zeyl.) refers to specimens collected by Hermann and these are *Givotia rottleriformis* Griff. ex Wight (also Euphorbiaceae). The other part refers to a description made by Burman and this is *Aleurites moluccana* (L.) Willd. (see Trimen, 1898; Merrill, 1917). The confusion can best be solved by choosing one of the Hermann specimens as lectotype and with that decision the name *Croton moluccana* has nothing to do with *Melanolepis multiglandulosa* anymore and Müller's name is just an incorrect interpretation.

Webster (1994) places *Melanolepis* together with *Doryxylon*, *Sumbaviopsis* and *Thyrsanthera* in the subtribe Doryxylinae based on the presence of 3-colporate heterobrochate pollen, stellate indumentum, basal laminar glands, habit (trees or shrubs), connate stamens, and seeds with an ariloid. The Doryxylinae are part of the tribe Chrozophorae in the subfamily Acalyphoideae. In Van Welzen (1999) it is shown that the Doryxylinae have to be sunk into the subtribe Chrozophorinae.

Typical characters for *Melanolepis* are the stems with a broad soft pith, the serrate ovate leaves which can be 3-lobed, the adaxial glands at the base of the leaf, the stellate indumentum, the absence of petals, the many stamens with a gland on the back of the connective, the flat ring-like disc in the pistillate flowers, the short style and stigmas, the mainly loculicidal capsules of which the column usually also disappears during dehiscence. The species is presumably monoecious, though usually only flowers of one sex are found per specimen. Occasionally specimens with both sexes present on separate inflorescences are found and very seldom inflorescences with a mixture of staminate and pistillate flowers. The latter two cases support the view that the plant is monoecious.

MELANOLEPIS

Melanolepis Rchb.f. & Zoll., Acta Soc. Regiae Sci. Indo-Neerl. 1 (1856) 22; Linnaea 28 (1856) 324; Merr., Interpr. Herb. Amboin. (1917) 318; Corner, Ways. Trees Malaya (1940) 274; Backer & Bakh.f., Fl. Java 1 (1964) 481; Airy Shaw, Kew Bull. 26 (1972) 309; Whitmore, Tree Fl. Malaya 2 (1973) 118; Airy Shaw, Kew Bull. Add. Ser. 4 (1975) 175; Kew Bull. Add. Ser. 8 (1980) 174; Kew Bull. 36 (1981) 332; Kew Bull. 37 (1982) 30; Alph. Enum. Euphorb. Philipp. Is. (1983) 38; G.L. Webster, Ann. Missouri Bot. Gard. 81 (1994) 73. — Type species: *Melanolepis multiglandulosa* (Reinw. ex Blume) Rchb.f. & Zoll.

Shrubs to trees, presumably monoecious, but usually only one sex per plant; flowering twigs smooth, lenticellate, glabrous except when young, with a broad soft pith. *Indumentum* mainly consisting of stellate hairs, only a few simple hairs. *Stipules* deltoid, densely hairy except for glandular apex and basal glands on the inside, caducous. *Leaves* spirally arranged, simple; petiole relatively long, basally usually constricted, filled with soft pith; blade ovate, sometimes 3-lobed, papery, usually symmetric, base cordate to cuneate, with a group of protruding glands on the upper surface, margin inconspicuously to very coarsely dentate, with glands in teeth and smaller ones along the margin, apex acute to acuminate, very apex acute, usually green when dry with whitish venation, upper surface glabrous except for a few basal hairs, lower surface sparsely to very densely hairy, often with 2 basal black glandular areas (esp. in New Guinea) and additional smaller glandular areas along the veins; venation palmate with 5 (7) major nerves, secondary nerves ending in marginal teeth, not interconnected, veins scalariform, quaternary veins more reticulate. *Inflorescences* terminal panicles,

very laxly (1–3) branched (therefore raceme-like) with either staminate or pistillate flowers, seldom both sexes on the same inflorescence, more often both sexes present on different inflorescences, erect; staminate flowers up to 5 per cymule, pistillate flowers single or 2 (seldom with a few staminate ones) per cymule. *Bracts and bracteoles* broadly ovate to deltoid, outside hairy, inside glabrous. *Flowers* actinomorphic, sepals (4) 5, valvate, petals absent. *Staminate flowers* pedicellate; sepals ovate, outside densely puberulous with simple and stellate hairs, inside glabrous; stamens 200–250, free, filaments thread-like, anthers basidorsifixed just below the apidorsal gland on the connective, 2-locular, opening introrsely with lengthwise slits; disc and pistillode absent; receptacle convex. *Pistillate flowers*: pedicel elongating in fruit; sepals basally united into calyx, lobes triangular to ovate, outside densely tomentose, inside only apically so; disc a flat ring, glabrous to marginally hairy with simple hairs, marginally also with protruding trichomes; pistil 2- or 3-locular, one ovule per locule, smooth, tomentose; style absent to short, stigmas apically not to slightly split, papillate above, tomentose below. *Fruits* lobed ± obcordate capsules, leathery, thin-walled, loculicidal, hardly septicidal, densely hairy outside, glabrous inside; column usually dehiscent too, when present narrow, tapering towards the not or hardly broadened apex; septa remnants with a single vein, narrow, straight, non-fibrous. *Seeds* usually 2 or 3 per fruit, triangular in transverse section, adaxially with sharp ridge, abaxially convex, covered by a thin, fleshy sarcotesta; exotesta thin, smooth, mesotesta woody, mesotesta and endotesta folding inwards.

Distribution — Two species, one restricted to Cambodia (Kampuchea), the other widespread from Peninsular Thailand throughout Malesia and into the Pacific to Taiwan, Ryukyu Islands, and Society Islands.

Note — The two species can be separated by the dentation of the leaves, whereby *M. vitifolia* is obscurely dentate and always 3-palmatifid, while *M. multiglandulosa* has very coarse teeth, and is usually not lobed and when lobed only in juvenile stages until about halfway along the blade (mainly on Okinawa). The other characters mentioned by Gagnepain (1925) are incorrect (number of styles) or could not be verified (difference in dehiscence, *M. vitifolia* dehiscent very tardily).

Melanolepis multiglandulosa (Reinw. ex Blume) Rchb.f. & Zoll. — Fig. 1, Map 1

Melanolepis multiglandulosa (Reinw. ex Blume) Rchb.f. & Zoll., Acta Soc. Regiae Sci. Indo-Neerl.

1 (1856) 22; Linnaea 28 (1856) 324; Merr., Interpr. Herb. Amboin. (1917) 318; Sp. Blancoan. (1918) 223; Enum. Philipp. Flow. Pl. (1923) 431; Corner, Ways. Trees Malaya (1940) 274, text-f. 87; Holthuis & H.J. Lam, Blumea 5 (1942) 203; Backer & Bakh.f., Fl. Java 1 (1964) 481; Airy Shaw, Kew Bull. 26 (1972) 309; Whitmore, Tree Fl. Malaya 2 (1973) 118; Airy Shaw, Kew Bull. Add. Ser. 4 (1975) 175; Kew Bull. Add. Ser. 8 (1980) 174; Kew Bull. 36 (1981) 332; Kew Bull. 37 (1982) 30; Alph. Enum. Euphorb. Philipp. Is. (1983) 38. — [*Croton multiglandulosus* Reinw. ex Blume, Catalogus (1823) 105, nom. nud.] — *Rottlera multiglandulosa* Reinw. ex Blume, Bijdr. (1826) 609. — *Mallotus multiglandulosus* (Reinw. ex Blume) Hurus., J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6 (1954) 308. — Lectotype (here proposed): *Anonymous s. n.*, s. d. (holo L, barcode L 0020491), Java.

Ricinus dioicus Wall. ex Roxb., Fl. Ind. 3 (1832) 690; Wall., Cat. (1847) nr. 7808. — *Melanolepis* ? *calcosa* Miq., Fl. Ned. Ind. 1, 2 (1859) 399, nom. superfl. — *Mallotus calcosus* (Miq.) Müll. Arg. in DC., Prodr. 15, 2 (1866) 958, nom. superfl. — *Rottlera calcosa* (Miq.) Scheff., Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 125, nom. superfl. — Lectotype (here proposed): Rumphius, Fl. Amb. 4 (1743) t. 64: Folium calcosum. See note 2.

- Adelia monoica* Blanco, Fl. Filip., ed. 2 (1845) 561; Merr., Sp. Blancoan. (1918) 223 (under *Melanolepis multiglandulosa*). — Neotype (appointed here, see Merrill, 1918): *Merrill Species Blancoanae* 489 (holo NY, n.v.; iso BO, L), Philippines, Luzon, Manila.
- Melanolepis angulata* Miq., Fl. Ned. Ind., Eerste Bijv. (1861) 455. — *Mallotus angulatus* (Miq.) Müll. Arg. in DC., Prodr. 15, 2 (1866) 958. — *Rottlera angulata* (Miq.) Scheff., Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 124. — Type: *Diepenhorst s.n.* (holo U?, n.v.), Indonesia, Sumatra, Priaman Prov.
- Mallotus moluccanus* (L.) Müll. Arg. var. *glabratus* Müll. Arg. in DC., Prodr. 15, 2 (1866) 958. — *Melanolepis multiglandulosa* (Reinw. ex Blume) Rchb.f. & Zoll. var. *glabratus* (Müll. Arg.) Fosberg, Phytologia 5 (1955) 289. — Syntypes: *Gaudichaud 181* (n.v.); *Wallich 7808* (K); *7826B* (K).
- Mallotus hellwiganus* K. Schum. in K. Schum. & Hollrung, Fl. Kaiser Wilh. Land (1889) 79. — *Mallotus hollrungianus* T. Durand & B.D. Jacks., Ind. Kew., Suppl. 1 (1906) 262, nom. superfl. — Type: *Hollrung 412* (n.v.), Papua New Guinea, Hatzfeldhafen.
- Mallotus moluccanus* (L.) Müll. Arg. var. *pendulus* Merr., Philipp. J. Sci., Bot. 7 (1912) 401. — *Melanolepis moluccana* (L.) Pax & K. Hoffm. var. *pendula* (Merr.) Pax & K. Hoffm. in Engl., Pflanzenz. IV.147.vii (1914) 144. — *Melanolepis multiglandulosa* (Reinw. ex Blume) Rchb.f. & Zoll. var. *pendulus* (Merr.) Merr., Enum. Philipp. Flow. Pl. (1923) 432. — Lectotype (here proposed): *Merrill 8305* (PNH†, n.v.; iso L), Philippines, Mindanao, District of Zamboanga.
- Mallotus moluccanus* auct. non (L.) Müll. Arg.: Müll. Arg., Linnaea 34 (1865) 185; in DC., Prodr. 15, 2 (1866) 958. — *Mallotus moluccanus* sensu Müll. Arg. var. *genuinus* Müll. Arg., Linnaea 34 (1865) 185, nom. inval. — *Rottlera moluccana* Scheff., Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 122. — *Melanolepis moluccana* (L.) Pax & K. Hoffm. in Engl., Pflanzenz. IV.147.vii (1914) 142, f. 20. See note 3.

Shrub to tree, up to 20 m high, dbh up to 30(–60) cm, in monsoon areas deciduous; flowering twigs 2–11 mm thick. *Indumentum* off-white, light grey, grey-yellow or brown hairs. *Bark* smooth to shallowly longitudinally fissured with many minute lenticels, mainly in the fissures, to finally flaky, flakes detaching easily, grey to (mottled) pale fawn-grey to light grey-brown, to pale yellow, up to 3 mm thick; under bark green to dark straw to blue grey under lenticels; inner bark firm, fibrous, whitish to green to pale yellow to (orange-)brown, turning dark blue after exposure, c. 6 mm thick; latex sometimes obvious, milky, sticky; wood soft, cream to pale straw to greenish. *Stipules* c. 1.2 by 0.8 mm. *Leaves*: petiole 2.4–31 cm long, whitish when dry; blade ovate, sometimes 3-lobed, 5–38 by 5–34 cm, index 1–1.1, smooth, dull light to dark green above, paler, whitish to almost glaucous, more glossy below, midrib and veins often whitish at both sides, flat to slightly raised above, raised below. *Inflorescences* densely pale brown hairy; up to 26(–54) cm long, side-branches up to 41 cm long, often somewhat flattened. *Bracts* 1.4–2.5 by 0.5–1 mm, thick; *bracteoles* 0.5–0.6 by 0.4–0.5 mm. *Staminate flowers* 7–13 mm diam.; pedicels 5–6 mm long, abscission zone in upper 2–3 mm, often inconspicuous; sepals pale grey to (yellowish) white, grey green inside; stamens cream-white to (pale) yellow, filaments 1.5–2.3 mm long, anthers 0.8–1 by 0.5–0.6 mm. *Pistillate flowers* 4.5–5.5 mm diam.; pedicels 3–6(–13 in fruit) mm long with (inconspicuous) abscission zone in upper 0.5–1.5(–3.5 in fruit) mm; calyx (brownish) mid green to yellowish to white, tube c. 1 mm high, lobes 1.7–3 by 1.2–1.8 mm; ovary 2.5–3.8 by 3.3–4.2 mm, light green; style almost absent to 0.6(–2) mm long, stigmas ± erect, creamy, up to 1.1 mm long, when split only upper c. 0.5 mm split. *Fruits* 9–15 by 7–9 mm, densely tomentose with stellate hairs to almost glabrous, mid green to greenish brown to olive green to greyish green; column c. 5 mm long, cream. *Seeds* 5.5–6 by 4.5–5.5 mm, creamy to purplish magenta; aril grey to orange.

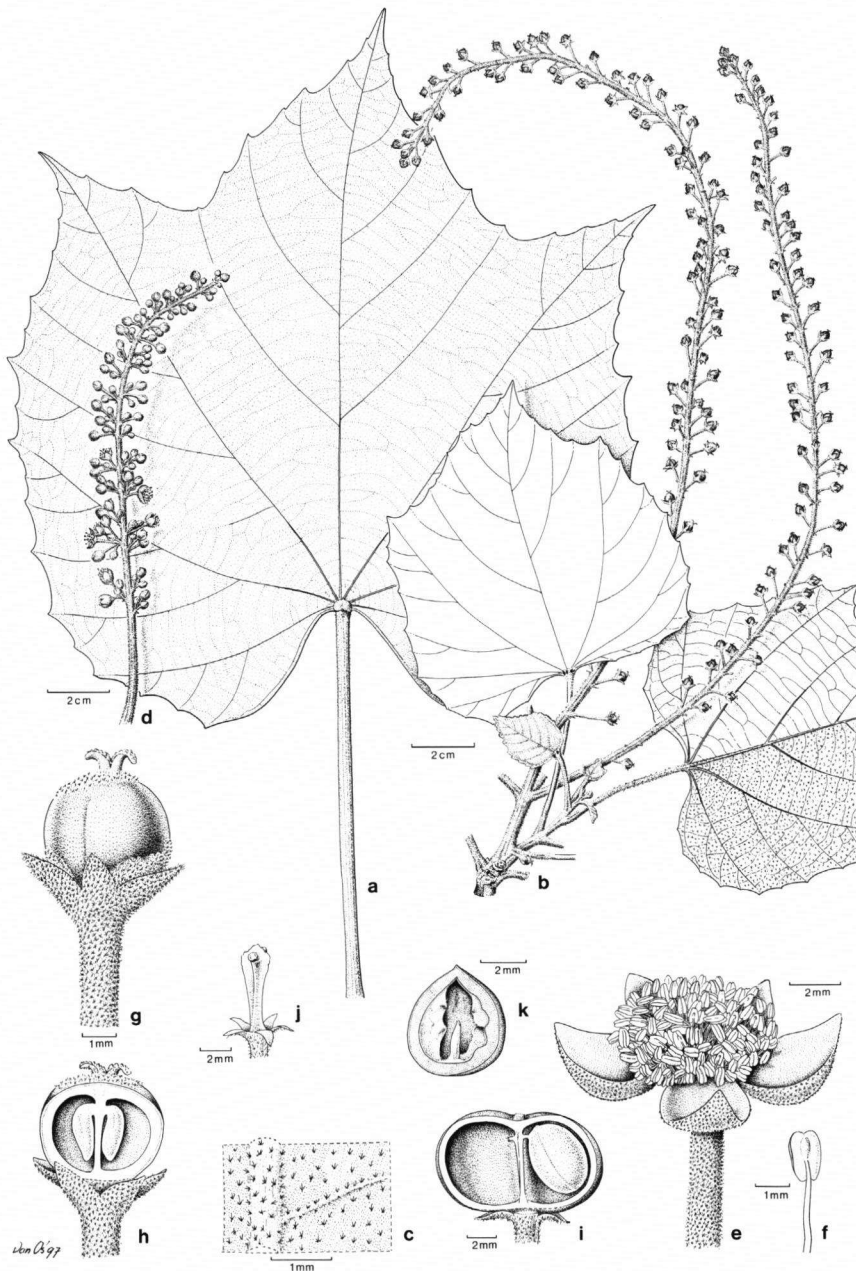
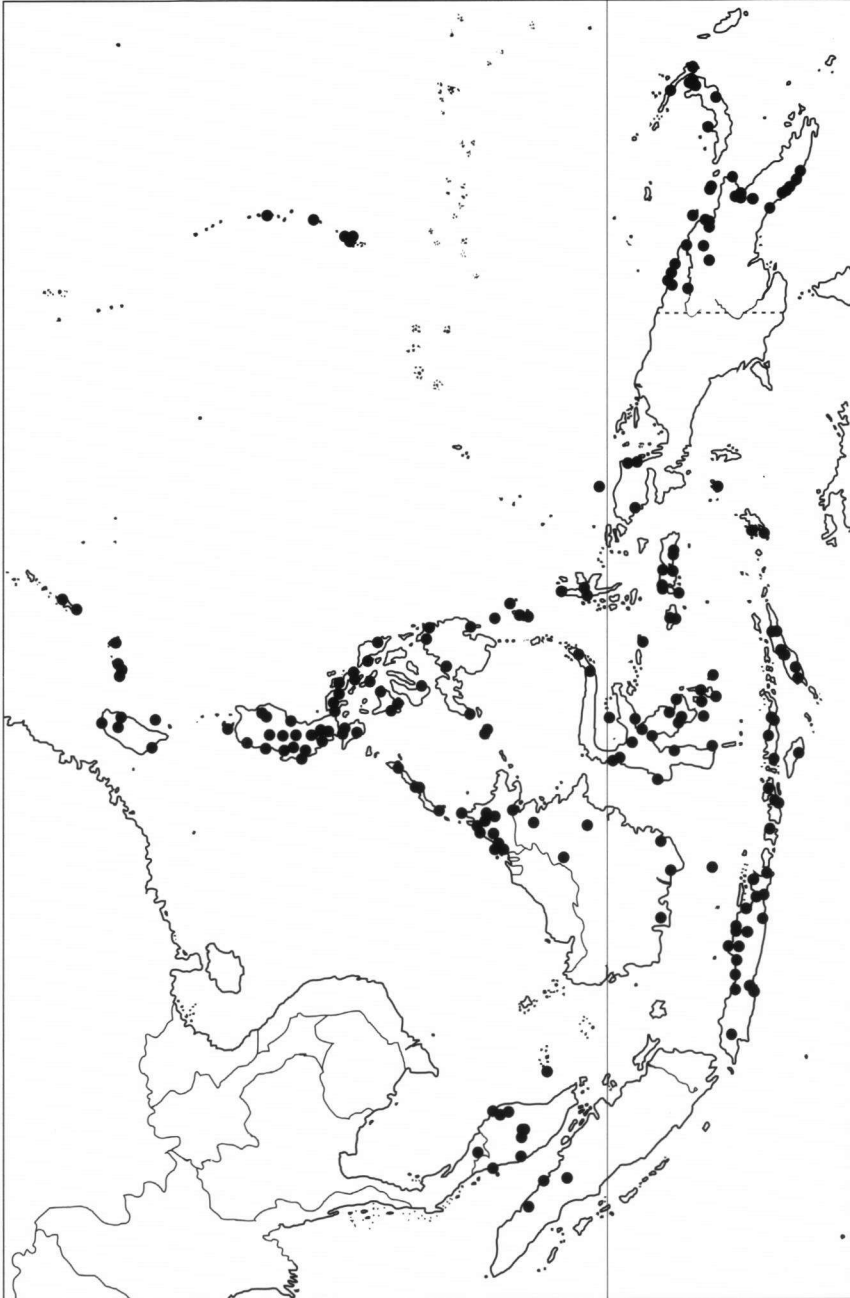


Fig. 1. *Melanolepis multiglandulosa* (Reinw. ex Blume) Rchb.f. & Zoll. a. 3-lobed leaf; b. habit with pistillate inflorescences; c. detail of lower leaf surface with stellate hairs; d. staminate inflorescence; e. staminate flower; f. stamen with gland above insertion of filament; g. pistillate flower with part of hairs removed; h. section through pistillate flower; i. section through fruit; j. column after dehiscence of fruit; k. section through seed, showing rumination [all L; a: *Anonymous s. n.* (barcode L 0020489); b, c, g, h: *ANU 1611*; d–f: *SAN (Lideh & Francis) 55938*; i–k: *Amdjah 820*].



Map 1. Distribution of *Melanolepis multiglandulosa* (Reinw. ex Blume) Rchb. f. & Zoll.

Distribution — Taiwan, Ryukyu Islands, Marianas, from S Thailand throughout Malesia to Papua New Guinea (Bismarck Archipelago). Unknown from Sarawak and Brunei on Borneo.

Habitat & Ecology — Rare to usually locally common, mainly found in secondary places like roadsides, regrowth thickets, depleted open secondary forest, forest edges in savannah, coconut plantations, old gardens, but also in primary forest, (*Barringtonia*) swamp forest, *Eucalyptus deglupta* dominated forest, monsoon (deciduous) forest, along mangroves. Considered an invader of cut forest (Ryukyu Islands: *Walker & Tawada 6624*). Soil, often poorly drained and/or temporary inundated: alluvial sand, clay, volcanic soil, coral (sand), red loam; andesite bedrock. Altitude: sea level up to 300(–1335) m. Flowering and fruiting throughout the year. The seeds are eaten by birds [*LAE (Wiakabu & A. M. C.) 73584*].

Uses — Japan (Ryukyu Islands): wood is used for shoes. Borneo, Sabah: bark used as a cure for cough. Philippines: use against chest pain and leaves or flowers on wrist against fever. Moluccas, Ceram: counter poison (not indicated against what; *Eyma 3425*). Also suitable as firewood (Philippines, Papua New Guinea).

Notes — 1. The species is somewhat variable in its range: towards the north (West Pacific Islands) and to the east (Bismarck Archipelago) there is a tendency to more glabrous leaves, while in New Guinea two basal glands at the upper surface protrude further than the other glands and at the lower surface there are always two basal black glandular areas. The latter are usually absent in specimens from other areas.

2. Usually, the name *Ricinus dioicus* is attributed to Wallich and is always cited as *R. dioicus* Wall. ex Roxb. However, Roxburgh did only refer to the text and plate in Rumphius' book and cited Ambon as the place of origin of the material. Roxburgh's *Flora Indica* (1832) was published after his death and was edited by Wallich. The identification of a specimen collected by Wallich (*Wallich 7808*) was only published in 1847, in a later edition of the *Flora Indica*. Therefore, it is likely that by the time the *Flora* was published, Wallich had not yet collected *Melanolepis* and, consequently, the plate of Rumphius (which can easily be identified as *M. multiglandulosa*) has to be selected as type. Selecting Rumphius' plate as lectotype reduces *Melanolepis calcosa* Miq. (and the names based on it) to superfluous homotypic synonyms of Roxburgh's name.

3. The name *Croton moluccana* L., to which Müller Argoviensis, Pax & K. Hoffmann, and Scheffer refer in their new combinations, is based on two references. The first one ('*Fl. Zeyl. 346*'; must be page 146) is *Givotia rottleriformis*, the other one ('*Nux juglans moluccana bifida* Burm. *Fl. Zeyl. 170*') is *Aleurites moluccana* (the latter is based on *Jatropha moluccana* L., by coincidence the same epithet). The specimen in Linnaeus' herbarium (no. 1140/20) in London is indeed *M. multiglandulosa*, but this is not the type of the species (Merrill, 1917; Trimen, 1898). Müller Argoviensis regarded this specimen as the type and, therefore, erroneously made the necessary combination in *Mallotus*. The best thing to do is to lectotypify Linnaeus' name with one of the Hermann specimens (*Givotia rottleriformis*), because this is the only indirect reference (via L., *Fl. Zeyl.*) to specimens; the other reference only mentions the description in Burman's *Thesaurus Zeylanica* (= *Aleurites moluccana*).

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REFERENCES

- Blume, C.L. 1825. *Bijdragen tot de flora van Nederlandsch Indië*: 609. Batavia.
 Gagnepain, F. 1925. Euphorbiacées. In: M.H. Lecomte, *Flore Générale de l'Indo-Chine* 5: 347–349, f. 40.3–10. Masson et Cie., Paris.
 Kuntze, O. 1891. *Revisio Generum Plantarum* 2: 608. Arthur Felix, Leipzig.
 Linnaeus, C. 1753. *Species Plantarum* 2: 1005. Laurentii Salvii, Holmiae.
 Merrill, E.D. 1917. *An Interpretation of Rumphius's Herbarium Amboinense*: 318, 319. Bureau of Printing, Manila.
 Müller Argoviensis, J. 1865. Euphorbiaceae. *Linnaea* 34: 185, 186.
 Reichenbach f., H.G. & H. Zollinger. 1856. In: H. Zollinger, *Ueber die Rottlera-Arten*. *Linnaea* 12: 324, 325.
 Roxburgh, W. 1832. *Flora Indica; or, descriptions of Indian Plants*. Vols. 1–4. Serampore: Parbury, Allen & Co., London.
 Trimen, H. 1898. *A Handbook to the Flora of Ceylon* 4: 50, 51. Dulau & Co., London.
 Van Welzen, P.C. 1999. Revision and phylogeny of subtribes Chrozophorinae and Doryxylinae (Euphorbiaceae) in Malaysia and Thailand. *Blumea* 44: 411–436.
 Webster, G.L. 1994. Synopsis of the genera and suprageneric taxa of Euphorbiaceae. *Ann. Missouri Bot. Gard.* 81: 73.

IDENTIFICATION LIST

The numbers after the collectors and their collecting numbers refer to:

1 = *Melanolepis multiglandulosa* (Reinw. ex Blume) Rech.f. & Zoll.

2 = *Melanolepis vitifolia* (Kuntze) Gagnep.

- A series 1269: 1; 3176: 1 — Ahern 48: 1 — Ahmad & Sidek SA.632: 1 — Amdjah 820: 1 — Amir 192: 1 — Angian 10303: 1 — ANU series 1611: 1 — Aranez 37: 1.
 Backer 7953: 1; 7979: 1; 26842: 1; 30422: 1 — Balajadia 3705: 1 — Barclay 4096: 1; 4152: 1 — Bartlett 15834: 1 — Bartlett & la Rue 246: 1 — bb series 17062: 1; 21362: 1; 24404: 1; 31367: 1 — Becking 89: 1; 161: 1 — Beguin 1048: 1; 1266: 1; 1828: 1 — Beumée 5260: 1 — Bloembergen 4515: 1 — Brass 5639: 1; 29170: 1; 32486: 1 — Britton 152: 1 — Bryan, Jr. 1096: 1 — BS series 11263: 1; 35405: 1; 44365: 1; 44427: 1; 49102: 1; 49876: 1 — Burley 75: 1 — Buwalda 4022: 1; 7296: 1 — BW series 4962: 1; 8387: 1.
 Carr 11243: 1; 11718: 1; 11719: 1 — Castro & Melegrito 1546: 1 — Cel/V-289: 1 — Chin 951: 1 — Cinatti 326: 1 — Clemens 6636: 1; 8192: 1; 16746: 1 — Colfs 133: 1 — Coode 5370: 1; 6065: 1 — Cuming 499: 1 — Cushing-Falanruw 836: 1.
 De Vogel 3016: 1 — De Vogel & Vermeulen 6465: 1; 6486: 1; 6991: 1 — De Voogd 1066: 1 — Demoulin 5770: 1 — Didrichsen 3001: 1 — Dorgelo 2282: 1; 3072: 1 — Duaneh 287: 1.

- Ebalo 868: 1 — Edaño 1262: 1 — Elbert 1915: 1; 2586: 1; 2755: 1; 2848: 1; 3247: 1; 3639: 1; 3886: 1; 4124: 1; 4297: 1; 4336: 1 — Ellen 85: 1 — Elliott & Nakamine 595: 1 — Elmer 8152: 1; 8227: 1; 10441: 1; 12666: 1; 15512: 1; 17866: 1 — Endert 2368: 1 — Eyma 1590: 1; 3425: 1; 3991: 1.
- Fallen, Wiakabu & Lelean 358: 1 — FB series 765: 1; 1049: 1; 3601: 1; 11491: 1 — Forbes 1789: 1; 3745: 1; 4084: 1 — Fosberg 37450: 1; 37787: 1; 37931: 1; 38358: 1 — Fox 333: 1; 600: 1 — Frake 223: 1 — Friedberg 397a: 1; 464: 1 — Furuse 3026: 1.
- Geesink 8903: 1 — Gibbs 2653: 1; 2721: 1 — Gilli 592: 1 — Godefroy 13: 2 — Goklin 1292: 1 — Gressitt 9: 1 — Guam Experiment Station 298: 1 — Guerrero 726: 1.
- Hallier 399: 1; 4399: 1 — Hartley 9644: 1 — Hatusima 17890: 1 — Hatusima & Sato 28820: 1 — Henry 45: 1; 151: 1; 738d: 1; 788d: 1; 919: 1 — Herbst 7296: 1 — Herre 263: 1 — Hochreutiner 2260: 1 — Hoogland 4850: 1 — Hoogland & Craven 10127: 1 — Huang, Yang, Kao, Chen & Tang 9422: 1.
- Idjan & Mochtar 106: 1.
- Ja series 1667: 1 — Jensen 341: 1.
- Kamis 3012: 1 — Kanehira 9: 1; 1061: 1 — Kanehira & Hatusima 14180: 1 — Kartawinata, K. 1753: 1 — Keng K 1183: 1 — Kerr 7289: 1 — Keßler et al. 1589: 1 — Kjellberg 904: 1 — KL series 3069: 1 — Kodno 130a: 1 — Kohlhaas 211: 1 — Koie 2232: 1 — Kond 5: 1; 8: 1; 11: 1; 41: 1; 130: 1 — Koorders 2392: 1; 2394: 1; 2536: 1; 2537: 1; 2538: 1; 2539: 1; 2540: 1; 2541: 1; 2543: 1; 12782: 1; 12982: 1; 13579: 1; 16956: 1; 19731: 1; 24071: 1; 28912: 1; 28940: 1; 30162: 1; 32496: 1; 33533: 1; 36102: 1 — Kooy 384: 1 — Kornassi 657: 1 — Korthals 1193: 1 — Kostermans 244: 1 — Kostermans & Wirawan 179: 1.
- LAE series 55017: 1; 56768: 1; 58615: 1; 66706: 1; 73584: 1 — Lagosa 64: 1 — Lam 2464: 1; 2546: 1; 3184: 1; 3361: 1; 3418: 1 — Lange 25: 1 — Leu 952: 1 — Lewandowsky 33: 1 — Liao 10208: 1 — Loher 4828: 1; 4829: 1; 4830: 1; 4831: 1; 4832: 1 — Lörzing 13259: 1 — Lynn Zwickey 192: 1.
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