

THE COMPOSITAE OF NEW GUINEA II *

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ADDITION AND CORRECTIONS TO PART I

9. DICHROCEPHALA (I, p. 594)

KEY TO THE SPECIES

- 1 a. Heads 3—5 mm wide, in small, terminal, slender, rigid panicles; corolla of marginal flowers tubular, with a 3-dentate apex, receptacle hemispheric 1. *D. bicolor*
- b. Heads 5—6 mm wide, on long rigid peduncles in the axils of the highest leaves; corolla of marginal flowers with a very short tube and a widely campanulate 3-fid limb, receptacle with a hemispheric lower part and a conical upper part 2. *D. chrysanthemifolia*

1. *Dichrocephala bicolor* (Roth) Schlechtend. (I, p. 594).

2. *Dichrocephala chrysanthemifolia* (Bl.) DC., Prodr. 5 (1836) 372; Miq., Fl. Ind. Bat. 2 (1856) 38; Hook., Fl. Br. Ind. 3 (1881) 245; Boerl., Handl. 2 (1891) 236; Merr., Enum. Phil. 3 (1923) 599; Koster in Back. & Bakh. v. d. Brink. Fl. Java 2 (1965) 381. — *Cotula chrysanthemifolia* Bl., Bijdr. (1826) 918. — *D. tanacetoides* Schultz-Bip. in Zoll., Syst. Verz. (1854) 122; Miq., Fl. Ind. Bat. 2 (1856) 38. — *D. chrysanthemifolia* (Bl.) DC. var. *tanacetoides* (Schultz-Bip.) Koster, Fedde Repert. 34 (1933) 7.

Erect herb, stem pilose, 1—2 mm thick. *Leaves* spatulate or narrowly oblong with a cordate and amplexicaul base, acute at the apex, mucronately dentate-serrate, lower ones with an entire, long-tapering lower part, leaves hirsute at both sides, 1—2 cm long, 2—5 mm broad (in specimens from Java 2—8.5 cm long, 0.5—3.5 cm broad). Heads few in the axils of the highest leaves, on a rigid, 2—4.5 (in specimens from Java to 7.5) cm long peduncle, globular, 5—6 (in specimens from Java to 10) mm in diam. *Marginal flowers* numerous, in 5—6 rows, corolla tubular, 0.75 mm long, with a very short tube and a 3—4-fid, campanulate, glandular limb; style-arms lanceolate; achene obovoid, compressed, with thickened edges, about 1 mm long, glandular at the apex, glabrous, pappus wanting. *Disc-flowers* numerous, corolla 1.5 mm long, with a short tube and a 4-fid, campanulate, purplish, glandular limb; anthers 4, loosely cohering; style-arms short; achenes like those of marginal flowers; receptacle with a hemispheric lower part and a conical upper part.

Distribution: India, Java, Celebes, Lesser Sunda Islands, Philippines, New Guinea, tropical Africa.

Collector's annotations: 50 cm tall, flowers reddish.

Local distribution: Western Highlands: 1 mile west of Tubongas Lutheran mission, near Kepilam, 1964, Flenley ANU 2246 (L, LAE).

Ecology: in *Miscanthus kunai* grassland, much disturbed by pigs; alt. 2490 m.

*) The Compositae of New Guinea I in Nova Guinea, Botany, 24 (1966) 497—614.



Pl. 17. *Arrhenechthites tomentella* Mattf. 1. Inflorescence and leaf, nat. size; 2. head, $\times 5$; 3. disc flower, $\times 10$; 4. anther, $\times 10$; 5. marginal flower, $\times 10$; 6. upper part of abnormal style, $\times 20$; 7. leaf, nat. size. (1—6 from Clemens 11342 bis; 7 from Clemens 5251).

Corrections kindly mentioned by Mr L. J. Brass:

- p. 524, line 21 from above add 5526 after Brass
- p. 532, line 7 from above read 31263 instead of 21362
- p. 535, line 4 from below read 4877 instead of 4867
- p. 548, line 10 from below read 31032 instead of 31052

SENECIONEAE

DC., Prodr. 5 (1836) 500; Hoffmann in Engler-Prantl, Nat. Pfl. Fam. 4, 5 (1894) 283.

ARRHENECHTHITES

Mattf., Bot. Jahrb. 69 (1938) 288.

Shrubs or undershrubs. *Leaves* alternate, dentate. *Inflorescences* paniculate or corymbose, heads heterogamous, few-flowered; involucre oblong-campanulate, more or less biseriata, phyllaries 5—8. *Marginal flowers* female, about as many as phyllaries and opposite to them, corolla filiform with inflated base and oblique, minutely 3—5 denticulate or subligulate apex; style-arms exerted, short; achene cylindrical with a callose ring at the apex, pappus-hairs numerous, white, barbellate, caducous. *Disc flowers* masculine or bisexual and sterile, few or single, corolla tubular with inflated base and campanulate limb, 5-lobed at the apex, lobes recurved; anthers subentire or subsagittate at the base, apical appendage ovate, sterile; style-arms short, outer face pilose; achenes narrowly cylindrical or stipiform, sterile, abortive, pappus as in marginal flowers; receptacle naked, small, flat.

5 species: 4 in New Guinea, 1 in New South Wales.

KEY TO THE SPECIES

- 1 a. Phyllaries 5, marginal flowers 5, disc flower 1 2.
- b. Phyllaries 7—8, marginal flowers 6—9, disc flowers 1—8 3.
- 2 a. *Leaves* undulate-dentate (teeth minute), ferruginously woolly tomentose below, margins involute; inflorescence with glabrous, often angularly curved branches, peduncles bearing 4 minute linear bracts at the top, corolla of marginal flowers shortly 3—4-dentate, of disc flower deeply lobed, lobes lanceolate, strongly recurved, 3 mm long 1. **A. tomentella**
- b. *Leaves* minutely mucronulate-serrate, white-floccose-tomentose (hairs long, crisp) below, margins flat; inflorescence with slightly curved branches, tomentose like leaves below, peduncles bearing 4—7 scattered minute linear bracts, corolla of marginal flowers 5-lobate, of disc flowers with narrowly campanulate, 5-lobed limb, lobes patent, deltoid, 1 mm long 2. **A. alba**
- 3 a. *Leaves* 7—24 cm long; style-arms of disc flowers short, lanceolate, obtuse, outside papillose. 3. **A. novoguiniensis**
- b. Upper leaves 2.5—5 cm long, style of disc flowers almost undivided, clavate, abruptly dilated and bearing a crown of papillose hairs at the apex 4. **A. haplogyna**

1. **Arrhenechthites tomentella** Mattf., Bot. Jahrb. 69 (1938) 290; Belcher, Ann. Missouri Bot. Gard. 43 (1965) 75. — Pl. 17 fig. 1—7.

Shrub or herb, stem terete, tapering into the axis of the inflorescence, striate, glabrous, 5 mm thick in the upper part. *Leaves* elliptic-oblong, gradually attenuate into the 0.5—1 cm long petiole, cuneate at base, acuminate to caudate, obtuse at apex, undulate-dentate (teeth minute), with revolute margins, firm, bullate, more or less shining, dark coloured and glabrous above, pale green, more or less densely rusty lanate-tomentose (hairs fine, crispy) and minutely glandular below, 5.5—10 cm long (petiole included), 1—2.5 cm broad. *Panicles* long (12—30 cm), thin, often angularly bent, branches in the axils of leaf-like bracts; heads oblong, 8—10 mm long, about 2.5 mm thick, on a 5—11 mm long thin peduncle, in the axil of a minute linear bract, bearing 4 short, lanceolate, acute bracts at the top; involucre inflate at the base, phyllaries 5, lanceolate-oblong, obtuse, striate,



Pl. 18. *Arrhenechthites alba* Koster. 1. Inflorescence and leaf, nat. size; 2. head, $\times 5$; 3. disc flower, $\times 8$; 4. anther, $\times 14$; 5. marginal flower, $\times 7$. (*Floyd NGF 7495*). — *Arrhenechthites haplogyna* (F. v. M.) Mattf. 6. Head, $\times 2\frac{1}{2}$; 7. disc flower, $\times 5$; 8. apex of its style, $\times 60$; 9. anther, $\times 20$; 10. marginal flower, $\times 5$ 11. leaf, nat. size. (*MacGregor s.n.*, near summit of Owen Stanley Range, 1889).

7—9 mm long. *Marginal flowers* 5, female, corolla filiform, oblique, shortly 3—4-dentate, gradually widened to the base, 4—5 mm long; style exserted, arms short, lanceolate-oblong, obtuse; achene terete, ribbed, sparsely shortly pilose between the ribs, 2—2.5 mm long, brown, pappus-hairs white, 5 mm long. *Disc flower* one, masculine, corolla tubular, 8—10 mm long, with infundibular, deeply lobed limb, lobes fleshy, lanceolate, subacute, strongly recurved, 3 mm long; anthers nearly sagittate, apical appendage obtuse, often all or most of the anthers reduced and sterile; style exserted, arms short, truncate, pilose; achene abortive, 2.5—3 mm long, pappus like that in marginal flowers.

Distribution: New Guinea.

NEW GUINEA. Morobe Dist.: Mt Sarawaket, Busu Tamunac, 1937, *Clemens 5251* (A, type); Sarawaket Range, South-West slope of Mt Enggom, along Zaran Creek, 1963, *Van Royen 16148* (L); Matap, Ulap trail, 1940, *Clemens 11342 bis* (A); Cromwell Mts, Mannasat, 1964, *Hoogland 9624* (CANB, L). — Eastern Highlands: Mt Wilhelm, 1960, *Borgmann 269* (L). — Madang Dist.: Saidor subdist., Nako-Rawa Div., Sewe, 1964, *Sayers NGF 21386* (L).

Collectors' annotations: herb or straggling shrub, c. 2 m tall, tip lax, overhanging, stem and branches purple or dark red, leaves aromatic, light green, nerves purple on underside, corolla dirty yellow or pale green, flowers with resinous smell.

Ecological notes: in open grassland, in scrub, in alpine meadow, on edge of forest treefern-grassland, on creek-bed in *Nothofagus* forest. Altitude (1500—)2280—2700 m.

2. *Arrhenechthites alba* Koster, *spec. nov.* — Pl. 18 fig. 1—5.

Caulis pars superior teres, floccoso-tomentosa, pilis albis longis crispis, 2—4 mm crassa. *Folia* elliptico-oblonga, acuminata, apice acuta, in petiolum 3—10 mm longum gradatim attenuata vel subsessilia, minute mucronato-serrata, supra tenuiter, subtus dense albo-tomentosa, cum petiolo 3—10 cm longa, 0.5—2.5 cm lata. *Paniculae* terminales et axillares, tenues, capitula cylindrica, 7—9 mm longa, pedunculata, pedunculo tenui, pilis longis crispis tenuibus dense albo-floccoso-tomentoso, 2—7 mm longo, bracteolis 4—7 linearibus acutis ornato; involucreum cylindricum, basi inflatum, 6—8 mm longum, squamis 5, lanceolatis, apice subacutis, glabris, marginibus pallidis scariosis. *Flores marginales* 5, femineae, 7.5 mm longae; corolla filiformis, apice obliquo, ad basin inflata, 5-lobata, lobis acutis; stylus exsertus, ramis brevibus, lanceolatis, crassis, obtusis; achenium oblongum, subangulare, sparse breviter pilosum, 2.5 mm longum, fuscum; pappi setae albae, barbellate, 4.5 mm longae. *Flos centralis* 1, masculus, 8 mm longus; corolla 5 mm longa, tubo filiformi, limbo anguste campanulato, 5-lobata, lobis patentibus, deltoideis, leviter recurvatis, acutis, 1 mm longis; antherae basi obtusae, appendice apicali ovata sterili; stylus subinteger, apice papillosum, breviter exsertus; achenium 3 mm longum, lineariblongum, abortivum, pappi setis ut in floribus femineis; receptaculum parvum, planum.

Type: Morobe District, Bulolo Valley, *Floyd NGF 7495* (L).

Distribution: New Guinea.

NEW GUINEA. Morobe Dist.: Bulolo Valley, on top of main ridge above Bulolo plantation area, 1955, *Floyd NGF 7495* (A, CANB, K, L, type); Wonimbu-Galumbu, 1940, *Clemens 41247* (MICH); Wantoat, 1940, *Clemens 10969* (A).

Collectors' annotations: 0.60—1.80 m tall, leaves silvery beneath, corolla of flowers cream-coloured or pale green.

Altitude: (1050—1800), 1350 m.



Pl. 19. *Arrhenechthites novoguineensis* (S. Moore) Mattf. ssp. *novoguineensis*. 1. Inflorescence and leaves $\times \frac{1}{2}$; 2. head, $\times 5$; 3. disc flower, $\times 7\frac{1}{2}$; 4. anther, $\times 10$; 5. marginal flower, $\times 7\frac{1}{2}$; 6. upper part of style $\times 20$. (Brass 10841).

3. *Arrhenechthites novoguineensis* (S. Moore) Mattf., Bot. Jahrb. 69 (1938) 292; Belcher, Ann. Missouri Bot. Gard. 43 (1956) 78. — *Erechthites novoguineensis* S. Moore, Trans. Linn. Soc. Bot. 2, ser. 9 (1916) 86. — *A. dolichophylla* Mattf., Bot. Jahrb. 69 (1938) 289; Belcher, Ann. Missouri Bot. Gard. 43 (1956) 79 (erroneously '*dolichocephala*'). — *A. mastichothrix* Mattf., Bot. Jahrb. 70 (1940) 477; Belcher, Ann. Missouri Bot. Gard. 43 (1956) 78.

Shrub or bushy herb, stem tapering into the axis of the inflorescence, terete, glabrous, 7—10 mm thick. *Leaves* elliptic-lanceolate, gradually attenuate into the 0.5—1.5 cm long petiole, attenuate to caudate, acute at apex, mucronate-serrate (distance between the teeth 3—10 mm), membranous, sometimes rugose, glabrous at both sides, the somewhat puberulous midrib excepted, petiole included 7—24 cm long, 1—5 cm broad, nerves reticulate. *Panicles* ample, 9—27 cm long and as wide, axis and branches more or less glandular-pilose, heads oblong, 10—11 mm long, 3 mm wide, afterwards subcampanulate, on filiform, 3—12 mm long peduncles bearing 1—3 minute linear bracts, phyllaries lanceolate, acute, with pale scarious margins, one-nerved, glabrous, 6—8 mm long. *Marginal flowers* 6—9, female; corolla 3-dentate, 4—5 mm long; style-arms short, lanceolate, obtuse; achene angular-terete, ribbed, 2 mm long; pappus 4 mm long. *Disc flowers* 1—6; corolla 6—9 mm long, 5-lobed, lobes lanceolate, acute, with thickened margins; anthers subsagittate at the base, apical appendage obtuse; style-arms short, lanceolate, obtuse, outside pilose; achene cylindrical, 2.5 mm long, empty; receptacle alveolate.

Distribution: New Guinea.

Remarks. Mattfeld, having only few specimens at his disposal, came to the conclusion that three different though much allied species could be recognized. He considered the number of disc flowers to be characteristic for the three species. According to him this number should be 2 for *A. novoguineensis*, 3—5 for *A. mastichothrix*, and 4—6 for *A. dolichophylla*. In the material now available, however, a great variability of that number was found (see the enumerated specimens). It is clear that the number of disc flowers cannot be considered a reliable character to distinguish species. The other characters to distinguish the concerning three species, being the breadth and the apex of the leaves, neither can be kept upright after investigation of the material now available. However, the number of disc flowers in a head allows to distinguish two subspecies, each of which seems to have a different area.

I. ssp. *novoguineensis* — *Erechthites novoguineensis* S. Moore. — *A. novoguineensis* (S. Moore) Mattf. — **Pl. 19 fig. 1—6.**

1—3 (rarely 4) disc flowers in a head; phyllaries 6.5—8.5 mm long.

NEW GUINEA. Eastern Highlands: Mt Otto, south slopes, frequent, 1959, *Brass 30926* (CANB, L; 1, sometimes 2 disc flowers in a head); Goroka subdist., Daulo Chuave road, 1954, *McKee & Floyd 6346* (A, CANB, L, LAE; 2 disc flowers in a head); Goroka subdist., near Miruma village, Upper Asaro Valley, 1956, *Hoogland & Pullen 5343* (A, BM, BO, BRI, CANB, K, L, LAE, MEL; 2—4, mostly 3, disc flowers (in a head)); Goroka subdist., Chimbu Divide, Daulo road camp, 1954, *Womersley, Floyd & McKee 6084* (A, BRI, LAE; 2—3 disc flowers in a head); Marafunga, about 20 miles NW. of Goroka, 1964, *Hartley 13245* (CANB, L; 1—3 disc flowers in a head); Upper Chimbu River Valley, Pengagl, Komanemambuno, 1960, *Borgmann 185* (L; 1—2 disc flowers in a head); Mt Wilhelm, east slopes, frequent, 1959, *Brass 30480* (CANB, L; 1—2 disc flowers in a head); Minj subdist., Wahgi-Jimmy Divide, N. of Nondugl, confluent Warapuri and Kori Rivers, 1963, *van Royen NGF 18180* (BRI, CANB, L; 2, rarely 1, disc flowers in a head). — Western Highlands: Al River, Nondugl, 1953, *Womersley 5162* (A, BM, CANB, K, L, LAE; mostly 1, sometimes 2, rarely 3, disc flowers in a head); Wahgi Valley, Nondugl, 1951, *Gyldenstolpe s.n.* (S; 1—2 disc flowers in a head); Kubor Range, Nona Minj Divide, Uinba, 1963, *Vink 16543* (L; 1, rarely 2, disc flowers in a head); near Wankl village on mountain slope, c. 5 km SE. of Mt Hagen station, 1956, *Hoogland & Pullen 5819* (A, BM, BRI, CANB, L, LAE, MEL; mostly 2, sometimes 1, disc flowers in a head); Wabag

subdist., Yaki River valley, near Poio village, 1960, *Hoogland & Schodde* 6789 (A, BO, CANB, K, L, LAE; 1—2 disc flowers in a head); Laiagam subdist., Yobobos grassland area, source of Lagaip River, 1960, *Hoogland & Schodde* 7654 (A, BM, BRI, CANB, L, LAE; 1—2 disc flowers in a head). — Southern Highlands Dist.: Ibiwara, Tari Gap, 1966, *Gillison N.G.F.* 25179 (L, LAE); S.A.D. vicinity of Lei camp, Tari, 1966, *Frodin N.G.F.* 28366 (L, LAE). — Western New Guinea: Nassau Range, 9 km NE. of Lake Habbema, 2800 camp, 1938, *Brass* 10841 (A, L; 2—4, mostly 3, disc flowers in a head); Bele River, 18 km NE. of Lake Habbema, 2200 m camp, abundant, 1938, *Brass* 11063 (A, L; (2—)3 disc flowers in a head); Carstenz Peak, 1913, *Kloss s.n.* (BM, type; 2 disc flowers in a head, acc. to Belcher); Wissel Lake region, slope of Mt Otero, 1939, *Eyma* 4397 (A, BO, L; 2—3 disc flowers in a head).

Collectors' annotations: (small or tall, lax, straggling-scrambling) shrub or bushy herb, 1—3 m tall, with many stems close together, fleshy, stems and branches purplish, base of stem leafless, petioles red, leaves dark green above, light green below, branches of inflorescence and peduncles red, purple, or purplish green, phyllaries purplish green or light green tinged with purplish brown, corolla (pale) yellow, cream-coloured, creamy-green, light green, or lobes purple with light stripes, anthers light brown.

Ecological notes: secondary growths (of moist mossy forest, on a forest landslip), secondary forest, in undergrowth of *Nothofagus* forest, edge of rain forest on slope, in grassland borders, in shrubbery along river, near gardens. Altitude 1600—c. 2900 m.

2. *ssp. dolichophylla* (Mattf.) Koster, *comb. nov.* — *A. dolichophylla* Mattf. — *A. mastichothrix* Mattf.

3—6 disc flowers in a head, phyllaries 5—7 mm long.

NEW GUINEA. Milne Bay Dist.: Mt Dayman, Maneau Peak, 1953, *Brass* 22275 (A, CANB, L, LAE; 4 disc flowers in a head); Maneau Range, Mt Dayman, north slopes, 1953, *Brass* 22463 (A, CANB, L, LAE; 4—5 disc flowers in a head); Mt Dupal, 1962, *Crutwell* 1357 (L; 3—4 disc flowers in a head). — Morobe Dist.: 1937, *Clemens* 6263 (A; 5—6 disc flowers in a head); Ulap trail, 1940, *Clemens* 41155 (A; 3—4, sometimes 5 disc flowers in a head); Rawlinson Range, 1941, *Clemens* 12370 (A; 3—4, rarely 2 disc flowers in a head); Mt Sarawaket, 1963, *Hartley* 11252 (CANB, L; 4—5 disc flowers in a head); Samanzing vicinity, 1938, *Clemens* 9360 (A, L; (4—)5 disc flowers); Botoip vicinity, 1937, *Clemens* 7082 (A; 3—4 disc flowers in a head); Saruwaged Range, Masak River, 1937, *Clemens* 7509 (acc. to Mattf., Bot. Jahrb. 70, 1940, 478: 3—5 disc flowers in a head); Saruwaged Range, Busu Tamunac, 1937, *Clemens* 5287 (acc. to Mattf., Bot. Jahrb. 69, 1938, 289: 4—6 disc flowers in a head); Cromwell Mts, Mannasat, 1964, *Hoogland* 9413 (CANB, L). — Western New Guinea: Biak, Enarotali, dispersed, 1955, *Versteegh BW* 3104 (L; 4 disc flowers in a head).

Collectors' annotations: (tall) shrub, 1.20—c. 4 m tall, fleshy, peduncles purple, leaves (dark) green or greyish above, purple below; phyllaries greenish white, yellow green, or purple, corolla (pale) yellow, (greenish) white, brownish pink, or pale with purplish tips.

Ecological notes: in moss-forests, in secondary forest, in low forest on transition between coniferous-forest and treefern-grassland, along a river, in open places, subalpine, on clayish rocky soil. Altitude 1800—3000, (2100—3600) m.

4. *Arrhenechthites haplogyna* (F. v. M.) Mattf., Bot. Jahrb. 69 (1938) 292; Belcher, Ann. Missouri Bot. Gard. 43 (1956) 78. — *Senecio haplogynus* F. v. Müller, Transact. R. Soc. Victoria I, 2 (1899) 14. — *Erechthites haplogyna* Mattf., Bot. Jahrb. 62 (1929) 442. — **Pl. 18 fig. 6—II.**

Robust herb, stem subterete, tapering into the axis of the inflorescence, ribbed, glabrous, 3 mm thick in the higher part. Upper leaves more or less crowded, elliptic-lanceolate, tapering at both ends, obtuse at the apex, shortly petiolate or sessile, glabrous, obtusely

mucronulate, 2.5—5 cm long, 7—15 mm broad. *Corymbs* aggregate, heads oblong, 8—9 mm long, 2 mm wide, on 1—2 cm long filiform peduncles provided with 2—3 linear bracts, phyllaries 8, lanceolate-oblong, obtuse, densely papillate at the apex, 6—8 mm long. *Marginal flowers* 8—9, female; corolla filiform, 3—4-denticulate, gradually widened to the base, 4 mm long; style exerting, very shortly bifid, branches clavate, rounded at the apex; achene (immature) linear, glabrous, 2.5 mm long; pappus-hairs white, 4 mm long. *Disc flowers* 7—8; corolla tubular, infundibuliform, 6 mm long, deeply lobed, lobes lanceolate, subacute, fleshy, recurved, 2 mm long; anthers obtuse at base, apical appendage long, acute; style about as long as lobes of corolla, almost undivided, clavate, abruptly dilated, bearing a crown of papillose hairs at the apex; achene abortive, 3 mm long; pappus like that of marginal flowers.

Distribution: New Guinea.

NEW GUINEA. Central Dist.: Owen Stanley Range, Mt Knutsford, summit, 1889, *MacGregor s.n.* (MEL, type); Owen Stanley Range, near summit, 1889, *MacGregor s.n.* (MEL); Owen Stanley Range, crest, 1889, *MacGregor s.n.* (MEL).

Altitude: (2400—3900) m.