

DAVALLIACEAE

(H.P. Nooteboom, Leiden, The Netherlands)

Davalliaceae Mett. ex Frank in Leunig, Syn. Pflanzenk., ed. 2, 3 (1877) 1474; K.U. Kramer in K. Kubitzki (ed.), Fam. & Gen. Vasc. Pl. 1 (1990) 74–80.

Epiphytic, epilithic, or rarely terrestrial. *Rhizome* dorsiventral, scaly with extra-axillary buds near the leaves, creeping, usually long (short in *Gymnogrammitis*, not in Malesia) and densely covered with scales (and often also hairs in *Leucostegia*). *Leaves* alternately in two ranks on the dorsal side of the rhizome and articulated at the base to phyllopodia. Extra-axillary buds alternately in two ranks on the ventral-lateral sides of the rhizome; each bud intermediate between two succeeding phyllopodia in *Leucostegia* and in *Gymnogrammitis*, lateral to the phyllopodium or lower lateral and slightly anterior in the other genera. Roots on the ventral side of lateral buds, in *Leucostegia* scattered on all sides of the rhizome, in *Gymnogrammitis* along the entire ventral side of it. The vascular structure of the rhizome a dorsiventral dictyostele. Stele with a thick dorsal and a thick ventral vascular strand, in *Gymnogrammitis* only a thick dorsal strand. In *Leucostegia* the dorsiventral dictyostele with elongate leaf gaps with two simple leaf traces, in all other taxa many leaf traces for a leaf arising from the dorsal and ventral strands and from a strand connecting the two, the traces finely anastomosing in each leaf gap, the connecting strands thin and obscure. In *Leucostegia* scales basifixed with broad bases attached to the rhizome, often with hairs on the rhizome or on the base of the scales. In the other genera the rhizome scales peltate or basally attached with a cordate, overlapping, base (sometimes called pseudopeltate). The scales acicular, flat and nearly acicular, evenly narrowed towards the apex above the much broader base, or just evenly narrowed. In a number of species apical and marginal multicellular hairs on the scales. Scales often ciliate or toothed, the ciliae or teeth consisting of two upturned ends of adjacent marginal cells.

Incision of the *leaves* very diverse, from an entire leaf to a decomposed leaf with uni-veined ultimate segments, in *Davallia repens* even in an individual plant. Pinnules anadromous, the apical pinnule of at least the lower pinnae inserted nearer to the rachis than the basal pinnule, or catadromous, the other way round, in *Davallodes* and sometimes in *Davallia membranulosa*. Axes adaxially grooved, the grooves with raised centre; edges of laminar parts continuous with the ridges (wings) bordering the axis groove; costae and costules adaxially convex. Lamina often firm in texture, usually triangular, sometimes narrowed towards the base; when mature mostly without macroscopical epidermal appendages (hairy in *Davallodes* and some species of *Davallia*). Veins pinnately branched, free, ending behind the margin or reaching it. 'False veins' occasionally present between the true veins.

Sori strictly terminal in *Leucostegia*, various in the other genera (facing midveins either at the bending point or at the forking point of veins); indusium attached at the base, often also at the sides or part of them, rarely reniform with a short point of attachment, or absent (in *Gymnogrammitis*); soral trichomes present or not. Receptacle not elevated.

DISTRIBUTION

North to south from Korea to New South Wales and Three Kings Island N of New Zealand, and west to east from west tropical Africa, the Canary Islands and SW Europe to the Marquesas in the Pacific.

Literature: Ching, R.C., Davalliaceae, in Fl. Reip. Popul. Sin. 2 (1959) 280–319, 374–378. — Kato, M., A systematic study of the genera of the Fern family Davalliaceae. J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 13 (1985) 553–573; Taxonomic studies of Pteridophytes of Ambon and Seram (Mollucas) collected by Indonesian-Japanese botanical expeditions II. Davalliaceae and Oleandraceae. J. Fac. Sci. Univ. Tokyo, sect. 3, 14 (1989) 226. — Nootboom, H.P., Notes on Davalliaceae I. The genera Araiostegia, Davallodes, Leucostegia, and Gymnogrammitis. Blumea 37 (1992) 165–187; Notes on Davalliaceae II. A revision of the genus Davallia. Blumea 39 (1994) 151–214.

CHROMOSOMES

In *Leucostegia* $x = 41$, the chromosome counts indicate that *L. immersa* in India and Taiwan is diploid (Tryon & Lugardon 1991: 374); in *Gymnogrammitis* $x = 36$, the count from a plant in Yunnan, Dali also indicates diploidy (M. Kato et al. 1992: 108); in the other genera $x = 40$, triploidy is reported in *Davallia repens* from Sri Lanka (Manton & Sledge 1954).

References: Kato, M., et al., Cytotaxonomic study of ferns of Yunnan, Southwestern China. Bot. Mag. (Tokyo) 105 (1992) 105–124. — Manton, I. & W. A. Sledge, Observations on the cytology and taxonomy of the pteridophyte flora of Ceylon. Philos. Trans. Roy. Soc. London, B 238 (1954) 127–185. — Tryon, A. F. & B. Lugardon, Spores of the Pteridophyta (1991).

KEY TO THE GENERA

- 1a. Pinnules of at least the larger pinnae catadromous. Rhizome scales acicular or nearly acicular **Davallodes** (p. 268)
- b. Pinnules of at least the larger pinnae anadromous. Rhizome scales acicular or not 2
- 2a. Scales basifixed along broad base, roots borne on all sides of rhizome, sori terminal at the vein endings **Leucostegia** (p. 274)
- b. Scales peltate or pseudopeltate, roots restricted to the ventral side of lateral buds, sori facing midveins at the forking point at the bending of veins, extra-axillary buds lateral to the phyllopodia, or lower lateral and slightly anterior . **Davallia** (p. 236)

DAVALLIA

Davallia Sm., Mém. Acad. Sci. Turin 5 (1793) 414; Copel., Fern Fl. Philipp. (1958) 170; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 354; Noot., Blumea 39 (1994) 155. — Type species: *Davallia canariensis* (L.) Sm.

Wibelia Bernh. (non Fée 1852), J. Bot. (Schrader) 1800 (1801) 122, t. 1, f. 2. — *Davallia* sect. *Wibelia* M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 13 (1985) 566. — Type species: *Wibelia elata* Bernh.

Humata Cav., Descr. Pl. (1802) 272; Copel., Fern Fl. Philipp. (1958) 175; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 364. — Type species: *Humata ophioglossa* Cav.

Pachypleuria C. Presl, Tent. Pterid. (1836) 128; Epim. Bot. (1851) 98; M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 13 (1985) 567. — Type species: *Pachypleuria pedata* (Sm.) C. Presl.

- Stenolobus* C. Presl, Tent. Pterid. (1836) 129, t. 4, f. 30. — Type species: *Davallia solida* (G. Forst.) Sw.
- Parestia* C. Presl, Epim. Bot. (1851) 99. — Type species: *Parestia elegans* C. Presl.
- Pteroneuron* Fée, Mém. Foug. 5. Gen. Filic. (1852) 320, t. 25B, f. 1. — Type species: *Pteroneuron parallelum* Fée.
- Scyphularia* Fée, Mém. Foug. 5. Gen. Filic. (1852) 324, t. 26B, f. 1. — Type species: *Scyphularia pentaphylla* (Blume) Fée.
- Parasorus* Alderw., Bull. Jard. Bot. Buitenzorg III, 4 (1922) 317, t. 14. — Type species: *Parasorus undulatus* Alderw. [= *Davallia undulata* (Alderw.) Noot.].
- Araiostegia* Copel., Philipp. J. Sc. 34 (1927) 240, t. 1, 2; Fern Fl. Philipp. (1958) 166; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 364. — Type species: *Araiostegia hymenophylloides* (Blume) Copel.
- Trogostolon* Copel., Philipp. J. Sc. 34 (1927) 251, t. 4; Fern Fl. Philipp. (1958) 170. — Type species: *Trogostolon falcinellus* (C. Presl) Copel.
- Paradavallodes* Ching, Acta Phytotax. Sin. 11 (1966) 18. — Type species: *Paradavallodes multidentata* (Hook.) Ching.
- Davallia* sect. *Cordisquama* M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 13 (1985) 566. — Type species: *Davallia divaricata* Blume.

Roots restricted to the ventral side of lateral buds. Scales of *rhizome* peltate or basifixed with cordate base and overlapping lobes, variously shaped: distinctly acicular, flat and nearly acicular, narrowed evenly towards the apex, narrowed abruptly from a broad base, or broad, ovate to oblong-subdeltoid with round to acute apex. *Lamina* deltoid and broadest towards the base or rarely elongate, glabrous or rarely bearing multicellular hairs. Vein endings on sterile segments reaching the margin or not. False veins present or not. Rachis winged and therefore seemingly grooved adaxially (in dry state it is difficult to see whether the rachis itself is grooved or flat). Indusia and sori separate but in *D. undulata* indusia and sori connate and elongate along leaf margins. *Sori* facing midveins at the forking point of veins or at the bending point of a vein. — **Fig. 1.**

Distribution — From India through continental SE Asia to China, Korea, and Japan; throughout *Malesia*; NE Australia; in the Pacific to Samoa and New Zealand; the islands in the Indian Ocean; Africa (1 species in NW Africa); Canary Islands; SW Europe.

Legends to Plates 1–4: SEM photographs of indusia; scale bar = 1 mm.

Plate 1: 1. *Davallia angustata* (van Balgooy 5378). – 2. *D. brassii* (Brass 9097). – 3. *D. brevipes* (Hennipman 5580). – 4. *D. corniculata* (Iwatsuki T-8383). – 5. *D. denticulata* var. *denticulata* (Clemens 21459). – 6. *D. denticulata* var. *elata* (Kato C-4182). – 7. *Idem* (Nooteboom 5351). – 8. *D. divaricata* var. *divaricata* (Nooteboom 1221).

Plate 2: 9. *Davallia embolostegia* (Nooteboom 2246) – 10. *D. falcinella* (Elmer 14013). – 11. *D. heterophylla* (van Niel 3429). – 12. *D. parvula* (Anderson 10012). – 13. *D. pectinata* (Braithwaite 4571). – 14–16. *D. repens* (Brass 27402, LAE 58472, Main & Aden 510, respectively).

Plate 3: 17–21. *Davallia repens* (Price & Hernaez 713, Brass 7166, S 28663, Nooteboom 5542, Brooke 9064, respectively). – 22. *D. rouffaeriensis* (Docters van Leeuwen 10248). – 23. *D. sessilifolia* (de Vogel 7166). – 24. *D. sessilifolioides* (Kato C-5336).

Plate 4: 25. *Davallia solida* var. *solida* (Hennipman 6147). – 26. *D. trichomanoides* var. *trichomanoides* (Schmutz 18). – 27. *D. wagneriana* (Kjellberg 3658). – 28. *D. pentaphylla* (Kato C-1655) – 29. *D. seramensis* (Kato C-1276). – 30. *D. triphylla* (de Wilde c.s. 20708). – 31. *D. undulata* (Pleyte 363).

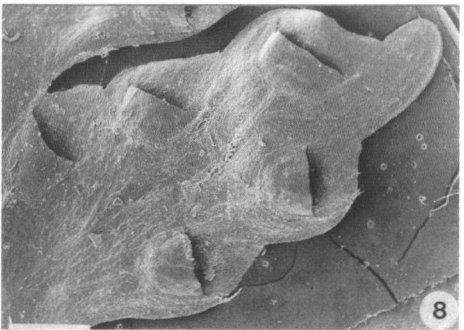
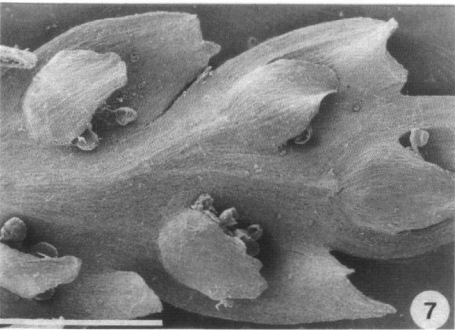
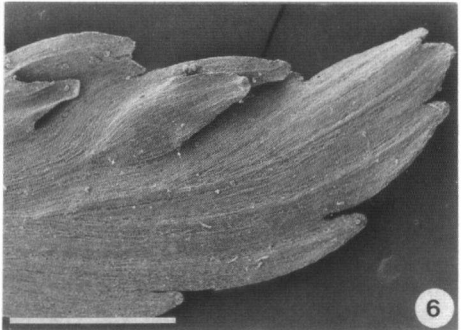
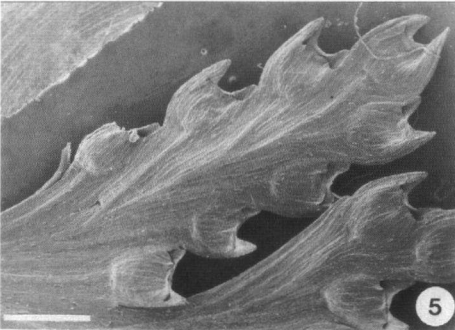
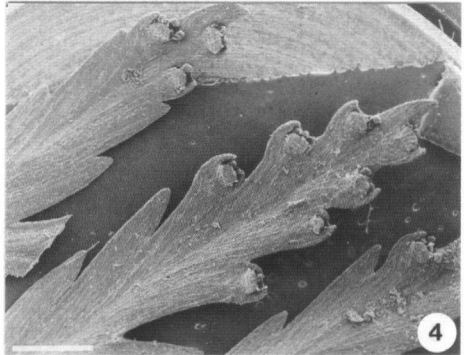
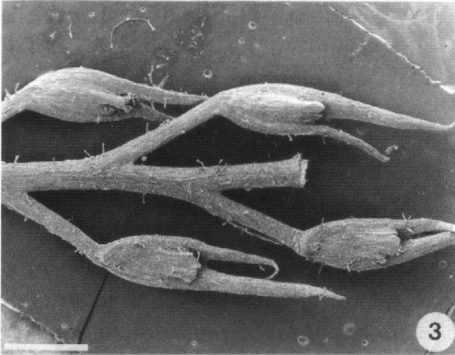
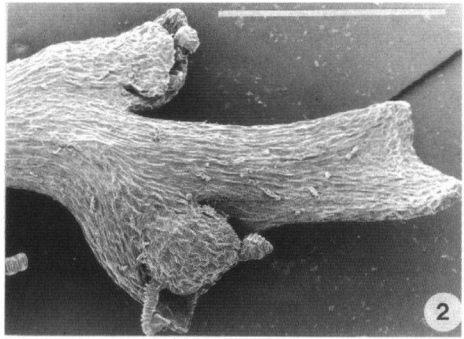
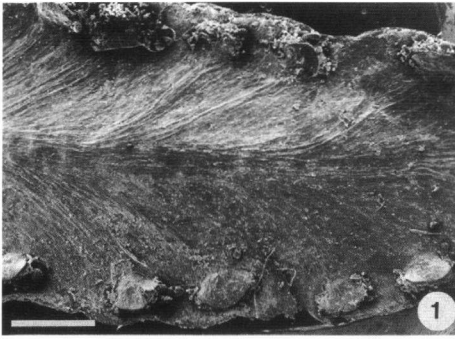


Plate 1 — Legend on page 237.

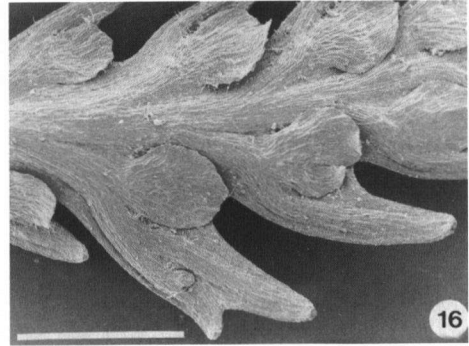
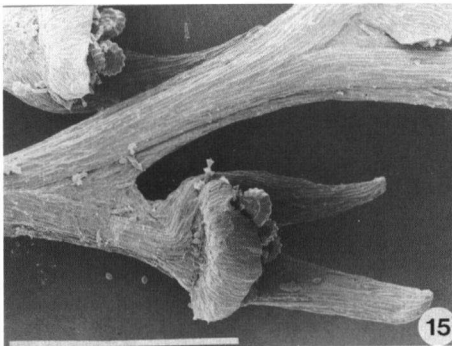
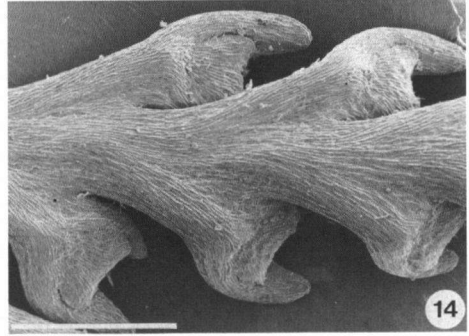
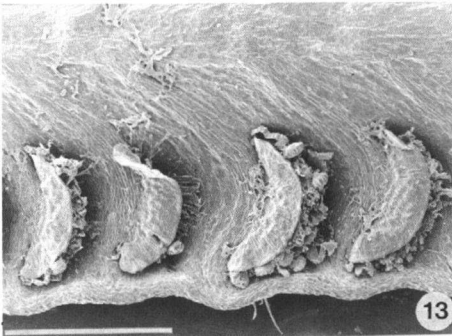
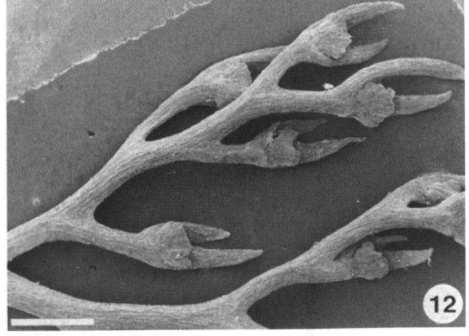
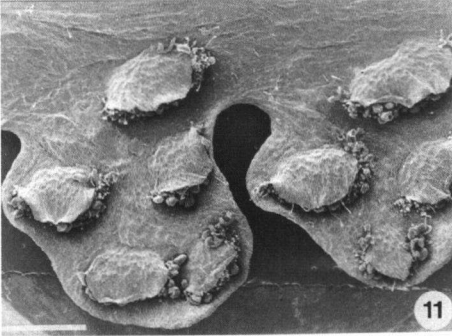
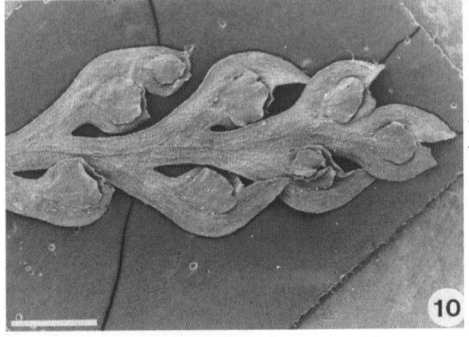
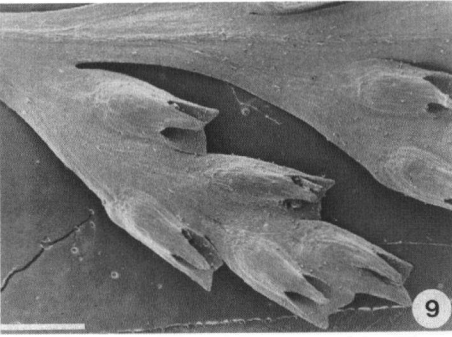


Plate 2 — Legend on page 237.

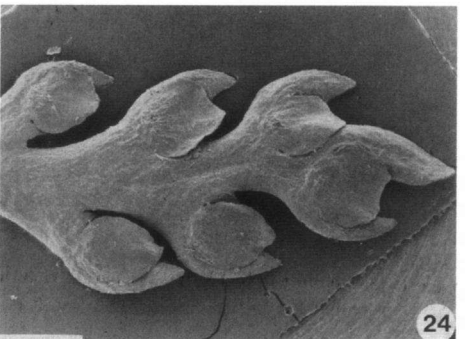
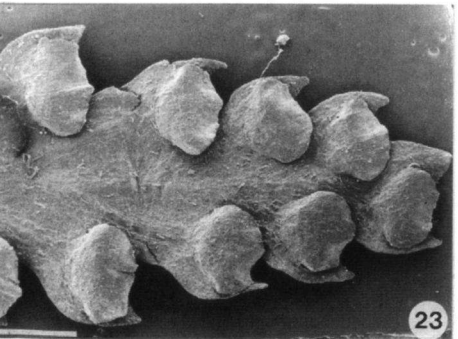
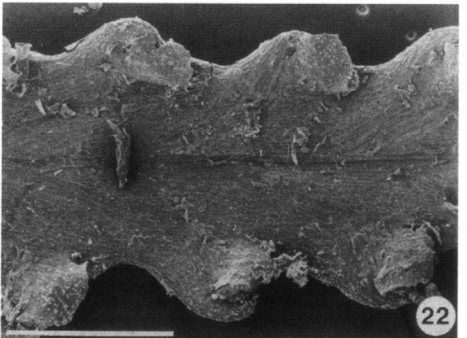
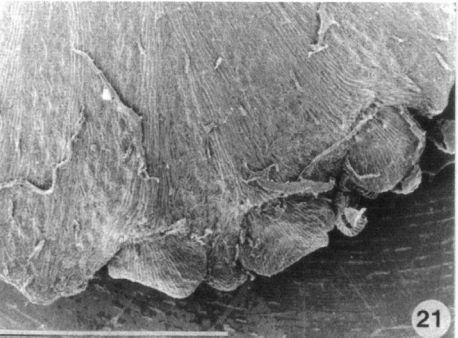
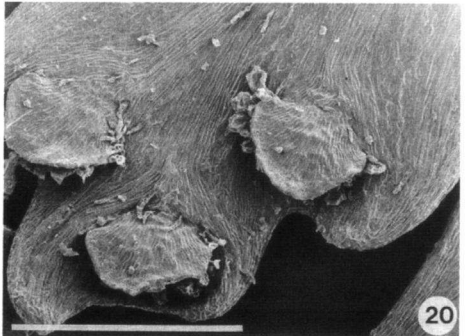
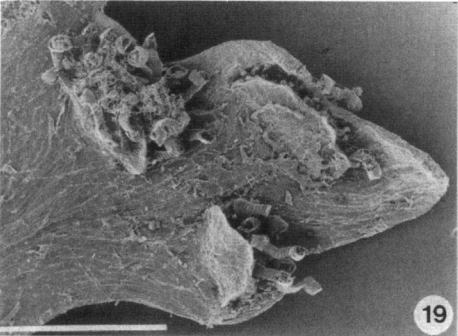
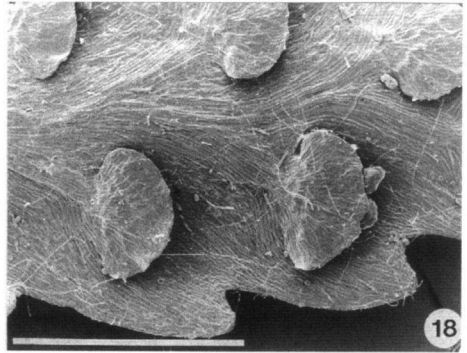
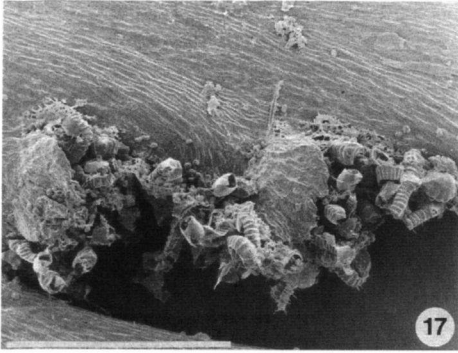


Plate 3 — Legend on page 237.

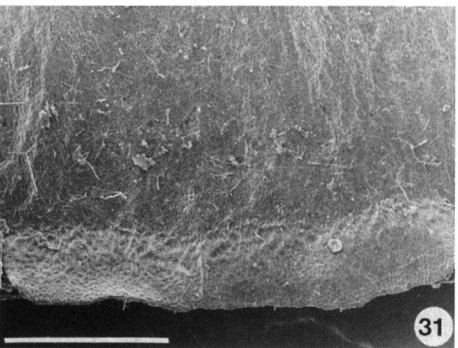
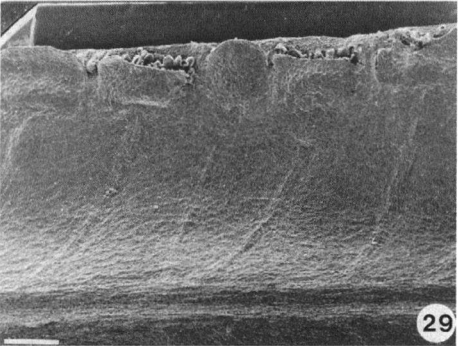
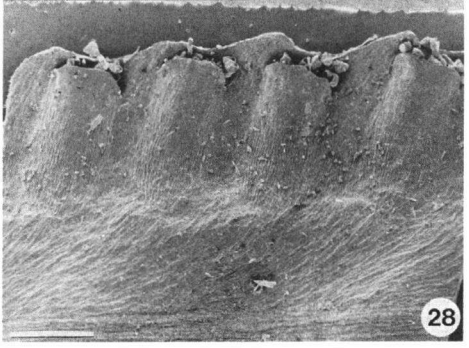
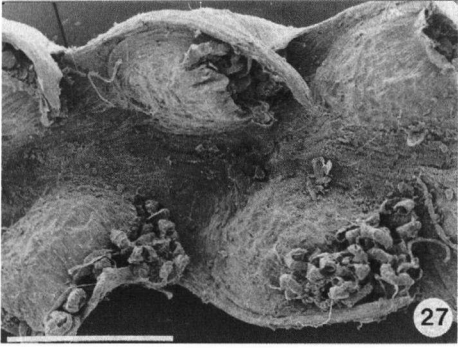
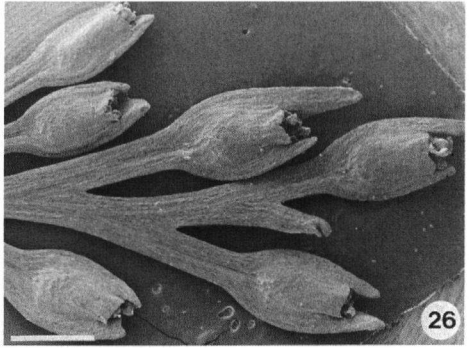
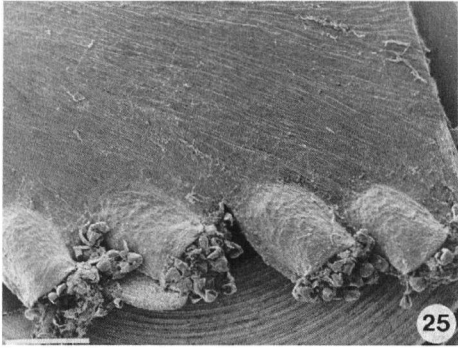


Plate 4 — Legend on page 237.

KEY 1 TO THE SPECIES

(use Key 2 if it is clear whether the rhizome scales are peltate or pseudopeltate)

- 1a. Lamina imparipinnate and leaflets entire or nearly so, occasionally lobed at the base or once branched, or lamina simple, entire to pinnatilobed, pectinate or pinnatifid, or 3-foliolate, the leaflets more or less divided 2
- b. Lamina compound or pinnate towards its base 10
- 2a. Lamina simple, pectinate or pinnatifid, or 3-foliolate, the leaflets more or less divided 3
- b. Lamina imparipinnate, leaflets entire or nearly so, occasionally lobed at the base or once branched, or lamina simple, entire to pinnatilobed 5
- 3a. Lamina pectinate, narrowly ovate **12. D. pectinata**
- b. Lamina of simple or pinnate leaf ovate 4
- 4a. Rhizome scales often curling backward **15. D. sessilifolia**
- b. Rhizome scales not or seldom curling backward **13. D. repens**
- 5a. Sori connate, elongate along leaf margins **23. D. undulata**
- b. Sori separate 6
- 6a. Indusium attached at the broad base and hardly or not at the sides, rhizome scales narrowed evenly towards the apex, or flat and nearly acicular, narrowed abruptly from a broad base, indusium semicircular 7
- b. Indusium also attached along the sides, pouch-shaped, rhizome scales distinctly acicular, indusium oblong 8
- 7a. Lamina strongly dimorphous, rhizome scales with a pale border quickly diminishing or disappearing towards the apex, indusium wider than long, 1.5–2.5 mm broad **9. D. heterophylla**
- b. Leaf not or slightly dimorphous, rhizome scales without pale border, indusium about as wide as long, 0.6–0.8 mm broad **1. D. angustata**
- 8a. Rhizome scales not bearing multiseptate hairs, rhizome white waxy under the rhizome scales, margin of leaflets in simple or imparipinnate sterile leaves not distinctly crenulate even towards the apex, indusium about as wide as long, 1 mm long **21. D. seramensis**
- b. Rhizome scales bearing multiseptate hairs at least when young, rhizome not white waxy, margin of leaflets in simple or imparipinnate sterile leaves distinctly crenulate to dentate at least towards the apex, indusium longer than wide, 1.5–2.5 mm long 9
- 9a. Rhizome scales not or seldom curling backward, appressed to rhizome, 5 mm long, margin of sterile leaves recurved or revolute **22. D. triphylla**
- b. Rhizome scales often curling backward, 6–10 mm long, margin of sterile leaves flat or nearly so **20. D. pentaphylla**
- 10a. Rhizome white waxy under the rhizome scales 11
- b. Rhizome not white waxy 21
- 11a. Sori borne several on a segment 12
- b. Sori frequently single on a segment 15
- 12a. Rhizome scales not or seldom curling backward or appressed to rhizome .. 13
- b. Rhizome scales often curling backward 14

- 13a. Indusium also attached along the sides, pouch-shaped, oblong **19. D. wagneriana**
- b. Indusium attached at the broad base and hardly or not at the sides, semicircular, or more or less triangular to rhomboid **13. D. repens**
- 14a. Lamina pinnate towards the base, false veins not present, indusium semicircular, 1.1–1.8 mm long, 1.2–1.8 mm broad **15. D. sessilifolia**
- b. Lamina compound, false veins present, indusium more or less triangular to rhomboid, or oblong, 0.5 mm long and broad **4. D. corniculata**
- 15a. Lamina entirely divided into fine linear segments without obvious rachis **11. D. parvula**
- b. Lamina pinnate with pinnatifid to pinnatifid pinnae, bipinnate, tripinnate or quadri-pinnate 16
- 16a. Lamina pinnate towards the base 17
- b. Lamina compound 19
- 17a. Lamina narrowly ovate, elongate, often narrowing towards the base **14. D. rouffaeriensis**
- b. Lamina ovate, deltoid, broadest towards the base 18
- 18a. Rhizome scales lacking marginal setae or teeth, or those rare, or toothed, vein endings on sterile segments not reaching the margin **16. D. sessilifolioides**
- b. Rhizome scales with marginal setae at least in distal part, vein endings on sterile segments reaching the margin **13. D. repens**
- 19a. Lamina bearing multicellular hairs, ultimate segments or lobes acute and usually ending in a tooth, leaf axes hairy, indusium also attached along the sides, pouch-shaped, oblong, longer than wide, upper margin elongated, free, extending to lamina margin or not **3. D. brevipes**
- b. Lamina glabrous, ultimate segments or lobes obtuse or acute without a tooth, leaf axes glabrous, indusium attached at the base and only part of the sides or attached at the broad base and hardly or not at the sides, semicircular or more or less triangular to rhomboid, wider than long or about as wide as long, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not 20
- 20a. Rhizome scales not or seldom curling backward **13. D. repens**
- b. Rhizome scales castaneous, often curling backward **2. D. brassii**
- 21a. Sori borne several on a segment 22
- b. Sori frequently single on a segment 26
- 22a. False veins present 23
- b. False veins not present 24
- 23a. Indusium upper margin elongated, free **5b. D. denticulata var. elata**
- b. Indusium upper margin not elongated, truncate or slightly rounded **5a. D. denticulata var. denticulata**
- 24a. Rhizome scales bearing multiseptate hairs (when young), with pale border from base to apex, peltate, lamina generally extending into a tooth only at the outside of a sorus or not extending into teeth beyond a sorus **17. D. solida var. solida**
- b. Rhizome scales not bearing multiseptate hairs, without pale border, basifixed with cordate base and greatly overlapping lobes, lamina generally extending into a tooth at both sides of a sorus 25

- 25a. Indusium upper margin elongated, free, indusium longer than wide **7. D. embolostegia**
 b. Indusium upper margin not elongated, truncate or slightly rounded, indusium about as wide as long **6a. D. divaricata** var. **divaricata**
- 26a. Indusium also attached along the sides, pouch-shaped, pinnae deltoid or ovate 27
 b. Indusium scaly, attached at the narrow, cordate base only, attached at the base and only part of the sides, or attached at the broad base and hardly or not at the sides, pinnae linear-triangular 29
- 27a. Lamina strongly dimorphous, rhizome scales narrowed evenly towards the apex, scales basifixed with cordate base and greatly overlapping lobes, 30–40 cm long, ultimate leaflets lobed halfway towards the midrib or only shallowly lobed, veins in sterile ultimate lobes pinnate, vein endings on sterile segments reaching the margin, indusium semicircular, wider than long, 1.5–2.5 mm broad **6b. D. divaricata** var. **dimorpha**
 b. Leaf not or slightly dimorphous, rhizome scales distinctly acicular or flat and nearly acicular, narrowed abruptly from a broad base or above the much broader base evenly narrowed towards the apex, scales peltate, stipes 4.5–20 cm long, ultimate leaflets lobed almost to the midrib, veins in sterile ultimate lobes frequently simple or forked, vein endings on sterile segments not reaching the margin, indusium oblong, longer than wide, 0.5–1 mm broad 28
- 28a. Rhizome scales nearly black **18b. D. trichomanoides** var. **lorrainii**
 b. Rhizome scales brown or red-brown **18a. D. trichomanoides** var. **trichomanoides**
- 29a. Indusium scaly, attached at the narrow, cordate base only, reniform, wider than long, rhizome scales basifixed with cordate base and greatly overlapping lobes, sori at the bending point of a vein **10. D. hymenophylloides**
 b. Indusium attached at the base and only part of the sides or attached at the broad base and hardly or not at the sides, semicircular or ± triangular to rhomboid, about as wide as long, rhizome scales peltate, sori at the forking point of veins . . . 30
- 30a. Lamina pinnate towards the base with pinnatilobed to pinnatifid pinnae, elongate, often narrowing towards the base, rhizome scales brown, narrowed evenly towards the apex, indusium more or less triangular to rhomboid, 0.4–0.6 mm long and broad **14. D. rouffaeriensis**
 b. Lamina compound, distinctly acicular, tripinnate or quadripinnate, deltoid and broadest towards the base, rhizome scales nearly black, indusium semicircular, 1 mm long and broad **8. D. falcinella**

KEY 2 TO THE SPECIES

- 1a. Rhizome scales basifixed with cordate base and greatly overlapping lobes . . 2
 b. Rhizome scales peltate 5
- 2a. Sori frequently single on a segment, indusium reniform or semicircular, wider than long 3
 b. Sori borne several on a segment, indusium oblong, longer than wide, or about as wide as long 4

- 3a. Leaves not or slightly dimorphous, elongate, often narrowing towards the base, pinnae linear-triangular, veins in sterile ultimate lobes frequently simple, the vein endings on sterile segments not reaching the margin, sori at the bending point of a vein, indusium scaly, attached at the narrow, cordate base only, reniform, 0.4–0.7 mm broad **10. D. hymenophylloides**
- b. Leaves strongly dimorphous, lamina deltoid and broadest towards the base, pinnae deltoid, veins in sterile ultimate lobes pinnate, the vein endings on sterile segments reaching the margin, sori at the forking point of veins, indusium also attached along the sides, pouch-shaped, semicircular, 1.5–2.5 mm broad **6b. D. divaricata var. dimorpha**
- 4a. Indusium upper margin elongated, free, indusium longer than wide **7. D. embolostegia**
- b. Indusium lips or upper margin not elongated, truncate or slightly rounded, indusium about as wide as long **6a. D. divaricata var. divaricata**
- 5a. Lamina imparipinnate, leaflets entire or nearly so, occasionally lobed at the base or once branched, or one entire to pinnatilobed simple leaf 6
- b. Lamina compound, simple, pectinate, pinnatifid, or pinnate towards the base, or 3-foliolate, the leaflets more or less divided 11
- 6a. Sori and indusia connate, elongate along leaf margins **23. D. undulata**
- b. Sori and indusia separate 7
- 7a. Rhizome not white waxy, rhizome scales bearing multiseptate hairs at least when young, indusium longer than wide, 1.5–2.5 mm long 8
- b. Rhizome white waxy, scales not bearing multiseptate hairs, indusium wider than long or about as wide as long, 0.5–1 mm long 9
- 8a. Rhizome scales not or seldom curling backward, appressed to rhizome, 5 mm long, margin of sterile leaves recurved or revolute **22. D. triphylla**
- b. Rhizome scales often curling backward, 6–10 mm long, margin of sterile leaves flat or nearly so **20. D. pentaphylla**
- 9a. Leaves strongly dimorphous, indusium wider than long, 1.5–2.5 mm broad **9. D. heterophylla**
- b. Leaves not or slightly dimorphous, indusium about as wide as long, 0.6–1 mm broad 10
- 10a. Rhizome scales distinctly acicular, with pale border quickly diminishing or disappearing towards the apex, often curling backward, 3–5 mm long, margins of fertile leaves not distinctly crenulate even towards the apex, indusium attached at the base and also along the sides, pouch-shaped, oblong **21. D. seramensis**
- b. Rhizome scales narrowed evenly towards the apex, without pale border, not or seldom curling backward, 6–8 mm long, margins of fertile leaves distinctly crenulate to dentate at least towards the apex, indusium attached at the broad base and hardly or not at the sides, semicircular **1. D. angustata**
- 11a. Lamina simple, one pectinate or pinnatifid leaf, or 3-foliolate, the leaflets more or less divided 12
- b. Lamina compound or pinnate towards the base 14
- 12a. Rhizome scales often curling backward, lamina pectinate . . . **15. D. sessilifolia**
- b. Rhizome scales not or seldom curling backward, lamina pectinate or not . . . 13

- 13a. Lamina ovate-deltoid and broadest towards the base **13. D. repens**
 b. Lamina narrowly ovate, elongate, often narrowing towards the base
 **12. D. pectinata**
- 14a. Lamina pinnate towards the base 15
 b. Lamina compound 20
- 15a. Sori frequently single on a segment 16
 b. Sori borne several on a segment 18
- 16a. Lamina narrowly ovate, elongate, often narrowing towards the base
 **14. D. rouffaeriensis**
 b. Lamina ovate-deltoid and broadest towards the base 17
- 17a. Vein endings on sterile segments not reaching the margin, rhizome scales lacking
 marginal setae or teeth, or those rare, or toothed **16. D. sessilifolioides**
 b. Vein endings on sterile segments reaching the margin, rhizome scales with marginal
 setae at least in distal part **13. D. repens**
- 18a. Indusium attached at base and also along the sides, pouch-shaped, oblong
 **19. D. wagneriana**
 b. Indusium attached at the base and only part of the sides or attached at the broad
 base and hardly or not at the sides, semicircular or more or less triangular to rhomboid
 19
- 19a. Rhizome scales often curling backward, toothed **15. D. sessilifolia**
 b. Rhizome scales not or seldom curling backward, with marginal setae at least in
 distal part **13. D. repens**
- 20a. Sori borne several on a segment 21
 b. Sori frequently single on a segment 26
- 21a. Rhizome not white waxy 22
 b. Rhizome white waxy under the scales 24
- 22a. Rhizome scales not or seldom curling backward, bearing multiseptate hairs at
 least when young, false veins not present **17. D. solida** var. **solida**
 b. Rhizome scales often curling backward, not bearing multiseptate hairs, false veins
 present 23
- 23a. Indusium upper margin elongated, free **5b. D. denticulata** var. **elata**
 b. Indusium lips or upper margin not elongated, truncate or slightly rounded
 **5a. D. denticulata** var. **denticulata**
- 24a. Rhizome scales often curling backward, margins of the lamina of each leaflet thickened
 **4. D. corniculata**
 b. Rhizome scales not or seldom curling backward, margins of the lamina of each
 leaflet not thickened 25
- 25a. Indusium also attached along the sides, pouch-shaped, oblong
 **19. D. wagneriana**
 b. Indusium attached at the broad base and hardly or not at the sides, semicircular, or
 more or less triangular to rhomboid **13. D. repens**
- 26a. Lamina bearing multicellular hairs, leaf axes hairy, ultimate segments of leaves
 ending in an acute tooth **3. D. brevipes**
 b. Lamina glabrous, leaf axes glabrous, ultimate segments of leaves not ending in an
 acute tooth 27

- 27a. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide 28
- b. Indusium attached at the base and only part of the sides, or attached at the broad base and hardly or not at the sides, semicircular or more or less triangular to rhomboid, wider than long, or about as wide as long 29
- 28a. Rhizome scales nearly black **18b. *D. trichomanoides* var. *lorrainii***
- b. Rhizome scales brown or red-brown **18a. *D. trichomanoides* var. *trichomanoides***
- 29a. Rhizome not white waxy, scales nearly black, distinctly acicular, vein endings on sterile segments not reaching the margin **8. *D. falcinella***
- b. Rhizome white waxy under the scales, scales brown or red-brown, narrowed evenly towards the apex, vein endings on sterile segments reaching the margin . 30
- 30a. Rhizome scales often curling backward **2. *D. brassii***
- b. Rhizome scales not or seldom curling backward 31
- 31a. Lamina pinnate with pinnatilobed to pinnatifid pinnae or bipinnate, tripinnate, or quadripinnate **13. *D. repens***
- b. Lamina entirely divided into fine linear segments without obvious rachis **11. *D. parvula***

Section Davallia

Davallia sect. *Davallia*: M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 13 (1985) 566. — *Wibelia* Bernh. — *Davallia* sect. *Wibelia* M. Kato — *Humata* Cav. — *Pachypleuria* C. Presl — *Stenolobus* C. Presl — *Parestia* C. Presl — *Pteroneuron* Fée — *Araiostegia* Copel. — *Trogostolon* Copel. — *Paradavallodes* Ching — *Davallia* sect. *Cordisquama* M. Kato.

For a more detailed synonymy, see under the genus.

Scales not acicular although nearly acicular scales occur, but then in combination with strongly divided leaves.

1. *Davallia angustata* Hook. & Grev.

Davallia angustata Wall. ex Hook. & Grev., Icon. Filic. (1831) t. 231; Noot., Blumea 39 (1994) 173. — *Davallia angustifolia* (sic!) Roxb., Fl. Ind. 4 Crypt. (Calc. J. Nat. Hist. 4) (1844) 51. — *Humata angustata* J. Sm., J. Bot. 3 (1841) 415, 416; Copel., Fern Fl. Philipp. (1958) 179; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 367. — *Pachypleuria angustata* C. Presl, Epim. Bot. (1851) 98. — Type: *Wallich 242* (K holo; BR, P), Roxburgh, Prince of Wales I.

Davallia attenuata Lodd., Cat. (1849). — *Humata attenuata* Alderw., Bull. Jard. Bot. Buitenzorg III, 5 (1922) 205. — Type: *Bünnemeijer 5829* (BO holo; L), Riau Arch., P. Tuju.

Humata microsora Copel., Philipp. J. Sc., Bot. 7 (1912) 55, t. 4; Fern Fl. Philipp. (1958) 179. — Type: *Weber 1146* (A, K, P), Mindanao, Butuan Subprov.

Humata mutata Alderw., Bull. Jard. Bot. Buitenzorg III, 5 (1922) 206. — Type: *Bünnemeijer 6900* (BO holo; L), Lingga Arch., P. Lingga.

Humata angustata var. *hastata* C. Chr., Gard. Bull. Str. Settlm. 4 (1929) 398. — Type: *Henderson 18256* (BM, SING), Peninsular Malaysia, Pahang, P. Tioman, G. Kajang.

Rhizome without the scales 1–2.5 mm diam., usually white waxy under the scales. Scales red-brown to nearly black, without pale border, narrowed evenly towards the apex, not or seldom curling backward, not bearing multiseptate hairs, toothed, peltate,

6–8 by 1 mm. *Stipes* pale to dark brown, adaxially grooved, 1–7 cm long, glabrous or with few scales. *Lamina* simple, entire to pinnatilobed, linear, glabrous, 5–24 by 6–20 cm, leaf not or slightly dimorphous. Margins distinctly crenulate to dentate at least towards the apex. False veins absent. *Sori* separate at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular, about as wide as long, 0.5–0.8 by 0.6–0.8 mm.

Distribution — Southern Thailand; *Malesia*: Sumatra, Peninsular Malaysia, Borneo, Philippines, SE Sulawesi; Pacific: Palau I., Baobeltaob.

Habitat & Ecology — Epiphytic, often low on the tree bole, or epilithic. Altitude 0–1300 m.

2. *Davallia brassii* (Copel.) Noot.

Davallia brassii (Copel.) Noot., *Blumea* 39 (1994) 174. — *Humata brassii* Copel., *Philipp. J. Sc.* 73 (1940) 351, t. 5. — Type: *Brass & Meijer Drees 9678* (L lecto; BM, K), Irian Jaya, Mt Trikora (= *Wilhelmina*).

Rhizome without the scales 1–1.5 mm diam., white waxy under the scales. Scales red-brown, without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 4–6 by 1 mm. *Stipes* dark brown, adaxially grooved, 1–17 cm long, glabrous or with few scales. *Lamina* compound, tripinnate towards the base and in the middle part, deltoid and broadest towards the base, glabrous, 2–9.5 by 1.5–4 cm. Longest petiolules 1–3 mm long. Pinnae ovate. Longest pinnae 1–3.5 by 0.6–1.5 cm. Pinnules of at least the larger pinnae anadromous, rhomboid or linear oblong. Longest pinnules 4–15 by 3–5 mm. Ultimate leaflets linear oblong or rhomboid, lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 1–3 by 0.5–0.8 mm. Upper ridge at the junction of the costa and pinna-rachis not swollen. Leaf axes glabrous. Veins in sterile ultimate lobes frequently simple, reaching the margin. False veins absent. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, more or less triangular to rhomboid, about as wide as long, 1 mm long and broad, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina generally extending into a tooth at both sides or only at the outside of a sorus.

Distribution — *Malesia*: New Guinea (Irian Jaya: Lake Habbema, Mt Trikora, Ugumba; Papua New Guinea: West Sepik, Mt Capella).

Habitat & Ecology — Epiphyte. Altitude 3000–3400 m.

3. *Davallia brevipes* Copel.

Davallia brevipes Copel., *Philipp. J. Sc.*, Suppl. 1 (1906) 147, t. 2; *Fern Fl. Philipp.* (1958) 172; Noot., *Blumea* 39 (1994) 175. — Type: *Copeland 1662* (BM, P), Mindanao, San Ramon.

Davallia pullei Rosenst., *Nova Guinea* 8 (1912) 719. — Type: *von Römer (Pulle) 214* (BO), New Guinea.

Rhizome without the scales 2–3.8 mm diam., white waxy under the scales. Scales red-brown, without pale border, narrowed evenly towards the apex, not or seldom curl-

ing backward, bearing multiseptate hairs at least when young, peltate, 7–9 by 1.5–2.5 mm. *Stipes* pale or dark brown, adaxially grooved, 2–13 cm long, bearing hairs and/or scales when young, or glabrous, or with few scales. *Lamina* compound, tripinnate towards the base and in the middle part, deltoid and broadest towards the base, bearing multicellular hairs, 8–23 by 5–14 cm, leaf not or slightly dimorphous. Longest petiolules 1–3 mm long. Pinnae deltoid. Longest pinnae 2.5–8 by 1.5–4.5 cm. Pinnules of at least the larger pinnae anadromous, linear oblong. Longest pinnules 10–30 by 3–10 mm. Ultimate leaflets linear oblong, lobed almost to the midrib. Ultimate segments or lobes acute and usually ending in a tooth, 0.5–4 by 0.3–1 mm. Upper ridge at the junction of the costa and pinna-rachis with a swollen lip. Leaf axes, at least rachises, hairy. Veins in sterile ultimate lobes simple or forked, reaching the margin. False veins absent. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1–1.5 by 0.5 mm, upper margin elongated, free, extending to lamina margin or not. Lamina generally extending into a tooth at both sides of a sorus.

Distribution — *Malesia*: Philippines (Mindanao), C Sulawesi, Moluccas (Seram), New Guinea (Irian Jaya: Albatros bivak and Cyclops Mts; Papua New Guinea: E Highlands Prov., W Highlands Prov., Fly River, Morobe Prov., New Ireland, Bougainville); Pacific: Samoa, Upolu.

Habitat & Ecology — Epiphytic, often low on trees, or epilithic, sometimes in exposed places. Altitude 80–1100 m.

4. *Davallia corniculata* T. Moore

Davallia corniculata T. Moore, Index Fil. (1861) 292; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 359; Noot., Blumea 39 (1994) 177. — Type: *Lobb 220* (K holotype; BM, L), Java.

Davallia epiphylla auct. non Spr.: Blume, Enum. Pl. Javae (1828) 235. — Based on *Blume s.n.* (L sh 908.332-500).

Humata squarrosa Alderw., Bull. Jard. Bot. Buitenzorg III, 2 (1920) 156. — Type: *Brooks 460 S* (BM), Sumatra.

Rhizome without the scales 3–4 mm diam., white waxy under the scales. Scales red-brown, without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 4–5 by 0.5–1 mm. *Stipes* dark brown, adaxially grooved, 9–30 cm long, glabrous or with few scales. *Lamina* compound, bipinnate or tripinnate towards the base and in the middle part, deltoid and broadest towards the base, glabrous, 16–50 by 9–25 cm. Longest petiolules 2–4 mm long. Pinnae narrowly ovate. Longest pinnae 5–19 by 2–4.5 cm. Pinnules of at least the larger pinnae anadromous, linear oblong or narrowly ovate. Longest pinnules 12–25 by 3–10 mm. Ultimate leaflets linear oblong, lobed almost to the midrib, or only shallowly lobed. Ultimate segments or lobes obtuse or acute without a tooth, or acute and usually ending in a tooth, 0.5–7 by 1–2 mm. Upper ridge at the junction of the costa and pinna-rachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet thickened and decurrent on the edge of the grooved rachis. Veins in sterile ultimate lobes pinnate, reaching the margin. False veins present. *Sori* separate, borne several on a segment, at the forking point of veins. Indusium attached at the

base and only part of the sides, or also attached along the sides, pouch-shaped, more or less triangular to rhomboid or oblong, about as wide as long, c. 0.5 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina generally extending into a tooth at both sides or only at the outside of a sorus.

Distribution — Southern Thailand; *Malesia*: Sumatra, Peninsular Malaysia, W Java, Borneo (Sabah, Mt Kinabalu).

Habitat & Ecology — Epiphytic or epilithic, sometimes in rather dry places. Altitude 300–1800 m.

5. *Davallia denticulata* (Burm. f.) Kuhn

Davallia denticulata (Burm. f.) Mett. ex Kuhn, Filic. Decken. (1867) 27; Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Luerssen, Fil. Graeff. (1871) 215, non Mett.; Copel., Fern Fl. Philipp. (1958) 174; Holtum, Revis. Fl. Malaya, ed. 2, 2 (1966) 359; Noot., Blumea 39 (1994) 178. — *Adiantum denticulatum* [Pluk., Phytogr. 3 (1692) 151, t. 180, f. 4;] Burm. f., Fl. Indica (1768) 236; Houtt., Nat. Hist. (1783) 254, t. 100, f. 2. — *Trichomanes denticulatum* (Burm. f.) Houtt., Nat. Hist. (1783) t. 100, f. 2. — *Davallia elegans* Sw., J. Bot. (Schrader) 1800 (1801) 87, nom. illeg.; Hedw., Fil. Gen. Sp. (1803); Blume, Enum. Pl. Javae (1828) 235. — *Trichomanes elegans* (Sw.) Poir., Leçons Fl. (1820) 79. — *Humata elegans* (Sw.) Desv., Prod. Fam. Foug. (1827) 324. — *Parestia elegans* (Sw.) C. Presl, Epim. Bot. (1851) 99. — Type: *Pryon s.n.* (n.v.), Java.

Distribution — Both of the varieties recognised occur in *Malesia*.

a. var. *denticulata*

Davallia denticulata (Burm. f.) Mett. ex Kuhn — *Adiantum denticulatum* Burm. f. — *Trichomanes denticulatum* (Burm. f.) Houtt. — *Davallia elegans* Sw. — *Trichomanes elegans* (Sw.) Poir. — *Humata elegans* (Sw.) Desv. — *Parestia elegans* (Sw.) C. Presl.

Davallia bidentata Schkuhr, 24 Kl. Linn. Syst. 1 (1804) t. 127; Deutschl. Krypt. Gew. 1 (1809) 119, t. 127. — *Davallia elegans* Sw. var. *bidentata* Hook., Sp. Fil. (1845) 165. — Type: Schkuhr Fil. t. 127.

Davallia patens Sw., Syn. Fil. (1806) 132, 348. — *Humata patens* (Sw.) Desv., Prod. Fam. Foug. (1827) 325. — Type: *Rottler s.n.* (n.v.).

Trichomanes chaerophylloides Poir., Encycl. 8 (1808) 80. — *Davallia chaerophylloides* (Poir.) Steud., Nomencl. Bot. 2 (1824) 146. — *Humata chaerophylloides* (Poir.) Desv., Prod. Fam. Foug. (1827) 325. — Type: herb. DC. (n.v.).

Trichomanes lucidum Roxb., Calcutta J. Nat. Hist. 4 (1844) 519. — Type: *Wallich 253* (BR n.v.; K), Penang.

Davallia elegans Sw. var. *pulchra* Hook., Sp. Fil. (1845) 165. — Lectotype: *Lobb s.n.* (K), Singapore.

Davallia elegans Sw. var. *subunidentata* Hook., Sp. Fil. (1845) 165. — Type: *Zollinger 147* (K holo; BM, L, P).

Davallia impressa Copel., Univ. Calif. Publ. Bot. 14 (1929) 377. — Type: *Bartlett 6841* (A, K, L), Sumatra.

Rhizome without the scales 3–15 mm diam., not white waxy. Scales red-brown or nearly black, with pale border from base to apex or without pale border, narrowed evenly towards the apex or flat and nearly acicular, narrowed abruptly from a broad base, often curling backward, not bearing multiseptate hairs, toothed, peltate, 4–8 by 0.5–1.5 mm. *Stipes* pale, adaxially grooved, 4–50 cm long, glabrous or with few scales.

Lamina compound, bipinnate or quadripinnate towards the base and in the middle part, deltoid and broadest towards the base, glabrous, 16–90 by 13–50 cm, leaf not or slightly dimorphous. Longest petiolules 4–35 mm long. Pinnae deltoid. Longest pinnae 8–45 by 5–30 cm. Pinnules of at least the larger pinnae anadromous, deltoid. Longest pinnules 70–200 by 40–110 mm. Ultimate leaflets linear oblong or narrowly ovate, lobed almost to the midrib or only shallowly lobed. Ultimate segments 5–27 by 2–6 mm. Upper ridge at the junction of the costa and pinna-rachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate (or forked in very narrow lobes), reaching the margin. False veins present. *Sori* separate, borne several on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide or about as wide as long, 1–1.3 by 0.5–1 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina generally extending into a tooth at both sides of a sorus.

Distribution — Generally common. Madeira, tropical and southern Africa, Madagascar, islands in the Indian Ocean (Comores, Seychelles, Christmas I.), Continental Asia: Sri Lanka, India (Assam, Andaman and Nicobar Is.), Thailand, Burma, China (Hainan), Indochina (Laos, Cambodia, Vietnam); throughout *Malesia*; Australia (Queensland); Pacific: Samoa, Society Is. (Tahiti).

Habitat & Ecology — Epiphyte on many different species of trees and in different types of forest incl. mangrove forest or on solitary trees, epilithic on granite, limestone, or sandstone, terrestrial on different kinds of soil, e.g. on sand in edge of kerangas forest. Altitude 0–2200 m.

b. var. *elata* (G. Forst.) Kuhn

Davallia denticulata (Burm. f.) Mett. ex Kuhn var. *elata* (G. Forst.) Mett. ex Kuhn in Miq., Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 288; Noot., Blumea 39 (1994) 180. — *Trichomanes elatum* G. Forst., Fl. Ins. Austr. (1786) n. 474. — *Davallia elata* (G. Forst.) Spreng., J. Bot. (Schrader) 1799 (2) (1800) 271. — *Wibelia elata* (G. Forst.) Bernh., J. Bot. (Schrader) 1801-I (1801) 122, t. 1, f. 2. — *Humata elata* (G. Forst.) Desv., Prod. Fam. Foug. (1827) 325. — *Parestia elata* (G. Forst.) C. Presl, Epim. Bot. (1851) 100. — Type: *Forster 474* (= 300) (BM).

Davallia papuana Copel., Philipp. J. Sc., Bot. 6 (1911) 81. — Type: *King 245* (n.v.).

Davallia tenuisecta Copel., Philipp. J. Sc. 73 (1940) 355, t. 10. — Type: *Brass 11701* (A, BO, L), Irian Jaya.

Davallia dejoncheerii Hovenkamp & de Joncheere, Blumea 33 (1988) 408. — Type: *de Joncheere 1157* (L. holo), Celebes.

Differs from the typical variety in the upper margin of the indusium being elongated, free from the leaf margin or not and sometimes the indusium only attached at the base and part of the sides.

Distribution — *Malesia*: Philippines (Luzon), Sulawesi (P. Muna, Central, North), Moluccas (Buru, Banda, Babar, Seram, Halmahera, Ternate, Morotai, Aru Is.), New Guinea (Irian Jaya: Lorentz River, Albatros bivak, Balim River; Papua New Guinea: many collections); Pacific: Carolines, Solomon Is. (Bougainville), New Caledonia, New Hebrides, Fiji, Samoa, Rarotonga, Society Is.

Habitat & Ecology — Epiphytic, epilithic, or terrestrial on different kinds of soil, in forest and on exposed places. Altitude 0–1600 m.

Note — This variety could have its origin in hybridisation of *Davallia denticulata* var. *denticulata* with *D. embolostegia*. It has the same rhizome scales as *D. denticulata* var. *denticulata*. See also the note under *D. embolostegia*.

6. *Davallia divaricata* Blume

Davallia divaricata Blume, Enum. Pl. Javae (1828) 237; Copel., Fern Fl. Philipp. (1958) 173; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 362; Noot., Blumea 39 (1994) 180. — *Araiostegia divaricata* (Blume) M. Kato, Acta Phytotax. Geobot. 26 (1975) 158. — Type: *Blume s.n.* (L sh 908.333-153 holo; K), Java, G. Burangan.

Davallia mucronata Blume, Enum. Pl. Javae (1828) 235. — Type: *Kuhl & van Hasselt s.n.* (L sh 908.333-148 holo), Java, Bogor.

Davallia alata J. Sm., London J. Bot. 3 (1841) 417, nomen, non Blume. — *Davallia decurrens* Hook., Sp. Fil. (1845) 167, t. 44B; Copel., Publ. Bur. Sci. Govt. Lab. Philipp. 28 (1905) 54. — *Microlepia decurrens* (Hook.) Fée, Mém. Foug. 5. Gen. Filic. (1852) 326. — *Araiostegia decurrens* (Hook.) M. Kato, Acta Phytotax. Geobot. 26 (1975) 158. — Type: *Cuming 350* (K holo; BM, P), Philippines, Bohol.

Davallia polyantha Hook., Sp. Fil. (1845) 168, t. 59A. — *Microlepia polyantha* (Hook.) Fée, Mém. Foug. 5. Gen. Filic. (1850) 327. — Type: *Lobb s.n.* (K), Singapore.

Davallia lobbiana T. Moore, Index Fil. (1861) 296. — Type: *Lobb 1857* (K), Sarawak.

Davallia sumatrana Copel., Philipp. J. Sc., Bot. 9 (1914) 230. — Type: *Brooks 147* (BM, P), Sumatra.

Distribution — Both varieties recognised occur in Malesia.

a. var. *divaricata*

Davallia divaricata Blume — *Araiostegia divaricata* (Blume) M. Kato — *Davallia mucronata* Blume — *Davallia decurrens* Hook. — *Microlepia decurrens* (Hook.) Fée — *Araiostegia decurrens* (Hook.) M. Kato — *Davallia polyantha* Hook. — *Microlepia polyantha* (Hook.) Fée — *Davallia lobbiana* T. Moore — *Davallia sumatrana* Copel.

Rhizome without the scales 10–15 mm diam., not white waxy. Scales brown or red-brown without pale border, narrowed evenly towards the apex, curling backward or not, not bearing multiseptate hairs, toothed, basifixed with cordate base and greatly overlapping lobes, 5–20 by 2–4 mm. *Stipes* pale, adaxially grooved, 15–60 cm long, glabrous or with few scales. *Lamina* compound, tripinnate towards the base and in the middle part, deltoid and broadest towards the base, glabrous, 60–100 by 40–70 cm. Longest petiolules 4–35 mm long. Pinnae deltoid. Longest pinnae 8–45 by 5–30 cm. Pinnules of at least the larger pinnae anadromous, deltoid. Longest pinnules 70–200 by 40–110 mm. Ultimate leaflets linear oblong or narrowly ovate, lobed halfway towards the midrib or only shallowly lobed. Ultimate segments 5–27 by 2–6 mm. Rachis adaxially distinctly grooved (often with a groove at either side). Upper ridge at the junction of the costa and pinna-rachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate (or forked in very narrow lobes), reaching the margin. False veins absent. *Sori* separate, borne several on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong; about as wide as long, c. 1 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina generally extending into a tooth at both sides of a sorus.

Distribution — Continental Asia: from India to China (Yunnan, Fukien, Kwangsi, Guangdong, Taiwan, Hainan), southwards through SE Asia; throughout *Malesia*; Pacific: Solomon Is. (Bougainville, 1 collection).

Habitat & Ecology — Generally epiphytic, sometimes epilithic on limestone, or bed-rock not specified; rarely terrestrial. Mostly in dense forest, sometimes on dry places. Altitude 0–1850 m.

b. var. *dimorpha* (Holttum) Noot.

Davallia divaricata Blume var. *dimorpha* (Holttum) Noot., Blumea 39 (1994) 182. — *Davallia dimorpha* Holttum, Gard. Bull. Str. Settlm. 9 (1937) 122; Revis. Fl. Malaya, ed. 2, 2 (1966) 362. — *Araiostegia dimorpha* (Holttum) M. Kato, Acta Phytotax. Geobot. 26 (1975) 158. — Type: *Holttum SF 31289* (SING holo; BM, BO, K), Malaya, Pahang, Cameron Highlands.

Lamina bipinnate or tripinnate towards the base and in the middle part, strongly dimorphous. Lamina of sterile leaves bipinnate or tripinnate, 40–60 by 25–50 cm. Longest pinnae 8–45 by 5–30 cm. Pinnules deltoid, 70–200 by 40–110 mm. Lamina of fertile leaves 40–60 by 25–50 cm, much more dissected than lamina of sterile leaves. Longest pinnae of fertile leaves 8–45 by 5–30 cm. Pinnules or pinnalobes deltoid, 70–200 by 40–110 mm. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, semicircular, 1 by 2 mm.

Distribution — *Malesia*: Sumatra (Eastcoast between Prapat and Pematang Siantar), Peninsular Malaysia (Pahang; Cameron Highlands).

Habitat & Ecology — Only once recorded: in crevices of rock in light shade. Altitude 400–1500 m.

Note — This is a local form of *Davallia divaricata* that was described by Holttum as a species. Except from the narrow segments of the fertile fronds and the broader indusia there are, however, no differences.

7. *Davallia embolostegia* Copel.

Davallia embolostegia Copel., Philipp. J. Sc., Suppl. 1 (1906) 147, t. 3; Fern Fl. Philipp. (1958) 171; Noot., Blumea 39 (1994) 182. — Type: *Copeland 1914* (n. v.), Luzon.

Rhizome without the scales 10–15 mm diam., not white waxy. Scales brown or red-brown without pale border, narrowed evenly towards the apex, curling backward or not, not bearing multiseptate hairs, toothed, basifixed with cordate base and greatly overlapping lobes, 5–20 by 2–4 mm. *Stipes* pale, adaxially grooved, 15–60 cm long, glabrous or with few scales. *Lamina* compound, tripinnate towards the base and in the middle part, deltoid and broadest towards the base, glabrous, 60–100 by 40–70 cm, leaf not or slightly dimorphous. Longest petiolules 4–35 mm long. Pinnae deltoid. Longest pinnae 8–45 by 5–30 cm. Pinnules of at least the larger pinnae anadromous, deltoid. Longest pinnules 70–200 by 40–110 mm. Ultimate leaflets linear oblong or narrowly ovate, lobed halfway towards the midrib. Ultimate segments 5–27 by 2–6 mm. Upper ridge at the junction of the costa and pinna-rachis not swollen. Leaf axes glabrous. Mar-gins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate (or forked in very narrow lobes), reaching the margin. False veins not present

(rarely present and plant like *D. denticulata* var. *elata*). *Sori* separate, borne several on a segment (if one on a lobe, the lobe not narrowed at base), at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1–1.5 by 0.3–0.5 mm, upper margin elongated, free, protruding beyond lamina margin. Lamina generally extending into a tooth at both sides of a sorus.

Distribution — *Malesia*: Sumatra (Mt Sibebe), Borneo (Sarawak, Sabah, S Kalimantan), Philippines (Luzon, Negros, Samar, Mindoro), Moluccas (Seram, Bacan, Halmahera, Ternate, Morotai); Pacific: Samoa (Savaii I.).

Habitat & Ecology — Epiphyte, generally in primary forest, sometimes epilithic. Altitude 0–2100 m.

Note — Hybridisation with *Davallia denticulata* is probably rather common; presumably collections with false veins are hybrids, sometimes they have the same shape of rhizome scales as *D. denticulata* but basally attached as in *D. embolostegia*.

8. *Davallia falcinella* (J. Sm.) C. Presl

Davallia falcinella (J. Sm.) C. Presl, Reliq. Haenk. 1 (1825) 66, t. 11, f. 2; Noot., Blumea 39 (1994) 183. — *Leucostegia falcinella* J. Sm., J. Bot. 3 (1841) 416. — *Acrophorus falcinellus* (J. Sm.) T. Moore, Index Fil. (1857) 2. — *Humata falcinella* (J. Sm.) Copel., Publ. Bur. Sci. Govt. Lab. Philipp. 28 (1905) 51. — *Trogostolon falcinellus* (J. Sm.) Copel., Fern Fl. Philipp. (1958) 170. — Type: *Hance s.n.* (PRC), Luzon.

Rhizome without the scales 2.5–3 mm diam., not white waxy. Scales nearly black, without pale border, distinctly acicular, often curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 6–10 by 2 mm. *Stipes* dark brown, adaxially grooved, 4–9 cm long, glabrous or with few scales. *Lamina* compound, tripinnate or quadripinnate towards the base and in the middle part, deltoid and broadest towards the base, glabrous, 7–14 by 6–14 cm. Longest petiolules 1–7 mm long. Pinnae linear-triangular. Longest pinnae 4–7 by 2–7 cm. Pinnules of at least the larger pinnae anadromous, linear oblong, or narrowly ovate. Longest pinnules 15–25 by 7–12 mm. Ultimate leaflets linear oblong, lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 1–2 mm long (up to 4 mm in sterile leaves), 1–2 mm broad. Upper ridge at the junction of the costa and pinna-rachis not swollen. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes frequently simple, not reaching the margin. False veins not present. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium attached at the base and only part of the sides, semicircular, about as wide as long, c. 1 mm. Lamina not extending into teeth beyond a sorus.

Distribution — *Malesia*: Philippines (Luzon, Mindanao, Leyte, Negros, Samar); Pacific: Marquesas Is.

Habitat & Ecology — Epiphyte. Altitude 0–800 m.

9. *Davallia heterophylla* Sm.

Davallia heterophylla Sm., Mém. Acad. Sci. Turin 5 (1793) 415; Noot., Blumea 39 (1994) 185. — *Humata heterophylla* (Sm.) Desv., Prod. Fam. Foug. (1827) 323; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 366. — Lectotype: *Charles Miller 1778* (BM).

[*Davallia lobulosa* Wall., Cat. (1828) n. 241, nomen]. — *Davallia longicauda* H. Christ, Bot. Jahrb. Syst. 23 (1896) 339. — Type: *Wallich 241* (K, P), Malaya, Penang.

Rhizome without the scales 1.8–2.4 mm diam., white waxy under the scales. Scales red-brown with pale border quickly diminishing or disappearing towards the apex, narrowed evenly towards the apex or flat and nearly acicular and narrowed abruptly from a broad base, curling backward (or appressed to rhizome, not crisped, only in the Pacific and New Guinea), not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 5–7 by 0.5–0.6 mm. *Stipes* pale, adaxially grooved or not, 0.5–7 cm long, glabrous or with few scales. *Lamina* simple, entire to pinnatilobed bearing multicellular hairs or glabrous, strongly dimorphous. Sterile lamina narrowly ovate (or ovate), 5–20 by 2–4.5 cm, margin flat or nearly so, not distinctly crenulate even towards the apex. Fertile lamina linear or rarely pinnatifid, 4–16 by 0.5–2.5 cm. False veins not present. *Sori* separate at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular, wider than long, 1 by 1.5–2.5 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not.

Distribution — Continental Asia: India (Nicobar Is.), Peninsular Thailand, S Vietnam; *Malesia*: Sumatra, Peninsular Malaysia, Java, Lesser Sunda Islands (Flores), Borneo, Philippines (Balabac, Paragua, Luzon, Catanduanes, Leyte, Samar, Mindanao), S Sulawesi (Lake Matano, Minahasa), Moluccas (Ambon, Seram, Aru Is., Banda), New Guinea; Pacific: Palau Is., Admiralty Is., Bougainville, Solomon Is., Carolines, Marianas, Guam, Fiji, Tonga, Samoa.

Habitat & Ecology — Epiphytic or epilithic, sometimes in swamp forest. Altitude 0–900 m (up to 2100 m, once recorded, Mt Kaindi in Papua New Guinea).

10. *Davallia hymenophylloides* (Blume) Kuhn

Davallia hymenophylloides (Blume) Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Noot., Blumea 39 (1994) 15. — *Aspidium hymenophylloides* Blume, Enum. Pl. Javae (1828) 172. — *Leucostegia hymenophylloides* (Blume) Bedd., Ferns S. India (1863) t. 252. — *Humata hymenophylloides* (Blume) Copel., Publ. Bur. Sci. Govt. Lab. Philipp. 28 (1905) 51. — *Araiostegia hymenophylloides* (Blume) Copel., Philipp. J. Sc. 34 (1927) 241; Noot., Blumea 37 (1992) 171. — Type: *Blume s.n.* (L sh 909.30-114), Java, Mt Burangran.

[*Leucostegia affinis* J. Sm., J. Bot. 3 (1841) 416, p.p., nomen]. — *Davallia affinis* Hook., Sp. Fil. (1845) 158, t. 52B. — *Microlepia affinis* (Hook.) C. Presl, Epim. Bot. (1851) 97. — *Acrophorus affinis* (Hook.) T. Moore, Proc. Linn. Soc. London 2 (1854) 286. — *Humata affinis* (Hook.) Mett., Fil. Hort. Bot. Lips. (1856) 102, t. 27, f. 5, 6. — Type: *Cuming 117* (K holotype; A, BM, L, P), Philippines.

Microlepia tenuifolia C. Presl, Epim. Bot. (1851) 97. — Type: *Cuming 215* (A, BM, K, L, P), Philippines.

Cystopteris dalhousiana Fée, Mém. Foug. 8 (1857) 108. — Type: *Dalhousie* in Herb. Delessert (G holotype; K), Penang.

Rhizome without the scales 3–20 mm diam., not white waxy. Scales brown (membranaceous), without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, lacking marginal setae or teeth or those rare, basifixed with cordate base and greatly overlapping lobes, 4–7 mm long. *Stipes* dark brown, adaxially grooved, 9–45(–65) cm long, glabrous or with few scales. *Lamina*

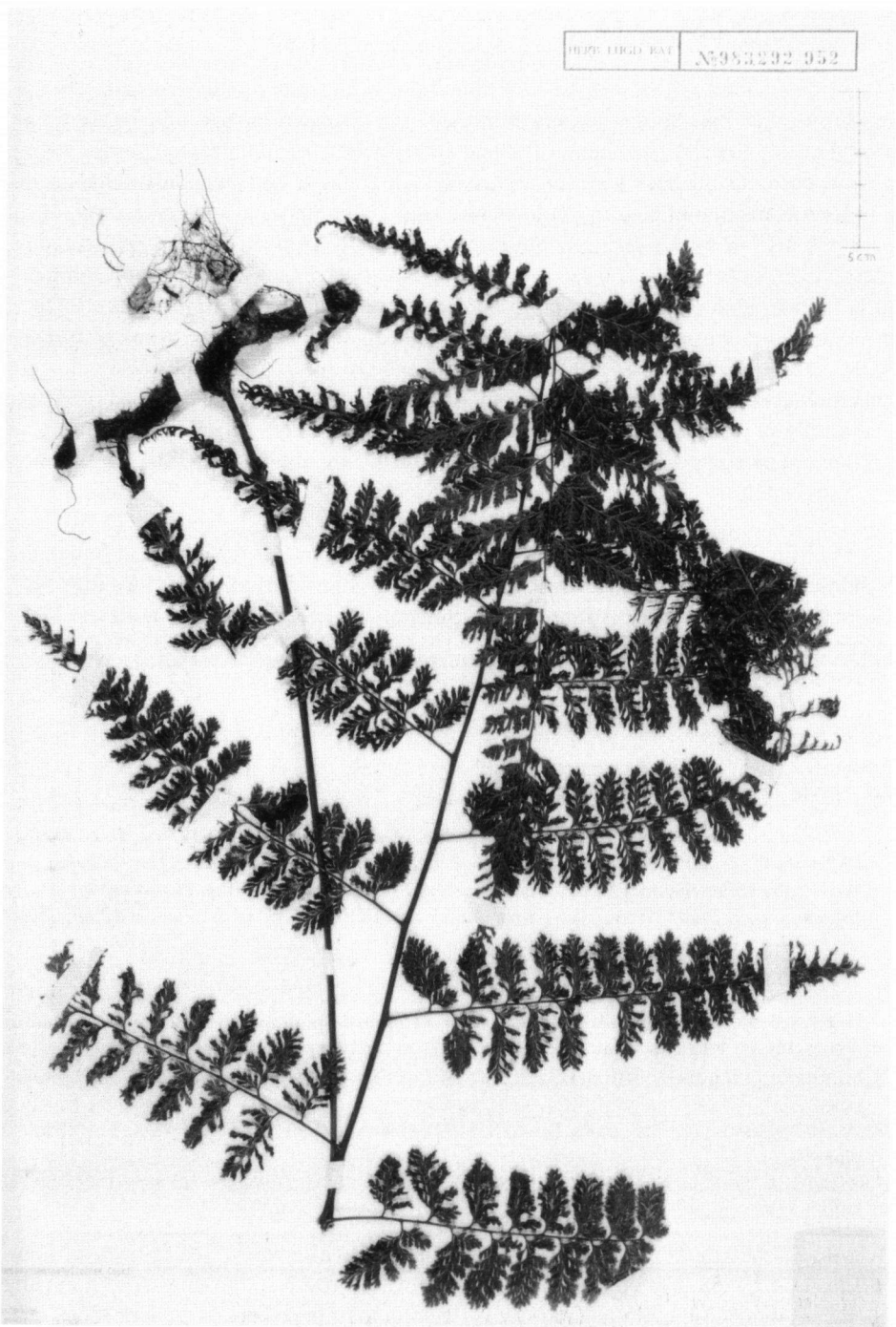


Fig. 1. *Davallia hymenophylloides* Blume (Ueda & Darnaedi B 8740).

compound, tripinnate, elongate, often narrowing towards the base, glabrous (or nearly so), 20–80(–90) by 6–50 cm, leaf not or slightly dimorphous. Longest petiolules 2.5–30 mm long. Pinnæ linear-triangular. Longest pinnæ 4–30(–44) by 1.5–15(–18) cm. Pinnules of at least the larger pinnæ anadromous, narrowly ovate. Longest pinnules 10–80 by 5–20 mm. Ultimate leaflets linear oblong. Ultimate segments or lobes obtuse or acute without a tooth. Leaf axes glabrous (or nearly so). Veins in sterile ultimate lobes frequently simple, not reaching the margin. False veins not present. *Sori* separate, often single on a segment at the bending point of a vein. Indusium scaly, attached at the narrow cordate base only, reniform, wider than long, 0.1–0.4 by 0.4–0.7 mm. — **Fig. 1.**

Distribution — Continental Asia: Sri Lanka, India (W Ghats, Darjeeling), Thailand (Prachinburi); in *Malesia*: Sumatra (Westcoast, Tapanuli, Bengkulu, Eastcoast, Toba, Aceh), Peninsular Malaysia, Java, Lesser Sunda Islands (Flores), Borneo (Sarawak, Sabah, W, S & E Kalimantan), Philippines (Luzon, Mindanao, Mindoro, Biliran, Marinduque).

Habitat & Ecology — Epiphytic or epilithic, rarely terrestrial. Altitude 500–2200 m.

11. *Davallia parvula* Hook. & Grev.

Davallia parvula Wall. [Cat. (1828) n. 247, nomen] ex Hook. & Grev., Icon. Filic. (1829) t. 138; Noot., Blumea 39 (1994) 189. — *Acrophorus parvulus* (Hook. & Grev.) T. Moore, Proc. Linn. Soc. London 2 (1854) 286. — *Humata parvula* (Hook. & Grev.) Mett., Fil. Hort. Bot. Lips. (1856) 102, t. 27, f. 7, 8; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 369. — *Leucostegia parvula* (Hook. & Grev.) Bedd., Handb. Ferns Brit. India (1883) 54. — Type: *Wallich 247* (K holo; BM, L, P), Singapore.

Rhizome without the scales 0.5–1.2 mm diam., white waxy under the scales. Scales red-brown without pale border, narrowed evenly towards the apex, not or seldom curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 2.5–6 by 0.3–0.6 mm. *Stipes* dark brown, adaxially grooved, 0.1–5 cm long, glabrous or with few scales. *Lamina* compound, entirely divided into fine linear segments without obvious rachis, deltoid and broadest towards the base, glabrous, 0.6–4 by 0.5–3.5 cm. Longest petiolules 1–2 mm long. Pinnules of at least the larger pinnæ anadromous. Ultimate segments or lobes obtuse or acute without a tooth, 0.5–4 by 0.2–0.4 mm. Ultimate segments of sterile compound leaves 0.2–0.4 mm broad. Upper ridge at the junction of the costa and pinna-rachis not swollen. Leaf axes glabrous. Veins in sterile ultimate lobes frequently simple, reaching the margin. False veins not present. *Sori* separate, frequently single on a segment at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular or more or less triangular to rhomboid, about as wide as long, 0.3–0.8 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina generally extending into a tooth at both sides of a sorus.

Distribution — *Malesia*: Sumatra (Eastcoast), Bangka, Lingga Archipelago, Singapore, Borneo (Sarawak, Brunei, Sabah, W, C & E Kalimantan), Papua New Guinea.

Habitat & Ecology — Epiphytic or epilithic. Altitude 0–800 m.

Note — *Davallia parvula* is closely related to *D. repens*. It is not easy to separate them; possible there are hybrids between some more dissected forms of *D. repens* and *D. parvula*.

12. *Davallia pectinata* Sm.

- Davallia pectinata* Sm., Mém. Acad. Sci. Turin 5 (1793) 415; Noot., Blumea 39 (1994) 189. — *Humata pectinata* (Sm.) Desv., Prod. Fam. Foug. (1827) 323; Copel., Fern Fl. Philipp. (1958) 178; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 369. — *Pachypleuria pectinata* (Sm.) C. Presl, Epim. Bot. (1849) 98. — Type: *D. Hurloch 1786* (n.v.), 'India Orientalis'.
- Nephrodium gaimardianum* Gaud. in Freyc., Voy. Uranie (1827) 335, t. 12, f. 1. — *Davallia gaimardiana* (Gaud.) C. Presl, Tent. Pterid. (1836) 128. — *Humata gaimardiana* (Gaud.) J. Sm., J. Bot. 3 (1841) 415. — Type: *Gaudichaud s.n.* (P), Île Rawak.
- Davallia intermarginalis* Blume, Enum. Pl. Javae (1828) 230. — *Pachypleuria intermarginalis* (Blume) C. Presl, Epim. Bot. (1851) 98. — *Humata intermarginalis* (Blume) T. Moore, Index Fil. (1861) 296. — Type: *Blume s.n.* (L sh 908.275-76), W Java.
- Prosaptia pinnatifida* C. Presl, Tent. Pterid. (1836) 166. — Type: *Meyen herb.* (n.v.), Luzon.
- Davallia multiflora* Roxb., Fl. Ind. 4 Crypt. (Calc. J. Nat. Hist. 4) (1844) 53. — *Davallia parallela* Wall. [Cat. (1828) n. 251, nomen] ex Hook., Sp. Fil. (1845) 153. — *Pachypleuria parallela* (Hook.) C. Presl, Epim. Bot. (1851) 98, pro spec. Philipp. — *Pteroneuron parallelum* (Hook.) Fée, Mém. Foug. 5. Gen. Filic. (1852) 320. — *Humata parallela* (Hook.) Brack., U.S. Expl. Exped., Filic. 16 (1854) 229. — Type: *Wallich 251* (K holo; P), Singapore.
- Davallia parallela* var. *a* Hook., Sp. Fil. 1 (1845) 153. — Type: *Cuming 61* (K holo; A, BM, L, P), Philippines.
- Humata lanuginosa* Alderw., Bull. Jard. Bot. Buitenzorg III, 2 (1920) 155. — Type: *Bünnemeijer 3881* (BO holo; K, L, P), Sumatra.
- Humata archboldii* Copel., Philipp. J. Sc. 73 (1940) 350, t. 4. — Type: *Brass 13301* (A, BM, BO, L), Irian Jaya.
- Humata tenuivenia* Copel., Philipp. J. Sc. 73 (1940) 350, t. 3. — Type: *Brass 14082* (A, BM, BO, L), Irian Jaya.

Rhizome without the scales 1.4–2.6 mm diam., white waxy under the scales. Scales red-brown, with pale border from base to apex, narrowed evenly towards the apex, not or seldom curling backward, bearing multiseptate hairs at least when young, peltate, 5 by 1.1–1.5 mm. *Stipes* pale or dark brown, adaxially grooved, 5–18 cm long, glabrous or with few scales. *Lamina* simple, one pectinate or pinnatifid leaf, narrowly ovate, elongate, often narrowing towards the base, bearing multicellular hairs or glabrous, 4–21 by 2.5–8 cm. Longest pinnae 1.5–3.2 by 0.3–0.5 cm. False veins not present. *Sori* separate at the forking point of veins or at the bending point of a vein. Indusium attached at the broad base and hardly or not at the sides, semicircular, wider than or about as wide as long, 0.6–0.8 by 0.6–1 mm, upper margin not elongated, truncate or slightly rounded, extending to the lamina margin or not. In some collections, e.g. *Brass 13301* (New Guinea) and *Posthumus s.n.* (Java), the scales are not hairy.

Distribution — Continental Asia: India (S Andaman, Nicobar Is.), China (Taiwan, Orchid I.), Thailand (southern?); *Malesia*: Sumatra, Peninsular Malaysia (Langkawi I., Kelantan, Pahang, Malacca, Johore), Singapore, Anambas Is., W Java, Borneo (Sarawak, Brunei, Sabah, W, S & E Kalimantan), Philippines (throughout but quite rare), N & C Sulawesi, Moluccas (Ambon, Seram, Talaud Is., Tanimbar Is., Aru Is., Ternate), Papua New Guinea incl. Bismarck Archipelago; Australia (N Queensland); Pacific: Truk Is., Solomon Is., New Hebrides, New Caledonia (Balade, Col d'Amos), Samoa, Carolines (Ponape), Cook Is. (Rarotonga, Mangaia), Austral Is., Ruruta, Society Is.

Habitat & Ecology — Epiphytic, epilithic, or sometimes terrestrial, on sand, lava, or limestone.

13. *Davallia repens* (L. f.) Kuhn

- Davallia repens* (L. f.) Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Noot., Blumea 39 (1994) 192. — *Adiantum repens* L. f., Suppl. Pl. (1781) 446. — *Humata repens* (L. f.) Diels, Nat. Pflanzenfam. 1, 4 (1899) 209; Copel., Fern Fl. Philipp. (1958) 178; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 371. — Type: *Sonnerat par Thouin (Commerçon) 74* (P holo; L), Île de France.
- Davallia pedata* var. *minor* Nees & Blume, Nov. Act. Acad. Caes. Leop. Nat. Cur. 11 (1823) 122, t. 13, f. 1. — Type: *Blume s.n.* (n.v.).
- Davallia subimbricata* Blume, Enum. Pl. Javae (1828) 231. — *Pachypleuria subimbricata* (Blume) C. Presl, Epim. Bot. (1851) 261. — Type: *Blume s.n.* (L sh 908.275-807 holo), Java.
- Davallia alpina* Blume, Enum. Pl. Javae (1828) 231. — *Humata alpina* (Blume) T. Moore, Index Fil. (1857) 92. — Type: *Blume s.n.* (L sh.908.275-905 holo), Java, Mt Gedeh.
- Davallia vestita* Blume, Enum. Pl. Javae (1828) 233. — *Pachypleuria vestita* (Blume) C. Presl, Epim. Bot. (1851) 261. — *Humata vestita* (Blume) T. Moore, Index Fil. (1857) 92; Copel., Publ. Bur. Sci. Govt. Lab. Philipp. 28 (1905) 50; Fern Fl. Philipp. (1958) 177; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 370. — Type: *Blume s.n.* (L sh 908.275-969), Java, Mt Burangan.
- Davallia bipinnatifida* Blume, Enum. Pl. Javae (1828) 234. — *Humata bipinnatifida* (Blume) T. Moore, Index Fil. (1861) 290. — Type: *Blume s.n.* (?), Java.
- Davallia lepida* C. Presl [Tent. Pterid. (1836) 128, nomen] ex Goldmann, Nov. Act. Acad. Caes. Leop. Nat. Cur., Suppl. 1, 19 (1843) 464. — *Pachypleuria lepida* (Goldmann) C. Presl, Epim. Bot. (1851) 99. — *Humata lepida* (Goldmann) T. Moore, Index Fil. (1857) 92. — Type: *Meyen s.n.* (K), Philippines, Manila, 1831.
- Davallia cumingii* Hook., Sp. Fil. (1845) 155, t. 45B. — Type: *Cuming 138* (A, BM, K, L, P), Philippines, Samar.
- Davallia longula* Kunze, Bot. Zeitung (Berlin) 6 (1848) 215. — *Humata longula* (Kunze) T. Moore, Index Fil. (1861) 296. — Type: *Zollinger 3182* (BM, L), Java.
- Davallia repens* var. *bipinnatipartita* Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 287. — Type: *Zollinger 3128* (n.v.), Java, Bandung.
- Davallia pinnatifida* Baker, J. Linn. Soc. Bot. 24 (1887) 257, non Sw. (1806). — *Humata intermedia* C. Chr., Index Filic. (1906) 353; Copel., Univ. Calif. Publ. Bot. 12 (1931) 401; Fern Fl. Philipp. (1958) 178. — Type: *Hose 179* (BM, K), Sarawak.
- Davallia bipinnatifida* Baker, Kew Bull. (1899) 119, nom. illeg., non Blume (1828). — Type: *Giulianetti & English s.n.* (K), New Guinea, Vanape Valley, 1897.
- Humata repens* var. *minuscula* C. Chr., Philipp. J. Sc., Bot. 3 (1908) 272. — *Humata minuscula* (C. Chr.) Alderw., Malayan Ferns Suppl. (1917) 216. — Type: *Ramos BS 1815* (P), Luzon, Rizal Prov.
- Humata introrsa* H. Christ, Nova Guinea 8 (1909) 160. — Type: *Versteeg 1279* (BO, K, L, P), Irian Jaya.
- Humata obtusata* Alderw., Bull. Jard. Bot. Buitenzorg II, 1 (1911) 8; Copel., Fern Fl. Philipp. (1958) 176. — *Pachypleuria obtusata* (Alderw.) M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 14 (1989) 232. — Type: *MacGregor BS 8386* (BO holo; L, P), Luzon, Benguet Prov.
- Humata subtilis* Alderw., Bull. Jard. Bot. Buitenzorg II, 7 (1912) 17. — Type: *Schlechter 13788* (BO holo; BM, K), Papua New Guinea.
- Humata crassifrons* Alderw., Bull. Jard. Bot. Buitenzorg II, 7 (1912) 18. — Type: *Schlechter 14430* (BO holo; BM, K), Papua New Guinea, Torricelli Mts.
- Humata schlechteri* Brause, Bot. Jahrb. Syst. 49 (1912) 26. — Lectotype: *Schlechter 14430a* (BM iso), Papua New Guinea, Torricelli Mts.
- Humata subtilis* forma *major* Alderw., Bull. Jard. Bot. Buitenzorg II, 16 (1914) 17. — Type: *Exp. Hulstijn 261* (BO holo; L), Sumatra.
- Humata cromwelliana* Rosenst. in Fedde, Rep. 10 (1912) 324. — Type: *Bamler 8* (K, P, UC), Papua New Guinea, Cromwell.
- Humata perpusilla* Alderw., Bull. Jard. Bot. Buitenzorg II, 7 (1912) 17. — Lectotype: *Boerlage 346* (BO), Moluccas, Ambon, Mt Toena.

- Humata brooksii* Copel., Philipp. J. Sc., Bot. 7 (1912) 64. — Type: *Brooks 134* (BM), Borneo, Sarawak, Mt Poh.
- Humata puberula* Copel., Philipp. J. Sc., Bot. 7 (1912) 64. — Type: *Brooks 135* (n.v.), Sarawak, Mt Penrissen.
- Humata repens* forma *nana* Alderw., Bull. Jard. Bot. Buitenzorg II, 7 (1912) 17. — Type: *Docters van Leeuwen 15* (n.v.), Java, Tretes.
- Humata tenuis* Copel., Philipp. J. Sc., Bot. 7 (1912) 67. — Type: *King 367* (BM), New Guinea, Tamata.
- Humata kinabaluensis* Copel., Philipp. J. Sc., Bot. 12 (1917) 48. — Type: *Topping 1745* (A), Borneo, Sabah, Mt Kinabalu.
- Humata pusilloides* Copel., Sarawak Mus. J. 2 (1917) 338 (descr. in key); Alderw., Bull. Jard. Bot. Buitenzorg II, 28 (1918) 26; Copel., Fern Fl. Philipp. (1958) 176. — Type: *Copeland 153* (BM, K, PNH, SING), Mindanao, Mt Matutum.
- Humata ledermannii* Brause, Bot. Jahrb. Syst. 56 (1920) 120. — Type: *Ledermann 9432* (BM iso), Papua New Guinea, Sepik.
- Humata kaudernii* var. *variabilis* C. Chr., Svensk Bot. Tidskr. 16 (1922) 98. — Type: *Kaudern 78* (BM, BO), Celebes.
- Humata wernerii* Copel., Univ. Calif. Publ. Bot. 12 (1931) 400, pl. 53B. — *Pachypleuria wernerii* (Copel.) M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 14 (1989) 232. — Type: *Werner 17a* (UC, photo K), New Guinea, Mt Goh.
- Humata kinabaluensis* var. *subvestita* C. Chr., Gard. Bull. Str. Settlem. 7 (1934) 232. — Type: *Holtium 25549* (BM, BO, K, SING), Borneo, Sabah, Mt Kinabalu.
- Humata mecodioides* Copel., Philipp. J. Sc. 73 (1940) 354, t. 8. — Type: *Brass 11691* (A, BM, BO, L), Irian Jaya, Balim River.
- Humata similis* Copel., Philipp. J. Sc. 73 (1940) 354, t. 9. — Type: *Brass 13365* (A, BM, BO), Irian Jaya, Idenburg River.
- Humata deltoidea* Copel., Philipp. J. Sc. 73 (1940) 352, t. 6. — Type: *Brass 13382* (A, BM, BO, L), Irian Jaya, Idenburg River.
- Humata papuana* Copel., Gen. Fil. 24 (1943) 441. — *Pachypleuria papuana* (Copel.) M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 14 (1989) 231. — Type: *Brass 6987* (A, BM, L), New Guinea, Palmer River.
- Humata dissecta* Alston, Nova Guinea II, 7 (1956) 2. — *Pachypleuria dissecta* (Alston) M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 14 (1989) 233. — Type: *C.J. Brooks 17571* (BM holotype; BO), Ambon, Mt Toena.
- Humata pauxilla* Stone & Lane, Bot. Not. 112 (1959) 373, f. 1. — Type: *Stone, Gressitt & Alban 2441* (BISH holotype; K).

Rhizome without the scales 0.5–3 mm diam., white waxy under the scales. Scales brown or red-brown, with pale border from base to apex or not, narrowed evenly towards the apex, not or seldom curling backward, bearing multiseptate hairs at least when young or with marginal setae at least in distal part, peltate, 2.5–7 by 0.3–1.5 mm. *Stipes* adaxially grooved, 0.1–18 cm long, glabrous or with few scales. *Lamina* compound (pinnate with pinnatifid to pinnatifid pinnae, or bipinnate to quadripinnate towards the base and in the middle part), simple (one pectinate or pinnatifid leaf), 3-foliolate (the leaflets more or less divided), or pinnate towards the base, ovate, deltoid and broadest towards the base, glabrous, 0.6–24 by 0.5–14 cm, leaf strongly dimorphous or not or slightly dimorphous. Longest petiolules 0–4 mm long. Pinnae linear-triangular, narrowly ovate, linear, or ovate to deltoid. Longest pinnae 1–10 by 0.6–7 cm. Pinnules (if present) of at least the larger pinnae anadromous, linear oblong or narrowly ovate. Longest pinnules 5–55 by 5–20 mm. Ultimate leaflets (if present) lobed almost to the midrib or only shallowly lobed. Ultimate segments or lobes obtuse or acute with-

out a tooth. In dimorphous plants lamina of fertile leaves pinnate with strongly dissected pinnae, bipinnate, or tripinnate towards the base and in the middle part. Longest petiolules of fertile leaves 1–7 mm long. Pinnae deltoid, linear-triangular, or narrowly ovate, 1–8 by 0.3–2.5 cm. Pinnules or pinnalobes deltoid, or linear-oblong, 2–35 by 1.5–15 mm. Ultimate leaflets linear oblong. Ultimate segments of fertile leaves 1–15 by 0.5–2 mm. Leaf axes glabrous. Veins in sterile ultimate lobes simple, forked, or pinnate, reaching the margin. False veins not present. *Sori* separate, borne several on a segment, or in much divided leaves frequently single on a segment, at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular or more or less triangular to rhomboid, wider than long or about as wide as long, 0.3–1 by 0.3–1.3 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina generally extending into a tooth at both sides or only at the outside of a sorus, or not extending into teeth beyond a sorus.

Distribution — Africa: Cameroun, Gabon; Indian Ocean: Comores, Madagascar, Seychelles, Mascareignes, Réunion, Mauritius, Kerguelen, Bourbon I.; Continental Asia: Sri Lanka, throughout India, Sikkim, S Burma, China (Yunnan, Kwangsi, Kweichow, Quangdong incl. Hongkong, Kiangsi, Fukien, Hainan, Taiwan), Japan (Shikoku, Kyushu, Yakushima, Okinawa), Thailand, Cambodia, Vietnam; throughout *Malesia*; Australia (Queensland). Pacific: common in Admiralty Is., Solomon Is., New Hebrides, New Caledonia, Fiji, Samoa.

Habitat & Ecology — Very diverse. Low or high epiphytic, epilithic on various kinds of rocks, sometimes terrestrial. In very wet to dry sunny places. Altitude 0–3420 m.

Note — This is a very variable species, probably subject to hybridising and introduction of genes from several related species. Only in areas where no related species are found, like in China, the islands in the Indian Ocean, and in Africa, the pure form with pinnate to pinnatifid leaves occurs. In New Guinea the pure form is very rare. I have tried to subdivide the species in varieties. Although some forms are rather constant even over large areas, there are always many intermediate forms found between all the rather constant ones, making separation and identification of these forms impossible. The pure form is generally found at lower altitudes, the other forms higher, e.g., in W Java the pure form occurs from 450–1100 m, the other forms from 1400–2500 m. In Peninsular Malaysia this is from 150–1600 m and from 1400–2000 m, respectively. In Borneo, however, the pure form is found from 0–2500 m, the other forms from 100 to 3150 m. In the Philippines this is from 500–1350 m and from 400–2500 m, respectively.

14. *Davallia rouffaeriensis* Noot.

Davallia rouffaeriensis Noot., *Blumea* 39 (1994) 200. — Type: *Docters van Leeuwen 10277* (L holo; A, BO), Irian Jaya, Rouffaer River.

Rhizome without the scales 1.3–2.8 mm diam., white waxy under the scales or not. Scales brown, without pale border, narrowed evenly towards apex, often curling backward, not bearing multiseptate hairs, lacking marginal setae or teeth or those rare, or toothed, peltate, 4–6 by 0.8–1 mm. *Stipes* dark brown, adaxially grooved, 3–14 cm long, glabrous or with few scales. Lamina narrowly ovate, elongate, pinnate with pinnatilobed

to pinnatifid pinnae towards the base and in the middle part, glabrous, 10–22 by 3–6.5 cm. Pinnae linear-triangular. Longest pinnae 1.5–3.5 by 0.3–0.7 cm. False veins not present. *Sori* separate, frequently single on a segment at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, more or less triangular to rhomboid, about as wide as long, 0.4–0.6 by 0.4–0.6 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not.

Distribution — *Malesia*: Irian Jaya, Rouffaer River.

Habitat & Ecology — No data available.

15. *Davallia sessilifolia* Blume

Davallia sessilifolia Blume, Enum. Pl. Javae (1828) 231; Noot., Blumea 39 (1994) 2001. — *Pachypleuria sessilifolia* (Blume) C. Presl, Epim. Bot. (1851) 98. — *Humata sessilifolia* (Blume) Mett., Fil. Hort. Bot. Lips. (1856) 102. — Type: *Kuhl & van Hasselt s.n.* (L sh 908.275-915), Java, Mt Salak.

Rhizome without the scales 0.8–1.3 mm diam., white waxy under the scales. Scales red-brown with pale border from base to apex or not, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, toothed, peltate, 5–8 by 0.5 mm. *Stipes* pale, adaxially grooved, 0.5–7 cm long, glabrous or with few scales. *Lamina* simple, one pectinate or pinnatifid leaf, or pinnate towards the base, ovate, bearing multicellular hairs, or glabrous, 2–16 by 1.8–5 cm, leaf not or slightly dimorphous. False veins not present. Veins in ultimate lobes pinnate. *Sori* separate, borne several on a segment at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular, wider than long or about as wide as long, 1.1–1.8 by 1.2–1.8 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not.

Distribution — *Malesia*: Sumatra (Mt Kerinci), Java, Lesser Sunda Islands (Bali, Lombok, Flores), Borneo (E Kalimantan), Philippines (Luzon), C & N Sulawesi, Moluccas (Ternate), New Guinea; Pacific: Solomon Is., New Hebrides, Fiji.

Habitat & Ecology — Epiphytic from deep shade to full sun. Altitude 150–1770 m.

16. *Davallia sessilifolioides* M. Kato

Davallia sessilifolioides M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 14 (1989) 227; Noot., Blumea 39 (1994). — Type: *Kato c.s. C-5336* (TI holotype; BO, L), Moluccas, Ceram.

Rhizome without the scales 0.8–1.3 mm diam., white waxy under the scales. Scales red-brown, without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, toothed, peltate, 5–8 by 0.5 mm. *Stipes* pale or dark brown, adaxially grooved, 0.5–4.5 cm long, glabrous or with few scales. *Lamina* ovate, pinnate with pinnatifid to pinnatifid pinnae towards the base and in the middle part, deltoid and broadest towards the base, glabrous, 4–7 by 1.7–2.5 cm. Pinnae linear. Longest pinnae 0.8–1.5 by 0.3–0.8 cm. Ultimate leaflets lobed almost to or halfway towards the midrib, veins in ultimate lobes of sterile leaves single or forked. False veins not present. *Sori* separate, usually borne single on a segment at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, ovate or

semicircular, longer than wide, or about as wide as long, 1–1.2 by 0.8–1 mm, upper margin not elongated, truncate or slightly rounded, extending to the lamina margin or not.

Distribution — *Malesia*: Moluccas (Seram, Manusela Nat. Park).

Habitat & Ecology — Altitude 200–1000 m.

Note — This species is closely related to *D. sessilifolia*, mainly differing in the more dissected leaves.

17. *Davallia solida* (G. Forst.) Sw.

Davallia solida (G. Forst.) Sw., J. Bot. (Schrader) 1800 (1801) 87; Copel., Fern Fl. Philipp. (1958) 173; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 360; Noot., Blumea 39 (1994) 202. — *Trichomanes solidum* G. Forst., Fl. Ins. Austr. (1786) 86. — *Humata solida* (G. Forst.) Desv., Prod. Fam. Foug. (1827) 324. — *Stenolobus solidus* (G. Forst.) C. Presl, Tent. Pterid. (1836) 130. — Type: *Forster 308* (BM holo; P), Pacific Islands.

Davallia caudata Cav., Descr. Pl. (1802) 279. — *Parestia caudata* (Cav.) C. Presl, Epim. Bot. (1851) 100. — Type: *Née* (n.v.), Philippines.

Davallia procera Hedw., Fil. Gen. Sp. (1803) t. 24, acc. to Index Filicum.

Davallia splendens Blume, Enum. Pl. Javae (1828) 234. — Type: *Reinwardt s.n.* (L sh 908.332-920 holo), Banda.

Stenolobus ornatus C. Presl, Tent. Pterid. (1836) 130. — [*Davallia ornata* Wall., Cat. (1828) n. 246, nomen.] — *Davallia solida* (G. Forst.) Sw. var. *latifolia* Hook., Sp. Fil. (1846) 163. — *Davallia solida* (G. Forst.) Sw. var. *ornata* (C. Presl) Mett. ex Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286. — Type: *Wallich 246* (K holo; P), Malaya, Penang.

Davallia solida forma *tomentella* Rosenst. in Fedde, Rep. 13 (1914) 213. — Type: *Grasshoff 43* (n.v.).

Davallia elmeri Copel., Leafl. Philipp. Bot. 9 (1920) 3107; Fern Fl. Philipp. (1958) 174. — Type: *Elmer 16234* (A, BM, BO), Luzon, Mt Bulusan.

Davallia robinsonii Copel., Philipp. J. Sc. 30 (1926) 326; Fern Fl. Philipp. (1958) 173. — Type: *Robinson BS 11704* (P), Mindanao, Cota Bato.

Davallia subsolida Ching, Fl. Reip. Popul. Sin. 2 (1959) 376. — Type: *Kudo & Susuki 15996* (n.v.), Taiwan.

var. *solida*

Rhizome without the scales 4–14 mm diam., not white waxy. Scales red-brown or nearly black (the peltate base black, persistent when the rest of the scale is shed) with pale border from base to apex, narrowed evenly towards the apex or above the much broader base evenly narrowed towards the apex, not or seldom curling backward, bearing multiseptate hairs at least when young (hairs at least at the apex of young scales, c. 1 mm long, woolly), peltate, 5–10 by 1–1.2 mm. *Stipes* pale, adaxially grooved, 9–35 cm long, glabrous or with few scales. *Lamina* compound, bipinnate or tripinnate towards the base and in the middle part, deltoid and broadest towards the base, glabrous (sometimes with hairs on junction of rachis and petiolule), 15–90 by 21–40 cm, leaf not or slightly dimorphous. Longest petiolules 5–25 mm long. Pinnae linear-triangular or narrowly ovate. Longest pinnae 11–28 by 6–15 cm. Pinnules of at least the larger pinnae anadromous, deltoid or rhomboid. Longest pinnules 4–10 by 1.5–8 cm. Ultimate leaflets linear oblong or rhomboid, lobed almost to the midrib, or only shallowly lobed (in bipinnate leaves the ultimate segments shallowly lobed). Ultimate segments 10–40 by 3–17 mm. Upper ridge at the junction of the costa and pinna-rachis not swollen.

Leaf axes glabrous (often hairs at junction of petiolules). Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate, reaching the margin or not. False veins not present. *Sori* separate, borne several on a segment at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1.2–2 by 0.5–1 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina not extending into teeth beyond a sorus.

Distribution — Continental Asia: Sri Lanka, India (Assam, Khasia, Andaman & Nicobar Is.), Burma, Thailand, S Cambodia, China (Yunnan, Kwangsi, Taiwan), Vietnam (Tonkin, Cochinchina); *Malesia*: Sumatra, Peninsular Malaysia, Anambas & Natuna Is., Java, Lesser Sunda Islands (Sumba, Flores), Borneo (Sarawak, Brunei, Sabah, C, S & E Kalimantan), Philippines and Moluccas common throughout, New Guinea; Pacific: common from the Bismarck Archipelago to the Santa Cruz Is., Samoa and the Society Is. and to the New Hebrides, New Caledonia, Fiji, and Tonga.

Habitat & Ecology — Epiphytic, epilithic on different kinds of rock, or terrestrial on different kinds of soil; as well in exposed places as in deep shadow, from open rocky places and savannas to primary rain forest. Altitude 0–1500 m.

Note — Sometimes the leaf segments are very narrow and the plant resembles var. *fejeensis* (Hook.) Noot. from Fiji and the Austral Islands. A third variety, var. *pyxidata* (Cav.) Noot., occurs in Australia (Queensland and New South Wales).

18. *Davallia trichomanoides* Blume

Davallia trichomanoides Blume, Enum. Pl. Javae (1828) 238; Copel., Fern Fl. Philipp. (1958) 172; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 361; Noot., Blumea 39 (1994) 206. — Type: *Blume s.n.* (L sh 908.332-946 holo), Java.

Davallia stenomera Kunze, Bot. Zeitung (Berlin) 6 (1848) 216. — Type: *Zollinger 359* (L).

Davallia fructuosa H. Christ in Warb., Monsunia 1 (1900) 86. — Type: *Warburg* (n.v.), Java.

Davallia barbata Alderw., Bull. Jard. Bot. Buitenzorg II, 2 (1913) 7. — *Davallia subdissecta* Alderw., Bull. Jard. Bot. Buitenzorg II, 23 (1916) 11, nom. illeg. — *Davallia trichomanoides* Blume forma *barbata* (Alderw.) Backer & Posth., Varenfl. Java (1939) 101. — Type: *Hallier 671* (BO holo; P), Java.

Davallia koordersii Alderw., Bull. Jard. Bot. Buitenzorg II, 1 (1911) 5. — Type: *Koorders 19387* (BO lecto; L), Java, Idjen.

Davallia subdissecta Alderw. var. *elegantior* Alderw., Bull. Jard. Bot. Buitenzorg II, 28 (1918) 17. — Type: *Backer 23827* (BO holo), Java, Mt Sanggaboewana.

Davallia subdissecta Alderw. var. *subgenuina* Alderw., Bull. Jard. Bot. Buitenzorg III, 2 (1920) 140. — Type: *Lörzing 5925* (BO holo; K, L), Sumatra, Karo Plateau.

a. var. *trichomanoides*

Rhizome without the scales 3–8 mm diam., not white waxy. Scales brown or red-brown, with pale border from base to apex or not, flat and nearly acicular, narrowed abruptly from a broad base or above the much broader base evenly narrowed towards the apex, often curling backward or appressed to rhizome, usually crisped, margins recurved, not bearing multiseptate hairs, with marginal setae at least in distal part or toothed, peltate, 4–8 by 1–1.5 mm. *Stipes* pale, adaxially grooved, 4.5–20 cm long, glabrous or with few scales. *Lamina* compound, tripinnate or quadripinnate towards the base and in the middle part, deltoid and broadest towards the base, glabrous, 10–35 by 9–25 cm.

Longest petiolules 1–6 mm long. Pinnae deltoid, longest 5–19 by 3–12 cm. Pinnules of at least the larger pinnae anadromous, narrowly ovate, longest 2–7 by 1–3 cm. Ultimate leaflets linear oblong or narrowly ovate, lobed almost to the midrib. Ultimate segments 5–27 by 2–6 mm. Upper ridge at the junction of the costa and pinna-rachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes simple or forked, not reaching the margin. False veins present, rarely absent. *Sori* separate, frequently single on a segment at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1.2–2 by 0.5–1 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina generally extending into a tooth at both sides of a sorus or only at the outside of a sorus.

Distribution — Continental Asia: India (Kerala, Darjeeling, Assam and eastern Himalayas), Nepal, Sikkim, Burma, N & C Thailand, China (Yunnan, Shantung, Shanghai), Korea, Japan common from Ryukyu in the south to Honshu in the north, Vietnam (Annam, Lang Bian, Tonkin); *Malesia*: Sumatra, Peninsular Malaysia, Java, Lesser Sunda Islands, Sulawesi (C, N, SW), Moluccas (Buru, Seram), New Guinea.

Habitat & Ecology — Epiphytic and epilithic on different kinds of rock, mostly in wet places, sometimes on dry, exposed places. Altitude 100–3500 m.

b. var. *lorrainii* (Hance) Holttum

Davallia trichomanoides Blume var. *lorrainii* (Hance) Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 361; Noot., Blumea 39 (1994) 207. — *Davallia lorrainii* Hance, Ann. Sci. Nat. Bot. 5 (1866) 254. — Type: *Lorrain 1732* (BM), Malaya, Penang.

Scales nearly black with highly contrasting white setae, 4–8 by 1.2–2 mm. Indusium 1–1.5 mm long, 1 mm broad.

Distribution — Continental Asia: India (Kerala), Thailand, Cambodia, Vietnam; *Malesia*: Sumatra (Aceh, Westcoast, Eastcoast), Peninsular Malaysia (Kedah, Penang, Selangor, Negri Sembilan), Java? (1 coll.), Borneo (Sabah, E Kalimantan), Philippines (Luzon, Bohol, Uma, Mindanao), C Sulawesi.

Habitat & Ecology — Epiphytic or epilithic, mostly in wet places but sometimes in exposed, dry places and savanna. Altitude 100–1800 m.

19. *Davallia wagneriana* Copel.

Davallia wagneriana Copel., Publ. Bur. Sci. Govt. Lab. Philipp. 28 (1905) 54; Fern Fl. Philipp. (1958) 172; Noot., Blumea 39 (1994) 208. — Type: *Copeland 1300* (P), Mindanao.

Rhizome without the scales 2–6 mm diam., white waxy under the scales. Scales brown, red-brown, or nearly black, without pale border, narrowed evenly towards the apex, not or seldom curling backward, bearing (woolly) multiseptate hairs at least when young, peltate, 6–8 by 1.5–2 mm. *Stipes* dark brown, adaxially grooved, 8–26 cm long, glabrous or with few scales. *Lamina* compound, bipinnate or pinnate with pinnatifid lobes towards the base and in the middle part, deltoid and broadest towards the base or elongate, glabrous, 10–44 by 5–20 cm, leaf not or slightly dimorphic (but pinnulae of fertile leaves very narrow). Longest petiolules 1–4 mm long.

Pinnae linear-triangular (curved upwards). Longest pinnae 4–13 by 1.5–3 cm. Pinnules of at least the larger pinnae anadromous. Pinnules or pinna lobes linear oblong. Longest pinnules 10–15 by 2–3 mm. Ultimate leaflets linear oblong, only shallowly lobed. Upper ridge at junction of costa and pinna-rachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate, reaching the margin. False veins present or not. *Sori* separate, borne several on a segment at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide or about as wide as long, 1 by 0.5–1 mm. Indusium lips or upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not. Lamina generally extending into a tooth only at the outside of a sorus.

Distribution — *Malesia*: Sumatra, Borneo (Sarawak, E Kalimantan), Philippines (Luzon, Panay, Mindanao, Negros, Leyte), N Sulawesi, Moluccas (Seram).

Habitat & Ecology — Epiphyte in deep shadow (only few times recorded). Altitude 450–1600 m.

Section *Scyphularia*

Davallia sect. *Scyphularia* (Fée) Noot., *Blumea* 39 (1994) 208. — *Scyphularia* Fée — *Parasorus* Alderw.

For a more detailed synonymy, see under the genus.

This section is characterised by a combination of characters not occurring in the type section. The rhizome scales are acicular, the leaves simple or imparipinnate (leaves or leaflets about linear), and the indusia are pouch-shaped or (in *D. undulata*) connate into a coenosorus.

20. *Davallia pentaphylla* Blume

Davallia pentaphylla Blume, Enum. Pl. Javae (1828) 232; Noot., *Blumea* 39 (1994) 209. — *Stenolobus pentaphyllus* (Blume) C. Presl, Epim. Bot. (1851) 99. — *Scyphularia pentaphylla* (Blume) Fée, Mém. Foug. 5. Gen. Fil. (1852) 325, t. 26B, f. 1. — Type: *Blume s.n.* (L sh 908.332-859 holo; K), Java, Bantam.

Davallia pentaphylla Blume var. *incisa* Rosenst., *Hedwigia* 56 (1915) 351. — Type: *Bamler 105* (P), Papua New Guinea, Wareo.

Scyphularia sinusora Copel., Philipp. J. Sc. 34 (1927) 255, t. 5. — Type: *Copland King 183* (n.v.), Papua New Guinea, Goodenough Bay.

Scyphularia dorsalis Copel., Univ. Calif. Publ. Bot. 12 (1931) 401. — Type: *Bamler 34* (UC; K photo), Papua New Guinea, Sattelberg.

Rhizome without the scales 2–4 mm diam., not white waxy. Scales nearly black with pale border quickly diminishing or disappearing towards the apex, distinctly acicular, often curling backward, bearing multiseptate hairs at least when young, peltate, 6–10 mm long. *Stipes* dark brown, adaxially grooved, 2–17 cm long, glabrous or with few scales. *Lamina* imparipinnate, leaflets entire or nearly so, occasionally lobed at the base or once branched (pairs of leaflets 2, occasionally 3 or 4), glabrous. Leaflets entire or nearly so, sometimes with some basal lobes. Sterile terminal leaflet 2.5–16 by 13–25 mm. Lateral leaflets 2.5–12 by 0.8–2.5 cm. Margin flat or nearly so, distinctly crenulate to dentate at least towards the apex. Petiolules 0–4 mm long. Leaflets of fertile

leaves entire or nearly so, sometimes with some basal lobes. Fertile terminal leaflet 8–19 by 0.7–1.5 cm. Lateral leaflets 4–14 by 0.4–1.2 cm. Margins distinctly crenulate to dentate at least towards the apex. Longest petiolules of the fertile leaves 0–4 mm long. Pinnae narrowly ovate or linear (narrowly). Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes parallel, once or twice branched from the base, reaching the margin. False veins not present. *Sori* separate (sometimes nearly connate, in a band along the margin) at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1.5–2.5 by 0.75–2 mm, upper margin not elongated, truncate or slightly rounded, separated from to even with lamina margin.

Distribution — *Malesia*: Sumatra (Mt Kerinci, Bengkulu), Bangka, throughout Java, Lesser Sunda Islands (Bali, Flores, Sumbawa), Borneo (Sarawak, E & S Kalimantan), Sulawesi (N, C & SW), Moluccas (Ternate, Seram), New Guinea; Pacific: Bougainville, Solomon Is., New Hebrides, Fiji.

Habitat & Ecology — Epiphytic or epilithic on different kinds of rock, rarely terrestrial. Altitude 150–3200 m, but rarely at lower altitudes.

21. *Davallia seramensis* M. Kato

Davallia seramensis M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 14 (1989) 223; Noot., Blumea 39 (1994) 210. — Type: *Kato, Ueda & Mahjar C-1276* (TI holotype; BO, L), Ceram.

Rhizome without the scales 1–2 mm diam., white waxy. Scales nearly black, with pale border quickly diminishing or disappearing towards the apex, distinctly acicular, often curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 3–5 mm long. *Stipes* 1–1.5 cm apart, dark brown, not grooved, 3–7 cm long, glabrous or with few scales. *Lamina* simple, entire to pinnatilobed, glabrous, 8–13 by 0.6–1.5 cm, leaf not or slightly dimorphous. Leaves entire or nearly so, sometimes with some basal lobes, linear. Margin flat or nearly so, not distinctly crenulate even towards the apex. Fertile leaves entire or nearly so, sometimes with some basal lobes, linear. Margins not distinctly crenulate even towards the apex. Veins in sterile leaves parallel, once or twice branched from the base, reaching the margin. False veins not present. *Sori* separate, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, about as wide as long, c. 1 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not.

Distribution — *Malesia*: Sulawesi (Minahasa, Mt Soputan), Moluccas (Seram), New Guinea (Irian Jaya, Mt Badurti).

Habitat & Ecology — Epiphyte. Altitude 0–1200 m.

22. *Davallia triphylla* Hook.

Davallia triphylla Hook., Sp. Fil. (1845) 162, t. 46a; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 357; Noot., Blumea 39 (1994) 210. — *Stenolobus triphyllus* (Hook.) C. Presl, Epim. Bot. (1851) 99. — *Scyphularia triphylla* (Hook.) Fée, Mém. Foug. 5. Gen. Filic. (1852) 324. — Type: *Cuming 366* (K holotype; P), Singapore.

Scyphularia simplicifolia Copel., Philipp. J. Sc., Bot. 7 (1912) 64. — *Davallia simplicifolia* (Copel.) C. Chr., Index Filic. Suppl. (1913) 23. — Type: *Brooks 133* (BM), Sarawak, Mt Santubong.

Rhizome without the scales 2–5 mm diam., not white waxy. Scales nearly black, with pale border quickly diminishing or disappearing towards the apex, distinctly acicular, appressed to rhizome, not crisped, bearing multiseptate hairs at least when young, peltate, 5 mm long. *Stipes* dark brown, adaxially grooved, 2–8 cm long, glabrous or with few scales. *Lamina* imparipinnate, leaflets entire or nearly so, occasionally lobed at the base or once branched, or simple, entire to pinnatilobed, glabrous. Leaflets entire or nearly so, sometimes with some basal lobes. Sterile terminal leaflet or simple leaf 9–35 by 1–4 cm. Lateral leaflets 6–9 by 0.6–2.5 cm. Margin recurved or revolute, distinctly crenulate to dentate at least towards the apex. Pinnae narrowly ovate. Leaflets of fertile leaves entire or nearly so, sometimes with some basal lobes, or pinnatifid. Fertile terminal leaflet or simple leaf 8–28 by 1–4.5 cm. Lateral leaflets 4–8 by 0.7–2 cm. Margins distinctly crenulate to dentate at least towards the apex or not. Pinnae narrowly ovate or linear. Veins in sterile leaflets parallel, once or twice branched from the base, reaching the margin. False veins not present. *Sori* separate at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 2 by 0.5–0.75 mm, upper margin not elongated, truncate or slightly rounded, extending to lamina margin or not, or protruding beyond lamina margin.

Distribution — *Malesia*: Sumatra (Aceh, Riau, Indragiri, Jambi), Peninsular Malaysia (Perak, Selangor, Trengganu, Negri Sembilan, Johore), Singapore, Borneo (Sarawak, Sabah, E Kalimantan).

23. *Davallia undulata* (Alderw.) Noot.

Davallia undulata (Alderw.) Noot., *Blumea* 39 (1994) 211. — *Parasorus undulatus* Alderw., *Bull. Jard. Bot. Buitenzorg* III, 4 (1922) 317. — Type: *Beguin 1321* (BO holo; L), Moluccas, Ternate.

Rhizome without the scales 1.5–2 mm diam., not white waxy. Scales nearly black, without pale border, distinctly acicular, often curling backward, not bearing multiseptate hairs, lacking marginal setae or teeth or those rare, peltate, 3–5 mm long. *Stipes* dark brown, not grooved, 2.5–5 cm long (winged towards the apex), glabrous or with few scales. *Lamina* simple, entire, glabrous, 6–17 by 1 cm, leaf not or slightly dimorphous. Fertile leaf 7–20 mm broad. Veins in sterile leaves parallel, once or twice branched from the base. *Sori* and indusia connate, elongate along leaf margins.

Distribution — *Malesia*: Moluccas (Halmahera and Ternate, Mt Sembilan).

Habitat & Ecology — Epiphyte. Altitude 600 m.

DAVALLODES

Davallodes Copel., *Philipp. J. Sc., Bot.* 3 (1908) 33; *Fern Fl. Philipp.* (1958) 168; Noot., *Blumea* 37 (1992) 176. — *Microlepia* sect. *Davallodes* Copel., *Publ. Bur. Sci. Govt. Lab. Philipp.* 28 (1905) 55. — Type species: *Davallodes hirsutum* (C. Presl) Copel.

Rhizome bearing only scales. Roots restricted to the ventral side of the lateral buds. Scales yellowish, light brown, or nearly black, with pale border extending from base to apex, quickly diminishing or disappearing into the apex, or without pale border, not bearing multicellular hairs, lacking marginal setae (or with marginal setae in *D. novo-*

guineense), entire, smooth on adaxial surface, peltate, or basifixed with a cordate base with greatly overlapping lobes (in *D. viscidulum* and *D. urceolatum*). *Stipe* articulated on phyllopodia, grooved, bearing hairs and/or scales when young. *Lamina* compound, pinnate with strongly dissected pinnae or bipinnate towards the base and in the middle part, elongate and narrowed towards the base, bearing multicellular hairs, not or slightly dimorphous. Hairs between veins on each surface present or not. Pinnae linear-triangular. Pinnulae or pinna lobes linear oblong. Ultimate segments obtuse, without a dominant tooth. Pinnules of at least the larger pinnae catadromous. Rachis adaxially raised. Leaf axes, at least rachises, hairy. Veins in ultimate lobes simple or forked, not reaching the margin. False veins wanting. *Sori* indusiate, separate, frequently single on a segment, facing midveins at the forking point of veins or (rarely) at the bending point. Indusium scaly, attached at the narrow, cordate base only, or attached at the base and only part way up at the sides, or also attached along the sides, pouch-shaped, or attached at the broad base and hardly or not at the sides, or very small, inconspicuous. — **Fig. 2.**

Distribution — Six species restricted to S Thailand (one species) and *Malesia*.

KEY TO THE SPECIES

- 1a. Indusium scaly, attached at the narrow, cordate base only 2
- b. Indusium attached at the base and only part of the sides or also attached along the sides and pouch-shaped, or only attached at broad base and hardly or not at sides, or very small and inconspicuous 3
- 2a. Leaves usually bipinnate. Indusium semicircular or oblong; scales basifixed with cordate base and greatly overlapping lobes, longest petiolules 1 mm long, longest pinnules or pinna lobes 15–32 by 3–10 mm, indusium longer than wide or about as wide as long **6. D. viscidulum**
- b. Leaves usually pinnate with strongly dissected pinnae. Indusium reniform, wider than long; scales peltate; longest petiolules 2–3 mm long; longest pinnules or pinna lobes 12–17 by 3–5 mm **1. D. borneense**
- 3a. Indusium attached at the broad base and hardly or not at sides, semicircular, wider than long; scales with pale border from base to apex or this quickly diminishing or disappearing towards the apex, flat and nearly acicular ... **3. D. novoguineense**
- b. Indusium attached at the base and only part of the sides or also attached along the sides, pouch-shaped, or very small, inconspicuous, more or less triangular to rhomboid or oblong, longer than wide or about as wide as long; scales without pale border, distinctly acicular 4
- 4a. Indusium very small, inconspicuous **2. D. hirsutum**
- b. Indusium conspicuous, attached at the base and only part of the sides or also attached along the sides, pouch-shaped 5
- 5a. Scales basifixed with cordate base and much overlapping lobes **5. D. urceolatum**
- b. Scales peltate 6
- 6a. Indusium longer than wide with free pointed upper half, at least as long as basal half **4. D. seramense**
- b. Indusium longer than wide or about as wide as long, without free pointed upper half **2. D. hirsutum**

1. *Davallodes borneense* (Hook.) Copel.

Davallodes borneense (Hook.) Copel., Sarawak Mus. J. 2 (1917) 336; Noot., Blumea 37 (1992) 178. — *Lastrea borneensis* Hook., Icon. Pl. (1854) t. 993. — *Nephrodium borneensis* (Hook.) Hook., Sp. Fil. 4 (1862) 111. — *Leucostegia borneensis* (Hook.) J. Sm., Ferns Brit. For. (1866) 77. — *Davallia borneensis* (Hook.) Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286. — *Dryopteris borneensis* (Hook.) Kuntze, Revis. Gen. Pl. 2 (1891) 812. — Type: *Lobb s.n.* (K), Borneo 1857.

Davallia nephrodioides Baker, J. Linn. Soc. Bot. 24 (1887) 257. — *Humata nephrodioides* (Baker) Alderw., Malayan Ferns (1909) 295. — *Leucostegia nephrodioides* (Baker) Copel., Sarawak Mus. J. 2 (1917) 336. — *Davallodes nephrodioides* (Hook.) Copel., Philipp. J. Sc. 34 (1927) 249. — Type: *Hose s.n.* (K holo; BM, P), Sarawak.

Rhizome without the scales 5–10 mm diam. Scales nearly black, with pale border abruptly diminishing or disappearing towards the apex or without pale border, distinctly acicular or flat and nearly acicular, lacking marginal setae or setae rare, peltate, 5–13 mm long. *Stipes* 9–30 cm long. *Lamina* compound, pinnate with strongly dissected pinnae towards the base and in the middle part, bearing multicellular hairs, 16–75 by 9–26 cm, lower pinnae not very small, about one third to about as long as longest ones. Hairs between veins on either surface absent or nearly so. Longest petiolules 2–3 mm long. Longest pinnae 5–14 by 1.5–4 cm. Longest pinnules or pinna lobes 12–17 by 3–5 mm. Hairs on leaf axes 0.5 mm long. *Indusium* scaly, attached at the narrow, cordate base only, reniform, wider than long, 0.3–0.5 by 0.75–1 mm.

Distribution — S Thailand; *Malesia*: Borneo (E & S Kalimantan, Sarawak, Sabah).

Habitat & Ecology — On tree trunks in wet places, along rivers etc. in deep shade. From sea level to 1500 m altitude.

2. *Davallodes hirsutum* (C. Presl) Copel.

Davallodes hirsutum (J. Sm. ex C. Presl) Copel., Philipp. J. Sc., Bot. 3 (1908) 33; Fern Fl. Philipp. (1958) 169; Noot., Blumea 37 (1992) 179. — [*Leucostegia hirsuta* J. Sm., J. Bot. 3 (1841) 416, nom. nud.] — *Microlepia hirsuta* C. Presl, Epim. Bot. (1851) 97. — *Davallia ciliata* Hook., Sp. Fil. (1845) 184, t. 60A. — *Microlepia ciliata* (Hook.) Copel., Publ. Bur. Sci. Govt. Lab. Philipp. 28 (1905) 55. — Type: *Cuming 174* (iso BM, K, L), Luzon.

Davallodes grammatosorum Copel., Philipp. J. Sc., Bot. 3 (1908) 34, t. 6; Fern Fl. Philipp. (1958) 169. — *Microlepia grammatosora* (Copel.) C. Chr., Index Filic. Suppl. (1913) 50. — Type: *Copeland 1724* (iso BM, P), Mindanao.

Davallodes gymnocarpum Copel., Philipp. J. Sc., Bot. 3 (1908) 34, t. 5; Fern Fl. Philipp. (1958) 170. — *Microlepia gymnocarpa* (Copel.) C. Chr., Index Filic. Suppl. (1913) 50. — *Leucostegia gymnocarpa* (Copel.) C. Chr., Index Filic. Suppl. 3 (1934) 120. — Type: *Copeland 2075* (n.v., *Copeland 196* in K is probably part of the type), Negros.

Davallodes laxum Copel., Philipp. J. Sc. 34 (1927) 246, t. 3, f. 1; Fern Fl. Philipp. (1958) 169. — Type: *Merrill 957* (n.v.), Luzon.

Davallodes congestum Copel., Philipp. J. Sc. 34 (1927) 247, t. 3, f. 2; Fern Fl. Philipp. (1958) 169. — Type: *Copeland 1481* (iso BM, TI), Mindanao.

Davallodes dolichosorum Copel., Philipp. J. Sc. 34 (1927) 248. — Type: *Schlechter 17857* (iso K, L), Papua New Guinea.

Davallodes burbridgei C. Chr. & Holttum, Gard. Bull. Str. Settlm. 7 (1934) 230. — Type: *Burbridge s.n.* (K holo; A), Borneo, Mt Kinabalu.

Rhizome without the scales 3–7 mm diam. Scales nearly black, without pale border, distinctly acicular, lacking marginal setae or setae rare, peltate, 10–20 mm long. *Stipes* 2–20 cm long. *Lamina* compound, pinnate with strongly dissected pinnae, or bipinnate



Fig. 2. *Davallodes hirsutum* (C. Presl) Copel. (LeRoy Topping 1767).

towards the base and in the middle part, bearing multicellular hairs, 20–100 by 6–28 cm, gradually narrowed towards its base and with the lower pinnae very small, or (rarely) the lower pinnae not very small, about one third to about as long as the longest ones. Hairs between veins on each surface present (rarely absent). Longest petiolules 0–3 mm long. Longest pinnae 4–14 by 1.2–4 cm. Longest pinnules or pinna lobes 6–20 by 2–6 mm. Hairs on leaf axes 0.5–1.5 mm long. *Indusium* attached at base and only part of the sides, or also attached along the sides, pouch-shaped, or very small and inconspicuous, ± triangular to rhomboid or oblong, longer than wide or about as wide as long (often with ciliate free upper part), 0.2–0.8 by 0.2–0.6 mm. *Indusium* lips truncate, extending to lamina margin or not, or triangular, not reaching lamina margin. — **Fig. 2.**

Distribution — *Malesia*: Sumatra (Eastcoast), Borneo (W & E Kalimantan, Sabah), Philippines (Luzon, Mindanao, Negros, Samar), Sulawesi, New Guinea (Irian Jaya: Manokwari; Papua New Guinea incl. Bismarck Arch., Bougainville, Goodenough I.).

Habitat & Ecology — Epiphytic, also in secondary and open forest. Altitude 350–1900 m.

3. *Davallodes novoguineense* (Rosenst.) Copel.

Davallodes novoguineense (Rosenst.) Copel., Univ. Calif. Publ. Bot. 12 (1931) 400; Noot., Blumea 37 (1992) 182. — *Davallia viscidula* Mett. var. *novoguineensis* Rosenst. in Fedde, Rep. 12 (1913) 526.

— Type: *Keysser 195* (BM iso), Papua New Guinea, Sattelberg.

Davallia borneensis auct. non Hook.: Rosenst. in Fedde, Rep. 10 (1912) 324.

Rhizome without the scales 5–7 mm diam. Scales light brown or nearly black, with pale border from base to apex, or this quickly diminishing or disappearing towards the apex (often at the base with a broad pale border tapering upwards), flat and nearly acicular, with marginal setae at least in the distal part, peltate, 3–8 mm long. *Stipes* 9–26 cm long. *Lamina* compound, pinnate with strongly dissected pinnae, or (usually) bipinnate towards base and in the middle part, bearing multicellular hairs, 25–55 by 9–38 cm, lower pinnae not very small, about one third to about as long as the longest. Hairs between veins on either surface present, or not. Longest petiolules 1–2.5 mm long. Longest pinnae 6–19 by 2–6 cm. Longest pinnules or pinna lobes 20–40 by 6–16 mm. Hairs on leaf axes 0.2–0.4 mm long. *Indusium* attached at the broad base and hardly or not at the sides, semicircular (sometimes ciliate), wider than long, 0.3 by 0.5–0.8 mm.

Distribution — *Malesia*: New Guinea (Irian Jaya: Lake Habbema; Papua New Guinea).

Habitat & Ecology — Terrestrial or a low epiphyte. Altitude 1500–3000 m.

Note — Some collections are intermediate with *Davallodes hirsutum*, especially in the shape of the *indusium*.

4. *Davallodes seramense* M. Kato

Davallodes seramense M. Kato, J. Fac. Sci. Univ. Tokyo, sect. 3, Bot. 14 (1989) 222; Noot., Blumea 37 (1992) 183. — Type: *Kato c. s. C-5624* (TI holo; BO, K, KYO, L, MO), Ceram.

Rhizome without the scales 5–15 mm diam. Scales nearly black, without pale border, distinctly acicular, lacking marginal setae or setae rare, peltate, 6–10 mm long. *Stipes*

14–25 cm long. *Lamina* compound, bipinnate towards the base and in the middle part, bearing multicellular hairs, 30–66 by 14–28 cm, the lower pinnae not very small, about one third to about as long as the longest. Hairs between veins on either surface present. Longest petiolules 1–1.5 mm long. Longest pinnae 10–17 by 2.4–3.5 cm. Longest pinnules or pinna lobes 12–20 by 3–5 mm, pinnatipartite. Hairs on leaf axes 0.1–1 mm long. *Indusium* attached at the base and only along part of the sides, pouch-shaped, free for the ciliate elongate upper half, oblong, longer than wide, 1 mm by 0.3 mm; indusium lips triangular.

Distribution — *Malesia*: Moluccas (C Seram, rather common).

Habitat & Ecology — Epiphytic or epilithic in deep shade. Altitude 500–1300 m.

Note — This species is very near *Davallodes hirsutum*, it only differs from the collections with pouch-shaped indusia of the latter species in the longer free distal halves of the indusium.

5. *Davallodes urceolatum* Copel.

Davallodes urceolatum Copel., Philipp. J. Sc. 34 (1927) 248; Noot., Blumea 37 (1992) 183. — Type: Yates 526 (A iso), Sumatra.

Rhizome without the scales 4–7 mm diam. Scales nearly black without pale border, distinctly acicular, with marginal setae at least in distal part or lacking marginal setae, basifixed with cordate base and greatly overlapping basal lobes, 15 mm long. *Stipes* dark brown, 5–19 cm long. *Lamina* compound, bipinnate towards the base and in the middle part, bearing multicellular hairs, 20–80 by 8–12 cm, lower pinnae not very small, about one third to about as long as the longest. Hairs between veins on both surfaces. Longest petiolules 1 mm long. Longest pinnae 5–9 by 1.5–2.5 cm. Longest pinnules or pinna lobes 8–15 by 3–5 mm. Hairs on leaf axes 0.2–1 mm long. *Indusium* also attached along the sides, pouch-shaped, oblong, longer than wide or about as wide as long, 0.7 by 0.5–0.6 mm. Indusium lips truncate, extending as far as lamina margin or not.

Distribution — *Malesia*: Sumatra (Karo plateau near Berastagi).

6. *Davallodes viscidulum* (Mett.) Alderw.

Davallodes viscidulum (Mett.) Alderw., Bull. Jard. Bot. Buitenzorg II, 4 (1911) 6; Backer & Posth., Varenfl. Java (1939) 102; Noot., Blumea 37 (1992) 184. — *Davallia viscidula* Mett. in Kuhn, Linnaea 36 (1869) 145. — *Humata viscidula* (Mett.) Alderw., Malayan Ferns (1908) 294. — Type: Blume 1451 (L holo), Java.

Davallia kingii Baker in Hook., Icon. Pl. (1886) t. 1622. — *Davallodes kingii* (Baker) Copel., Philipp. J. Sc., Bot. 6 (1911) 147. — Type: *Herb. Forbes, King 657* (K holo; BM, L), Java, Mt Waringin.

Rhizome without the scales 5–7 mm diam. Scales nearly black, with pale border from base to apex, or with pale border quickly diminishing or disappearing towards the apex, flat and nearly acicular, lacking marginal setae or setae rare, basifixed with cordate base and greatly overlapping basal lobes, 6–12 mm long. *Stipes* 6–22 cm long. *Lamina* compound, pinnate with strongly dissected pinnae, or (usually) bipinnate towards the base and in the middle part, bearing multicellular hairs, 26–70 by 16–45 cm; lower pinnae not very small, usually about one third to about as long as longest; hairs between veins on either surface absent or nearly so (a few scattered hairs present). Longest peti-

olules 1 mm long. Longest pinnae 8–18 by 2.5–6 cm. Longest pinnules or pinna lobes 15–32 by 3–10 mm. Hairs on leaf axes 0.2–0.5 mm long. *Indusium* scaly, attached at the narrow, cordate base only, semicircular or oblong, longer than wide, or rarely about as wide as long, 0.5–1 by 0.3–0.5 mm.

Distribution — Continental Asia: Thailand (Trang, Khao Chong); *Malesia*: Sumatra (Aceh, Westcoast, Mt Kerinci, Bengkulu), Java, Bali, SW Sulawesi.

Habitat & Ecology — Epiphytic and terrestrial, also in dry places. Altitude 100–2000 m, mostly at higher altitudes.

LEUCOSTEGIA

Leucostegia C. Presl, Tent. Pterid. (1836) 94, pl. 4, f. 11; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1955) 351; Copel., Fern Fl. Philipp. (1958) 167; Noot., Blumea 37 (1992) 184. — Type species: *Leucostegia immersa* C. Presl.

Rhizome bearing scales and hairs or only scales. Roots borne on all sides of the rhizome. Scales glabrous or bearing multiseptate hairs, basifixed, base not cordate. *Stipes* articulated at the base to phyllopodia, grooved or not, glabrous. *Lamina* compound, tripinnate or quadripinnate (rarely in small plants bipinnate) towards the base and in the middle part not dimorphous, glabrous (sometimes minute hairs present), entire to pinnatifid (often fertile leaves more strongly dissected). Pinnae deltoid or narrowly triangular. Pinnules of at least the larger pinnae anadromous. Pinnules or pinna lobes narrowly ovate. Rachis adaxially grooved. Leaf axes glabrous (sometimes a few minute hairs present). Veins in ultimate lobes simple, not reaching the margin. False veins not present. *Sori* indusiate, frequently single on a segment, terminal on the veins. *Indusium* scaly, either attached at the narrow, cordate base only, or attached at the base and only part of the sides. — **Fig. 3.**

Distribution — Continental Asia: India, Sikkim, Bhutan, Burma, N Thailand, Indochina, Cambodia, China (Yunnan), Taiwan; in *Malesia*: Malay Peninsula, Sumatra, Java, Lesser Sunda Islands, Borneo, Philippines, Sulawesi, Moluccas, New Guinea; Pacific Islands.

KEY TO THE SPECIES

- 1a. *Indusium* scaly, attached at the narrow, cordate base only (sometimes the base rather broad), semicircular, 1–1.5 by 1–2 mm **1. *L. immersa***
 b. *Indusium* attached at the base and part of the sides, oblong, 1.2–1.5 by 1 mm **2. *L. pallida***

1. *Leucostegia immersa* C. Presl

Leucostegia immersa C. Presl, Tent. Pterid. (1836) 95, t. 4, f. 11; Copel., Fern Fl. Philipp. (1958) 167; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 352; Noot., Blumea 37 (1992) 185. — *Davallia immersa* Wall. [Cat. (1828) n. 256, nom. nud.] ex Hook., Sp. Fil. (1846) 156. — *Acrophorus immersus* (C. Presl) T. Moore, Proc. Linn. Soc. London 2 (1854) 286. — *Humata immersa* (C. Presl) Mett., Fil. Hort. Bot. Lips. (1856) 102; Copel., Publ. Bur. Sci. Govt. Lab. Philipp. 28 (1905) 51. — Type: *Wallich 256* (K, L, P), Nepal, 1821.



Fig. 3. *Leucostegia immersa* C. Presl (Iwatsuki c. s. P 539).

Davallia immersa Hook. var. *amplissima* H. Christ, Verh. Naturf. Ges. Basel 2 (1897) 6. — Type: *Sarasin 144* (n.v.), Celebes.

Humata immersa (C. Presl) Mett. var. *nana* Copel., Philipp. J. Sc. 1, Suppl. (1906) 147. — Type: *Copeland 1830* (P), Luzon.

Humata dryopteridifrons Hayata, Ic. Pl. Form. 4, 6 (1916) 159. — *Davallia dryopteridifrons* Hayata, Ic. Pl. Form. 4, 6 (1916) 159, nomen. — Type: *Faurie 615* (TI holo; L, P, TNS), Taiwan, Arisan. *Cystopteris dimidiata* Decne. in Jacquem., Voy. Inde 4 (1844) 177, t. 178. — Type: *Jacquemont s.n.* (P).

Rhizome without the scales 2–15 mm diam. Scales narrowed evenly towards the apex, very hairy on the inner base at least when older. **Stipes** pale or dark brown, 8–115 cm long or more. **Lamina** tripinnate or quadripinnate (or bipinnate in small plants) towards the base and in the middle part, deltoid and broadest towards the base, glabrous (sometimes minute hairs present), 6–120 cm long or more. Longest petiolules 8–40 mm long. Ultimate leaflets rhomboid, only shallowly lobed. Ultimate segments (lobes) 0.5–3 mm long. **Indusium** scaly, attached at the narrow, cordate base only (sometimes the base rather broad), semicircular, 1–1.5 by 1–2 mm. — **Fig. 3.**

Distribution — Continental Asia: India, Sikkim, Bhutan, Burma, N Thailand, Indochina, Cambodia, China (Yunnan), Taiwan; in *Malesia*: Sumatra (Kerinci), Peninsular Malaysia (Perak), Java (1 coll. without locality), Lesser Sunda Islands (Bali, Timor), Borneo (Sabah: Mt Kinabalu; Sarawak: Baram Distr.; E Kalimantan), Philippines (Luzon, Mindanao, Mindoro, Leyte, Negros, Samar), Sulawesi, Moluccas (Seram, Ternate, Tidore), New Guinea (Irian Jaya: Idenburg River; Papua New Guinea: Morobe Prov.).

Habitat & Ecology — Epiphytic and terrestrial. Altitude 1000–2300 m, rarely lower.

2. *Leucostegia pallida* (Mett.) Copel.

Leucostegia pallida (Mett.) Copel., Philipp. J. Sc. 34 (1927) 252; Fern Fl. Philipp. (1958) 168; Holttum, Revis. Fl. Malaya, ed. 2, 2 (1966) 353; Noot., Blumea 37 (1992) 186. — *Davallia pallida* Mett. in Kuhn, Linnaea 36 (1869) 142. — Type: *Cuming 93* (n.v.), New Hebrides.

Davallia mooreana Masters in T. Moore, Gard. Chron. (1869) 964, fig. — Type: *Hort. Veitch 1869* (K).

Rhizome without the scales 2–15 mm diam. Scales evenly narrowed towards the apex. **Stipes** pale or dark brown, 8–115 cm long. **Lamina** tripinnate or quadripinnate (or bipinnate in small plants) towards the base and in the middle part, deltoid and broadest towards the base, glabrous (sometimes minute hairs present), 6–120 cm long or more. Longest petiolules 8–40 mm long. Ultimate leaflets rhomboid, only shallowly lobed. Ultimate segments (lobes) 0.5–3 mm long. **Indusium** attached at the base and part of the sides, oblong, 1.2–1.5 mm long, 1 mm broad.

Distribution — Continental Asia: Burma (Chin Hills); *Malesia*: Sumatra (mountains), Peninsular Malaysia (Perak: Maxwell's Hill & Larut), Borneo (Sarawak, E Kalimantan), Philippines (Luzon: Mt Bulusan), Moluccas (Seram), New Guinea (Irian Jaya, Papua New Guinea and New Ireland); Pacific: New Hebrides, Solomon Is., Bougainville, Samoa, Tahiti, Carolines, Ponape.

Habitat & Ecology — Epiphytic, epilithic, or terrestrial, sometimes in riverbed. On various kinds of substrate, also on limestone. Altitude 0–2100 m.

Note — The rhizome is glabrous according to Kato [J. Fac. Sc. Univ. Tokyo III, 13 (1985) 553–573]. However, in some plants I observed hairs on the rhizome, the scales themselves being glabrous.