

The Hymenophyllaceae of the Pacific Area. 1. *Hymenophyllum* subgenus *Hymenophyllum*

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Abstract Pacific species of *Hymenophyllum* subgen. *Hymenophyllum* redefined by Ebihara *et al.* (2006) are enumerated. In total, 26 species are recorded in the studied area, and synonymies, information of the type material, distribution and cytological records of each species are provided.

Key words: Australasia, filmy fern, Hymenophyllaceae, *Hymenophyllum*, Oceania, Pteridophyta.

Hymenophyllaceae or filmy ferns are one of the basal lineages of leptosporangiate ferns (Hasebe *et al.*, 1995; Pryer *et al.*, 2004) comprising about 600 species (Iwatsuki, 1990), mostly distributed in the tropics and temperate regions. In the Pacific area, this family has a great diversity, including many isolated lineages or monotypic ‘genera’, and occupies a high ratio in species number of the pteridophyte flora (e. g., 15% in New Zealand, Brownsey and Smith-Dodsworth, 1989). Local floristic works have already been published in most of the countries or regions of this area. However, none of them overviews the family’s distribution throughout the Pacific. This study covers the Mariana Islands, Caroline Islands, Bougainville Island (offshore Papua New Guinea), Solomon Islands, Vanuatu (former New Hebrides), New Caledonia, Fiji, Samoa, Tonga, Cook Islands, Austral Islands, Society Islands, Marquesas Islands, Australia, New Zealand and Hawaiian Islands (Fig. 1). The authors are also preparing a treatment of the family for Flora Malesiana. Upon completion of the two publications, most of the Old World species can easily be compared and identified. Since filmy ferns usually prefer moist and shady habitats, desert areas (e. g., Australian continent except for the Great Dividing Range) and coral islands (e. g., Marshall Islands, Naulu, Tuvalu and Kiribati)

completely lack their distribution. After a long controversy on the classification of Hymenophyllaceae, Ebihara *et al.* (2006) advocated a new system principally maintaining natural groups recognized by molecular phylogeny, which is adopted here. See Ebihara *et al.* (2006) for synonymy of each higher taxon.

Genus 1. *Hymenophyllum* Sm., Mém. Acad. Sci. Turin 5: 418 (1793).

The largest genus of the Hymenophyllaceae, comprising about half (ca. 250 spp.) of the species of the family. Nine of the ten subgenera are present in the Pacific area, usually epiphytic on tree trunks in foggy mountain forest in the tropics, or growing in lowland mossy forest at southern high latitudes.

Subgenus 1. *Hymenophyllum*

The largest subgenus of the genus. Frond margins are serrate in most of the species.

1. ***Hymenophyllum peltatum*** (Poir.) Desv., Mém. Soc. Linn. Paris 6: 333 (1827). [Fig. 2] — *Trichomanes peltatum* Poir. in Lamarck and Poir., Encycl. 8: 76 (1808).

Type: Bory de St.-Vincent s. n. (“Ile-de-France”=Mauritius) [P*] (*=n. v., examined by Tindale, 1963).

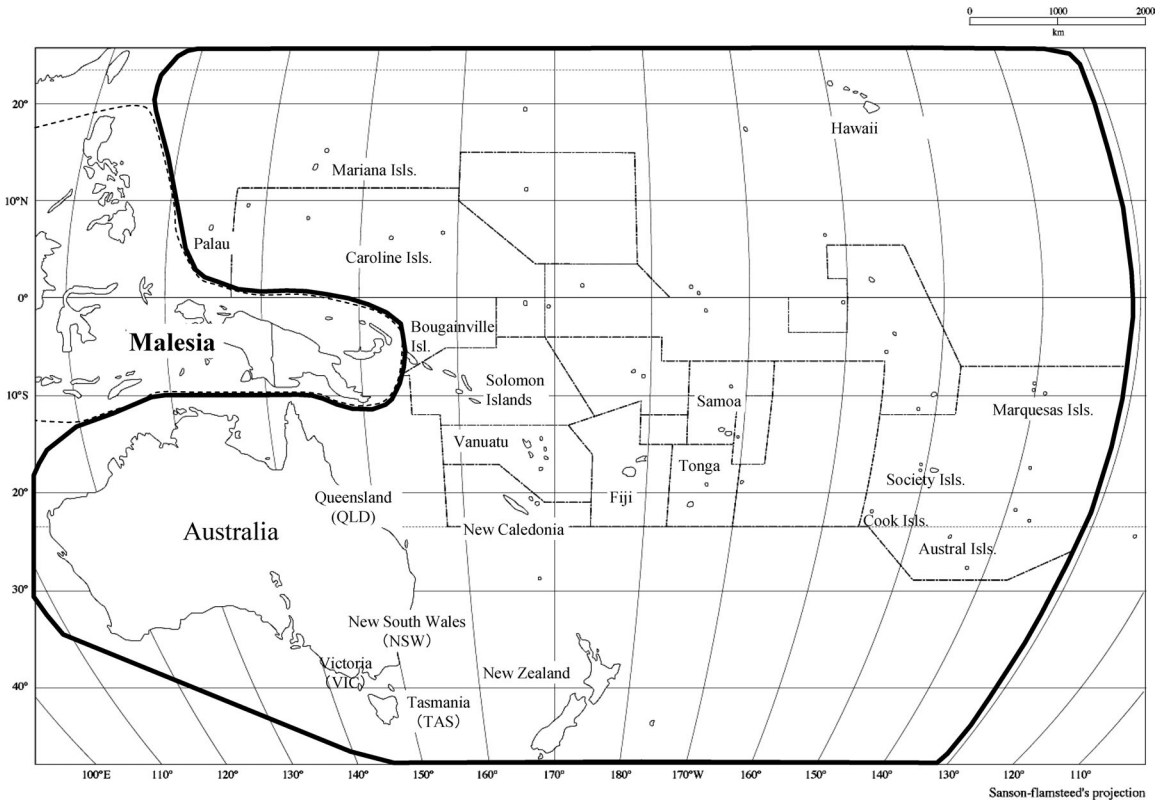


Fig. 1. The areas covered in this study (surrounded by the bold line) and the Malesia region (surrounded by the broken line).

Hymenophyllum falklandicum auct. non Baker: Puy et Orchard, Fl. Australia **50**: 539 (1993).

Hymenophyllum unilaterale auct. non Bory ex Willd.: Dobbie, N. Z. Ferns ed. 2, 58 (1921).

Distribution: Australia (QLD, NSW, VIC and TAS), New Zealand, Macquarie Isl.; Malesia (Borneo and Papua New Guinea), Mascarene Isl., South Africa, Southern Chile.

Chromosome number: $n=11$ (Brownlie, 1958, New Zealand; Laws in Tindale and Roy, 2002, Australia); $2n=22$ (Tindale, 1963, Australia).

Note: This is the only filmy fern species shared by New Zealand and the Malesia region, and our molecular data show that materials from Tasmania and Malaysia are actually close (Ebihara, unpublished). In Malesia, this species is apparently rare and known only from Mt. Kinabalu, Malaysia (Parris, 1992) and Mt. Victoria, Papua New Guinea (Iwatsuki, unpublished), both locat-

ed at high altitudes. It should be noted that its chromosome number $n=11$ is the smallest of all pteridophytes.

2. ***Hymenophyllum multifidum*** (G. Forst.) Sw., J. Bot. (Schrader) **1800**(2): 102, 1801.

[Fig. 3]

— *Trichomanes multifidum* G. Forst., Fl. Ins. Austr. 85 (1786) — *Davallia multifidum* (G. Forst.) A. Spreng., J. Bot. (Schrader) **1799**(2): 271 (1800) — *Meringium multifidum* (G. Forst.) — Copel., Philipp. J. Sci. **67**: 44 (1938).

Type: Forster Herb. 304 (Dusky Bay?, New Zealand) [BM*] (see Nicolson and Fosberg, 2004).

Hymenophyllum truncatum Colenso, Trans. and Proc. New Zealand Inst. **23**: 390 (1891) — *Hymenophyllum multifidum* (G. Forst.) Sw. var. *truncatum* (Colenso) Domin, Biblioth. Bot.

Table 1. Distribution of the species of *Hymenophyllum* subgen. *Hymenophyllum* in the Pacific area.

	Caroline Isls.	Solomon Isls.	Vanuatu	New Caledonia	Fiji	Samoa	Marquesas Isls.	Australia	New Zealand
<i>Hymenophyllum</i>									
subgen. <i>Hymenophyllum</i>									
1								+	+
2			+					+	+
3				+					+
4								++	
5									++
6								++	
7								++	
8								+	+
9									++
10								+	+
11								++	
12				++					
13					+	+			
14		+	+		+		+		
15	+								
16	+	+	+	+	+				+
17						++			
18				++					
19				++					
20			+		+				
21		+							
22					+				
23									++
24		+							
25									++
26				++					

+: present; ++: endemic.

20(85): 25 (1913).

Type: Colenso s. n., 1887–1890 (south of Dannevirke, Waipawa, New Zealand) [K].

Hymenophyllum alpinum Colenso, Trans. Proc. New Zealand Inst. **31**: 263 (1899) — *Hymenophyllum multifidum* (G. Forst.) Sw. var *alpinum* (Colenso) Domin, Biblioth. Bot. **20(85): 25 (1913).**

Syntypes: Hill s. n., 1845–1852; Colenso s. n., 1898 (Ruahine Mountain-range, New Zealand) (n. v.).

Hymenophyllum oligocarpum Colenso, Trans. Proc. New Zealand Inst. **31**: 264 (1899) — *Hymenophyllum multifidum* (G. Forst.) Sw. var *oligocarpum* (Colenso) Domin, Biblioth. Bot. **20(85): 25 (1913).**

Type: Hill s. n., 1898 (Waikaremoana, Hawke's Bay, New Zealand) (n. v.).

Hymenophyllum howense Brownlie, Pacific

Sci. **14**: 244 (1960).

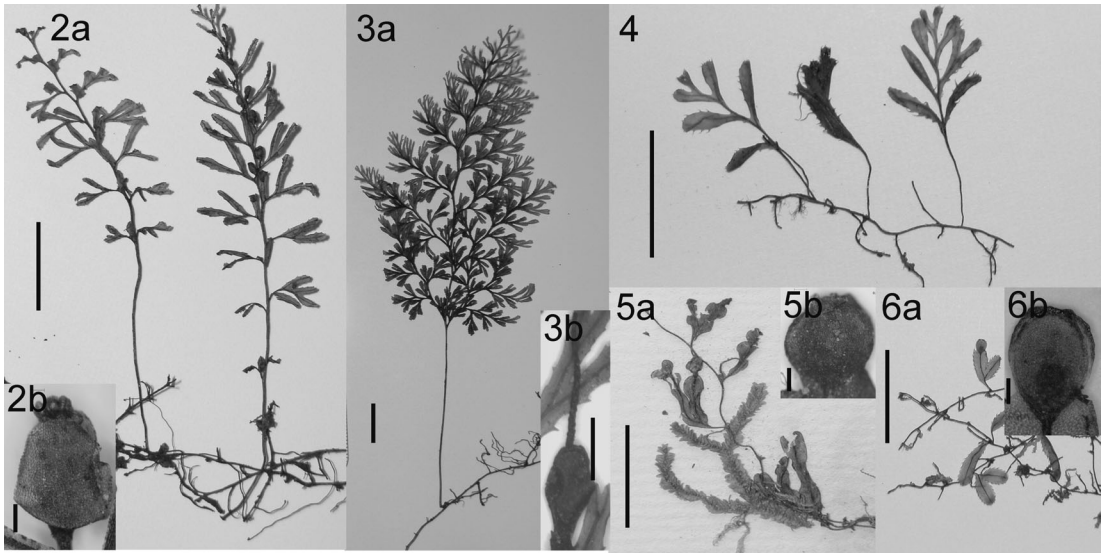
Type: Moore 4, Nov. 1877 (Mt. Gower, Lord Howe Isl., Australia) [K].

Distribution: Vanuatu, Fiji, Lord Howe Isl., New Zealand.

Chromosome number: n=26 (Brownlie, 1954, New Zealand; Braithwaite, 1975, Vanuatu and Fiji).

Note: Recent studies have shown that the distribution of this species is wider northward than recognized before. "Mountain form" which has curled fronds was reported from New Zealand (Holloway, 1923). The material we examined as "Mountain form" showed no obvious difference from a usual one in *rbcL* sequence (Ebihara, unpublished).

3. *Hymenophyllum minimum* A. Rich., Fl. N. Zel. 91, t. 14, fig. 2 (1832). [Fig. 4]



Figs. 2–6. 2a–b. *Hymenophyllum peltatum* (Ebihara 000223-011 [TNS]). 3a–b. *H. multifidum* (a. Ebihara 011217-06 [TNS]; b. Ebihara 011217-10 [TNS]). 4. *H. minimum* (Ebihara 011225-03 [TNS]). 5a–b. *H. marginatum* (a. Fraser s. n. [K, holotype]; b. Ebihara 010915-03 [TI]). 6a–b. *H. armstrongii* (Ebihara 011219-07 [TI]). Scale = 1 cm for whole leaves, and 0.4 mm for sori.

— *Meringium minimum* (A. Rich.) Copel., Philipp. J. Sci. **73**: 457 (1941).

Type: ? (“Nova-Zeelandia”=New Zealand) (n. v.).

Hymenophyllum pygmaeum Colenso, Trans. Proc. New Zealand Inst. **13**: 376 (1881).

Syntypes: Enys s. n. (Bealey, New Zealand); Collector unknown (Preservation Inlet; Resolution Island; Lyttelton Harbour; south of Hokitika, New Zealand) (n. v.).

Hymenophyllum pumilio Rosenst., Repert. Spec. Nov. Regni Veg. **9**: 72 (1910).

Type: Franc 1433, 1910 (Mt. Tao, New Caledonia) [isotypes in BM MICH* NY* P UC* US*].

Distribution: New Caledonia (one collection), New Zealand.

Chromosome number: $n=26$ (Lovis in Dawson *et al.*, 2000, New Zealand).

Note: This species has very minute fronds with spinulose teeth of involucre. In New Zealand, it appears to be a dwarf form of *H. revolutum*, but it is clearly distinguishable by its glabrous rachis and stipe. This species usually grows on the coast where sometimes spindrift

comes, which is an exceptional habitat for Hymenophyllaceae.

The identity of *H. pygmaeum* was carefully studied by Lovis (1982) who concluded that the species is a synonym of *H. minimum*.

Hymenophyllum pumilio, once collected in northern New Caledonia, has little obvious difference from *H. minimum*.

4. ***Hymenophyllum marginatum*** Hook. et Grev., Icon. Filic. **2**: t. 34 (1831). [Fig. 5]

— *Pachyloma marginata* (Hook. et Grev.) Bosch, Verslagen Meded. Afd. Natuurk. Kon. Akad. Wetensch. **11**: 318 (1861) — *Craspedophyllum marginatum* (Hook. et Grev.) Copel., Philipp. J. Sci. **67**: 27 (1938).

Type: Fraser s. n. (Port Jackson, “Nova Hollandia”=Australia) [K; E* L NSW].

Distribution: Australia (QLD, NSW and TAS).

Chromosome number: $2n=24$ (Tindale and Roy 2002, Australia).

Note: This and the following species have fronds bordered by black cells, and were formerly separated as a genus *Craspedophyllum*.

5. **Hymenophyllum armstrongii** (Baker) Kirk, Trans. Proc. New Zealand Inst. **10**: t. 21, fig. A (1878). [Fig. 6]

— *Trichomanes armstrongii* Baker in Hook. et Baker, Syn. Fil. 452 (1868) — *Hymenophyllum cheesemanni* Baker var. *armstrongii* (Baker) Cheesem., Man. N. Z. Fl. 938 (1906) — *Microtrichomanes armstrongii* (Baker) Copel., Philipp. J. Sci. **73**: 457 (1941) — *Craspedophyllum armstrongii* (Baker) Rae ex Copel., Gen. Fil. 33 (1947).

Type: Armstrong s. n., 1868 (New Zealand) [K].

Hymenophyllum cheesemanni Baker, Hooker's Icon. Pl. **12**: 30, t. 1132 (1873) — *Craspedophyllum cheesemanni* (Baker) N. A. Wakef., Victorian Naturalist **66**: 59 (1949).

Type: Cheesemann s. n., Oct. 1871 (Titiranga range, New Zealand) [K; GH* US].

Hymenophyllum melanocheilos Colenso, Trans. Proc. New Zealand Inst. **17**: 255 (1885).

Type: Rowson s. n., 1884 (Whangaroa, Mongonui, New Zealand) [K; W*].

Distribution: New Zealand (endemic).

Chromosome number: $n=13$ (Lovis in Bronwsey, 1991, New Zealand).

Note: In contrast to Australian *H. marginatum* whose frond margin are entire, New Zealand *H. armstrongii* shows spinulose-serrate margins.

6. **Hymenophyllum pumilum** C. Moore in Hook. et Baker, Syn. Fil. (ed. 2) 464 (1874).

[Fig. 7]

Type: Moore s. n. (Mill Creek, Mt. Tomah, NSW, Australia) [K].

Hymenophyllum moorei Baker in Hook. et Baker, Syn. Fil. (ed. 2) 464 (1874).

Type: Moore 5, Dec. 1871 (Lord Howe Isl.) [K; BM US].

Hymenophyllum minimum auct. non A.Rich.: Benth., Fl. Austral. 706 (1878).

Distribution: Australia (NSW and Lord Howe Isl.)

Chromosome number: $n=34$ (Tindale and Roy, 2002, Australia).

Note: The Lord Howe Island form *H. moorei*,

having larger sori, needs further comparison with continental plants.

7. **Hymenophyllum gracilescens** Domin, Biblioth. Bot. **20**(85): 23, t. 1, figs. 2–3 (1913).

[Fig. 8]

Type: Domin Iter Austral. 37, Dec. 1909 (Mt. Bellenden Ker, QLD, Australia) [PR*] (examined by Croxall, 1975).

Distribution: Australia (QLD) (endemic).

Chromosome number: unknown.

Note: This species, known from limited collections at Mt. Bellenden Ker range, resembles *H. peltatum*, but is distinguished by the crenulate lips of the involucre.

8. **Hymenophyllum bivalve** (G. Forst.) Sw., J. Bot. (Schrader) **1800**(2): 99 (1801). [Fig. 9]

— *Trichomanes bivalve* G. Forst., Fl. Ins. Austr. 84 (1786)—*Sphaerocionium bivalve* (G. Forst.) C. Presl, Hymen. 33 (1843)—*Meringium bivalve* (G. Forst.) Copel., Philipp. J. Sci. 67: 44 (1938).

Lectotype: Forster Herb. 301 (New Zealand ?) [BM]—designated by Tindale (1963).

Hymenophyllum spathulatum Colenso, Tasman. J. Nat. Sci. **2**: 184 (1846).

Type: Colenso s. n., Dec. 1841 (Shores of Waikare Lake, New Zealand) (n. v.).

Hymenophyllum pyriforme Bosch, Ned. Kruidk. Arch. **5**(3): 173 (1863).

Type: D'Urville s. n. (New Zealand) [B*] (see Tindale, 1963).

Distribution: Australia (QLD and NSW), New Zealand.

Chromosome number: $n=22$ (Brownlie 1958, New Zealand; Vessey and Barlow 1963, Australia); $n=21+1\beta$ (Tindale and Roy 2002, Australia).

9. **Hymenophyllum revolutum** Colenso, Tasman. J. Nat. Sci. **2**: 186 (1846). [Fig. 10]

Type: Colenso 276, Dec. 1841 (shores of Waikare Lake, New Zealand) [K].

Hymenophyllum zeelandicum Bosch, Ned. Kruidk. Arch. **5**(3): 175 (1863).

Syntypes: J. D. Hooker s. n. (Bay of Islands,



Figs. 7–14. 7. *Hymenophyllum pumilum* (Moore s. n. [K, holotype]). 8. *H. gracilescens* (Dockrill 1083 [K]). 9a–b. *H. bivalve* (Ebihara 011216-05 [TNS]. 10a–b. *H. revolutum* (a. Colenso 276 [K, holotype]; b. Ebihara 011222-11 [TNS]). 11a–b. *H. cupressiforme* (Ebihara 010905-01 [TNS]). 12. *H. baileyanum* (Bailey s. n. [K, isotype]). 13a–b. *H. deplanchei* (a. Deplanche 174 [K, isotype]; b. Ebihara 001228-05 [TI]). 14a–b. *H. feejeense* (a. Wilkes Expedition 10 [K, isotype]; b. Kokubo Fiji-5 [TNS]). Scale=1 cm for whole leaves, and 0.4 mm for sori.

New Zealand) [K]; Wilkes s. n. (New Zealand) (n.v.).

Hymenophyllum pusillum Colenso, Trans. Proc. New Zealand Inst. **12**: 365 (1880).

Syntypes: Colenso ? (Te Ranga mountain, head-waters of Waikare, Bay of Islands, 1836; head of the Wairarapa Valley, 1852; west slopes of Ruahine mountain range, near the head-waters of the River Manawatu, 1878–1880, New Zealand) (n. v.).

Hymenophyllum tunbridgense auct. non (L.) Sm.: Cheesem., Man. N. Z. Fl. 13 (1925).

Hymenophyllum unilaterale auct. non Bory: Dobbie, N. Z. Ferns 2nd. ed., 1921.

Distribution: New Zealand (endemic).

Chromosome number: $n=22$ (Brownlie 1958, New Zealand).

Note: The difference between this and the subsequent species is delicate. See the note for *H. cupressiforme*.

10. **Hymenophyllum cupressiforme** Labill., Nov. Holl. Pl. **2**: 102, t. 250, fig. 2 (1806).

[Fig. 11]

Hymenophyllum tunbridgense (L.) Sm. var. *cupressiforme* (Labill.) Hook.f., Fl. N. Zel. **2**: 11, 1852.

Type: Labillardiere s. n. (“Nova Hollandia et Terra Diemen”=Tasmania, Australia) [FI*] (examined by Tindale, 1963).

Hymenophyllum antarcticum C. Presl, Hymen. **31**, 50, t. 12A (1843).

Syntypes: Sieber syn. fil. no. 134 (Port Jackson, “Nova Hollandia”=Australia) [isotypes in E* L* W*]; Sieber flora mixia no. 254 [PR*] (see Croxall, 1975).

Hymenophyllum tunbridgense auct. non (L.) Sm.: R.Br., Prodr. Fl. Nov. Holl. **159** (1810); Benth., Fl. Austral. **7**: 706 (1878); Domin, Biblioth. Bot. **20**(85): 22 (1913).

Distribution: Australia (QLD, NSW, VIC and TAS), New Zealand.

Chromosome number: $n=21$ (Tindale and Roy 2002); $2n=42$ (Tindale and Roy, 2002); $n=22$ (Vessey and Barlow, 1963; Laws in Tindale and Roy, 2002); $n=ca. 24$ (Tindale, 1963). All mate-

rials are from Australia.

Note: This is one of the commonest *Hymenophyllum* in southern Australia, and apparently rare in New Zealand (Parris and Croxall, 1972). The difference between *H. revolutum* and this is not so clear as noted by Parris and Croxall (1972); the distinguishing character of *H. cupressiforme* is entirely winged rachis, but occasionally *H. revolutum* has wings toward the base of the rachis (personal observation). Whether the New Zealand distribution of this species is true or not still needs further investigation.

The species name *Hymenophyllum antarcticum* was given to the form that has near-entire lips of involucre. The denticulation of the lips of *H. cupressiforme* tends to be less distinct than that of *H. revolutum*.

11. **Hymenophyllum baileyana** Domin, Biblioth. Bot. **20**(85): 21, t. 2, figs. 2–3 (1913).

[Fig. 12]

Hymenophyllum trichomanoides F. M. Bailey, Rep. Govt. Sci. Exp. Bellenden-Ker **74** (1889), non Bosch — *Hemicyatheon baileyana* (Domin) Copel., Philipp. J. Sci. **67**: 28 (1938).

Type: Bailey s. n., 1889 (summit of Mt. Bellenden Ker, QLD, Australia) [BRI*; BM MEL* P] (see Croxall, 1975).

Distribution: Australia (QLD) (endemic).

Chromosome number: unknown.

Note: *Hymenophyllum baileyana* and the following species were separated as the genus *Hemicyatheon* by Copeland (1938), typified by this species. Copeland (1937) thought *Hemicyatheon* occupied an intermediate position between his *Mecodium* and *Meringium*, the two largest groups in *Hymenophyllum* s. l. Recent studies (Hennequin *et al.*, 2003; 2006) suggested both *Mecodium* and *Meringium* to be polyphyletic, and the two “*Hemicyatheon*” species to form a probable monophyletic group (Hennequin *et al.*, 2006).

12. **Hymenophyllum deplanchei** Mett. ex Kuhn, Linnaea **35**: 393 (1868).

[Fig. 13]

Hemicyatheon deplanchei (Mett. ex Kuhn)

Copel., Philipp. J. Sci. **67**: 28 (1938).

Type: Deplanche 174 (Mt. Mou, New Caledonia) [B*; K P] (see Brownlie, 1969).

Distribution: New Caledonia (endemic).

Chromosome number: $n = \text{ca. } 22$ (Braithwaite, unpublished, New Caledonia).

Note: Though the chromosome number of this species has not been published, Braithwaite labeled " $n = \text{ca. } 22$ " in his specimen deposited in K.

13. **Hymenophyllum feejeense** Brack., U.S. Expl. Exped., Filic. 16: 266, t. 37, fig. 2 (1854).

[Fig. 14]

— *Meringium feejeense* (Brack.) Copel., Philipp. J. Sci. **67**: 44 (1938).

Type: Wilkes Expedition 10, 1838–1842 (Ovolau, "Feejee Islands"=Fiji) [US; GH* K].

Distribution: Fiji and Samoa.

Chromosome number: $n = 22$ (Braithwaite, 1975, Fiji).

Note: This species resembles *H. bivalve* except for its dentate lips.

14. **Hymenophyllum serrulatum** (C. Presl) C. Chr., Index Filic. 367 (1905). [Fig. 15]

— *Didymoglossum serrulatum* C. Presl, Hymen. 23, 48 (1843) — *Leptocionium serrulatum* (C. Presl) Bosch, Ned. Kruidk. Arch. **4**: 383 (1859).

Type: Cuming 221 (Luzon, Philippines) [PRC; B BM GH K L P].

Leptocionium violaceum Meyen ex Bosch, Ned. Kruidk. Arch. **5**(3): 147 (1863) — *Meringium meyenianum* C. Presl, Hymen. 24, t. 8 (1843) — *Trichomanes meyenianum* (C. Presl) Bosch, Ned. Kruidk. Arch. **4**: 379 (1859) — *Hymenophyllum meyenianum* (C. Presl) Copel., Philipp. J. Sci. **64**: 25, t. 8 (1937).

Type: Cuming 264 (Philippines) [PRC; B BM GH K L P].

Hymenophyllum bougainvillense Jeff W. Grimes, Kew Bull. **34**: 233, t. 12 (1978).

Type: Schodde and Craven 3846A, 15 Aug 1964 (alt. 700 m, Maide River Gorge, lower slopes of L. Loloru crater, c. 24 km north of Buin, Bougainville Isl.) [CANB*].

Distribution: Solomon Isl., Vanuatu, Fiji, Mar-

quesas Isls.; Malay Peninsular, Malesia.

Chromosome number: $n = 21$ (Braithwaite, 1969, Solomon Isl.; Braithwaite, 1975, Vanuatu).

Note: This is a typical Malesian element. In New Guinea this and its allies (e. g., plants named "*H. rubellum*", "*H. firmum*" and "*H. ovatum*") still remain an issue of great complexity. In Solomon Islands, under a heavy influence from New Guinea, there are various forms provisionally assigned to this species. In Vanuatu and Fiji, the southernmost part of the range, the form is uniform and resembles typical *H. serrulatum*.

15. **Hymenophyllum edentulum** (Bosch) C. Chr., Index Filic. 360 (1905).

— *Leptocionium edentulum* Bosch, Ned. Kruidk. Arch. **5**(3): 148 (1863) — *Meringium edentulum* (Bosch) Copel., Philipp. J. Sci. **67**: 41 (1938).

Syntypes: Griffith s. n. (Assam) [K; BO L]; Lobb s. n. (Sarawak) [K; L].

Trichomanes denticulatum Baker, Syn. Fil. 82 (1867), non Hoult., nec Poir — *Hymenophyllum bakeri* Copel., Sarawak Mus. J. **2**: 309 (1917) — *Meringium bakeri* (Copel.) Copel., Philipp. J. Sci. **67**: 42 (1938).

Type: Motley s. n. (Borneo) [K].

Distribution: Micronesia; Malesia, South Asia.

Chromosome number: unknown.

Note: The difference between this and *H. serrulatum* is delicate—*H. edentulum* has less hairy axis, more slender rachis and less thickened internal cell walls than *H. serrulatum*.

16. **Hymenophyllum holochilum** (Bosch) C. Chr., Index Filic. 362 (1905). [Fig. 16]

— *Didymoglossum holochilum* Bosch, Pl. Jungh. **1**: 561 (1853) — *Leptocionium holochilum* (Bosch) Bosch, Ned. Kruidk. Arch. **4**: 383 (1859) — *Meringium holochilum* (Bosch) Copel., Philipp. J. Sci. **67**: 41 (1938).

Type: Hasskarl s. n. (Java) [L].

Hymenophyllum affine Brack., U.S. Expl. Exped., Filic. **16**: 265 t. 37 fig. 1 (1854).

Type: Wilkes (Brackenridge) 7 (Ovolau, "Feejee Islands"=Fiji) [US*].

Hymenophyllum subdimidiatum Rosesnt., Meded. Rijks-Herb. **11**: 1 (1912).

Type: Schlechter 14799, 24 Sept. 1902 (mountains near Yaouhe, New Caledonia) [isotypes in BM K L MICH* NSW P].

Hymenophyllum tunbridgense (L.) Sm. var. *exsertum* F. M. Bailey, Rep. Govt. Sci. Exp. Bellenden-Ker 74 (1889) — *Hymenophyllum praetervisum* Christ var. *australiense* Domin., Biblioth. Bot. **20**(85): 21 (1913).

Type: Bailey s. n. (Mt. Bellenden Ker, QLD, Australia) [BRI*; BM K NSW*] (see Croxall, 1975).

Hymenophyllum babinda Watts, Proc. Linn. Soc. New South Wales **39**: 766, t. 87, fig. 5 (1915).

Type: Watts s.n., July 1913 (Frenchman's Creek, near Babinda, QLD, Australia) [NSW; BRI* MEL?*].

Hymenophyllum pseudotunbridgense Watts, Proc. Linn. Soc. New South Wales **39**: 766 (1915).

Type: Waller [P1813], 1908 (Evelyn Scrub, QLD, Australia) [NSW; BRI?* MEL?*].

Hymenophyllum viride Rosesnt. ex Copel., Philipp. J. Sci. **64**: 59, t. 24 (1937).

Type: same as the type of *H. subdimidiatum*.

Hymenophyllum macgillivrayi auct. non (Baker) Copel.: Copel., Philipp. J. Sci. **64**: 60, t. 25 (1937).

Distribution: Micronesia, Solomon Isl., Vanuatu, New Caledonia, Fiji, Australia (QLD); Taiwan, Thailand, Malesia.

Chromosome number: n=21 (Braithwaite 1975, Vanuatu).

Note: As already pointed out by Ebihara *et al.* (2003), *H. subdimidiatum* and *H. pseudotunbridgense*, which have been applied to collections from Oceania, fall in the range of *H. holochilum*.

17. *Hymenophyllum praetervisum* Christ, Bot. Jahrb. Syst. **23**: 338 (1896). [Fig. 17]

Meringium praetervisum (Christ) Copel., Philipp. J. Sci. **67**: 44 (1938).

Syntypes: Reinecke s. n. (Savaii, Samoa); Reinecke 63 (Upolu, Samoa) [isotype in K]; Rei-

necke 88 (Upolu, Samoa) [isotype in BM K P]; Reinecke 88a (Upolu, Samoa) (n. v.); Reinecke 88b (Tutuila, Samoa) [isotype in K]; Reinecke 88c (Manua-Inseln, Samoa)

Distribution: Samoa (endemic?).

Chromosome number: unknown.

Note: This is apparently similar to widespread *H. holochilum*, but characterized by terminal sori and receptacles often exerted from involucre.

18. *Hymenophyllum dimidiatum* Mett. ex Kuhn, Linnaea **35**: 393 (1868). [Fig. 18]

Meringium dimidiatum (Mett.) Copel., Philipp. J. Sci. **67**: 43 (1938).

Type: Deplanche s.n. (New Caledonia) [B*] (see Brownlie, 1969).

Hymenophyllum piliferum C. Chr., Vierteljahrsschr. Naturf. Ges. Zurich **70**: 221 (1925).

Type: Franc 1450, 1913 (Baie du sud, New Caledonia) [P; BM K MICH*].

Distribution: New Caledonia (endemic).

Chromosome Number: n=21 (Braithwaite, 1975, New Caledonia).

Note: In New Caledonia, this species resembles *H. holochilum*; both species has 'dimidiate pinna' (i. e., the upper and lower parts of the pinna divide unevenly). But *H. dimidiatum* is easily distinguishable by the serrate lips of the involucre. The incorrect original description "folia...glaberrima,..." has confused subsequent taxonomists; the type collection actually has hairs on the underside of the axis (cf. Brownlie, 1960).

19. *Hymenophyllum rolandi-principis* Rosens., Repert. Spec. Nov. Regni Veg. **9**: 72 (1910). (Fig. 19)

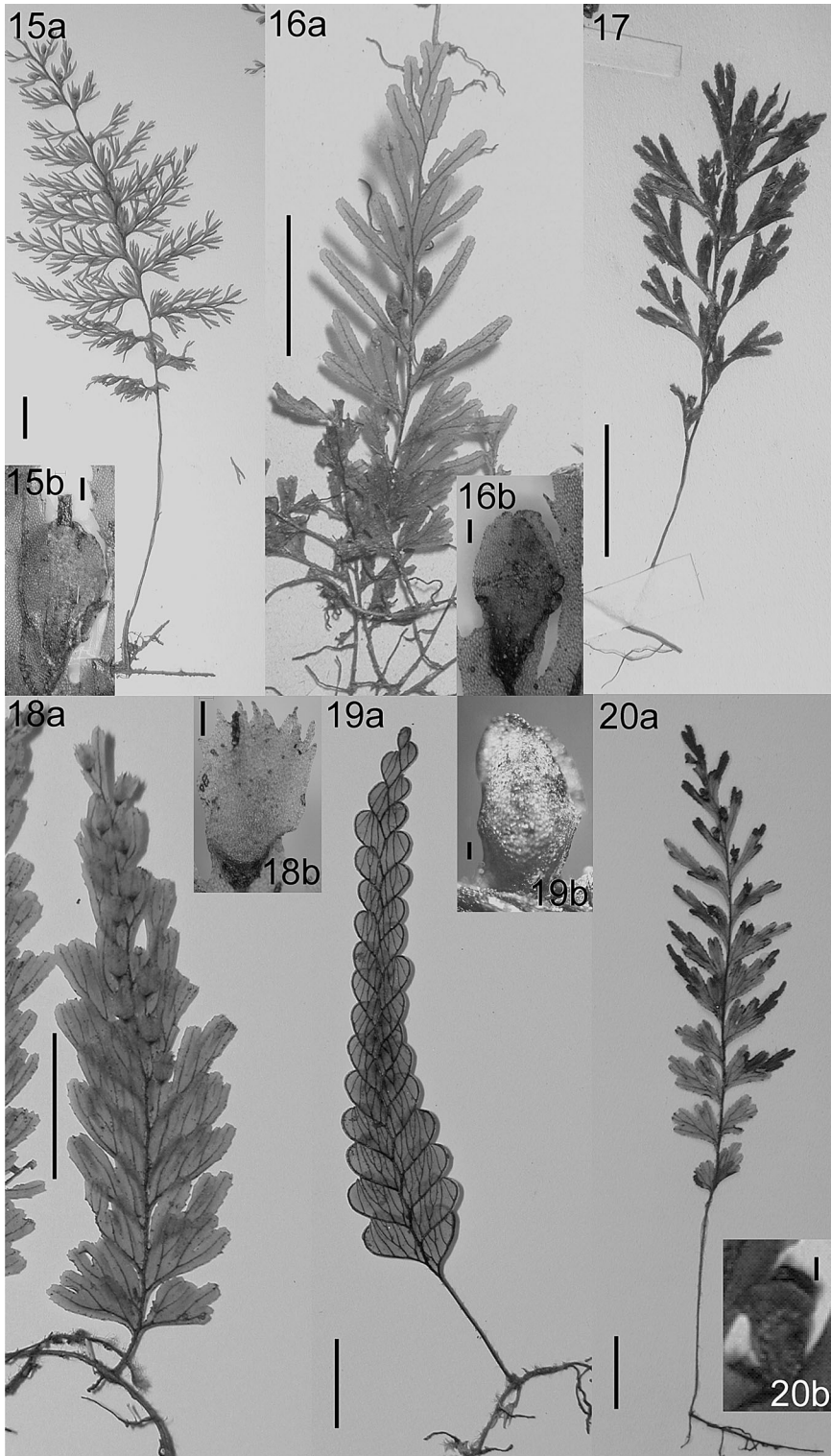
— *Rosenstockia rolandi-principis* (Rosesnt.) Copel., Gen. Fil. 36 (1947).

Type: Franc 1422, Jan. 1910 (Mt. Tao, New Caledonia) [isotypes in P UC* US*].

Distribution: New Caledonia (endemic).

Chromosome number: n=21 (Ebihara *et al.*, 2002, New Caledonia).

Note: Copeland (1947) established the 34th genus *Rosenstockia* for this peculiar plant. The



Figs. 15–20. 15a–b. *Hymenophyllum serrulatum* (a. Braithwaite RSS 4748 [BM]; b. Bernardi 13363 p.p. [K]). 16a–b. *H. holochilum* (a. Balansa 1642 [P]; b. Ebihara 001226-01 [TI]). 17. *H. praetervisum* (Reinecke 88 [K, isosyntype]). 18a–b. *H. dimidiatum* (Ebihara 001229-01 [TI]). 19a–b. *H. rolandi-principis* (Ebihara 001225-11 [TI]). 20a–b. *H. affine* (Braithwaite 691 [K]). Scale=1 cm for whole leaves, and 0.4 mm for sori.

study by Ebihara *et al.* (2002) suggested this is actually a result of drastic morphological specialization from *H. dimidiatum*.

20. **Hymenophyllum macgillivrayi** (Baker) Copel., Philipp. J. Sci. **64**: 60. t. 25 (1937).

[Fig. 20]

— *Trichomanes macgillivrayi* Baker, Ann. Bot. (London) **5**: 195 (1891) — *Meringium macgillivrayi* (Baker) Copel., Philipp. J. Sci. **67**: 44 (1938).

Type: Macgillivray s. n., 1854 (“Feejee Island”=Fiji) [K].

Hymenophyllum affine auct non Brack.: E. Fourn., Ann. Sci. Nat., Bot. V **18**: 264 (1873); Brownlie, Beih. Nova Hedw. **10**: 532 (1977) p.p.; Ebihara, Ann. Tsukuba Bot. Gard. **21**: 9 (2003).

Distribution: Vanuatu, Fiji.

Chromosome Number: n=21 (Braithwaite 1975, Fiji).

Note: There is much confusion concerning the identity of this species. Though Brownlie (1960) once recognized two species (*H. affine* with campanulate lips and *H. pseudotunbridgense* with longer lips) in Fiji, later he reduced them to one species *H. affine* (Brownlie, 1977). The name *H. macgillivrayi* has often been treated as a synonym of *H. affine*, but campanulate involucres of the type material of *H. macgillivrayi* are clearly distinguishable from those of *H. affine*. Consequently, *H. affine* should be a synonym of *H. holochilum*, and the correct name for the plants with campanulate sori is *H. macgillivrayi*.

21. **Hymenophyllum gorgoneum** Copel., Philipp. J. Sci. **64**: 60, t. 26 (1937). [Fig. 21]
— *Meringium gorgoneum* (Copel.) Copel., Philipp. J. Sci. **67**: 44 (1938).

Type: Brass 3304 (Tiratona, Santa Ysabel, Solomon Islands) [PNH* (now lost?); GH MICH].

Distribution: Solomon Islands; New Guinea

Chromosome number: n=21 (Braithwaite, 1969, Solomon Isl.).

22. **Hymenophyllum denticulatum** Sw., J. Bot. (Schrader) **1800**(2): 100 (1801). [Fig. 22]
— *Trichomanes denticulatum* (Sw.) Poir. in Lamarck et Poir., Encycl. **8**: 75 (1808) — *Didymoglossum denticulatum* (Sw.) Hassk., Obs. Bot. **2**: 16 (1857) — *Leptocionium denticulatum* (Sw.) Bosch, Ned. Kruidk. Arch. **4**: 382 (1859) — *Meringium denticulatum* (Sw.) Copel., Philipp. J. Sci. **67**: 42 (1938).

Type: Thunberg s. n. (Java) (n. v.).

Distribution: Fiji; Asia to Malesia.

Chromosome number: unknown.

Note: The *Hymenophyllum denticulatum*—*H. acanthoides* complex is one of the typical Malaysian *Hymenophyllum*. It is somewhat enigmatic that this species was repeatedly collected in Fiji though there is no record from either Solomon Islands or Vanuatu adjacent to Fiji.

23. **Hymenophyllum kerianum** Watts, Proc. Linn. Soc. New South Wales **39**: 767, t. 87, fig. 6 (1915). [Fig. 23]
— *Meringium kerianum* (Watts) Copel., Philipp. J. Sci. **67**: 43 (1938).

Lectotype: Watts s. n. [NSW P1240], July 1913 (Frenchman’s Creek, QLD, Australia) [NSW; BRI*]; designated by Croxall, Austral. J. Bot. **23**: 515 (1975).

Distribution: Australia (QLD) (endemic).

Chromosome number: unknown.

Note: This species is undoubtedly a close relative of *H. denticulatum*, and needs further careful comparison.

24. **Hymenophyllum brassii** C. Chr., Brittonia **2**: 273 (1937). [Fig. 24]
— *Meringium brassii* (C. Chr.) Copel., Philipp. J. Sci. **73**: 463 (1941) — *Myriodon brassii* (C. Chr.) Copel., Gen. Fil. 36 (1947).

Type: Brass 4114, 27 May 1933 (New Guinea) [BM; BO GH MICH].

Hymenophyllum odontophyllum Copel., Philipp. J. Sci. **64**: 73, t. 35 (1937) — *Myriodon odontophyllum* (Copel.) Copel., Philipp. J. Sci. **67**: 47 (1938).

Type: Ledermann 10357 (New Guinea)



Figs. 21–26. 21a–b. *Hymenophyllum gorgoneum* (Braithwaite RSS 4316 [BM]). 22. *H. denticulatum* (Herald 1263 [K]). 23. *H. kerianum* (Watts P1241 [BM, possible syntype]). 24. *H. brassii* (Braithwaite RSS 4415 [K]). 25. *H. walleri* (Croxall and Parris 3247 [K]). 26. *H. francii* (Franc 163 [P; holotype]). Scale=1 cm for whole leaves, and 0.4 mm for sori.

[MICH; B BM].

Distribution: Solomon Isl.; New Guinea.

Chromosome number: $n=21$ (Braithwaite, 1969, Solomon Isl.).

Note: This species is characterized by the less expanding lamina cells, and Copeland (1947) separated it as a distinct genus *Myriodon*, along with the type species *Myriodon odontophyllum* (Copel.) Copel. It is clear that this is a specialized form of a species of “*H. acanthoides* clade” (Ebihara *et al.*, 2002; Hennequin *et al.*, 2006).

25. **Hymenophyllum walleri** Maiden et Betche, Proc. Linn. Soc. New South Wales **35**: 802 (1910). [Fig. 25]

— *Mecodium walleri* (Maiden & Betche) Copel., Philipp. J. Sci. **67**: 21 (1938).

Type: Waller s. n., 1908 (Evelyn Scrub, near Herberton, QLD, Australia) [NSW; BRI* MEL?*] (see Croxall, 1975).

Distribution: Australia (QLD) (endemic).

Chromosome number: unknown.

Note: This species, having entire margins and lips, belonged to *Mecodium* by the definition of Copeland's system (1938). However, since its rachis and stipe underneath are densely covered with multicellular hairs, this species falls into the category of “*Hymenophyllum* sect. *Pseudomecodium*” sensu Iwatsuki (1984), now attributed to subgen. *Hymenophyllum*, the same as *H. exsertum* Wall. ex Hook., *H. oligosorum* Makino and *H. pachydermicum* Ces.

26. **Hymenophyllum francii** (Christ) Ebihara et K.Iwats., Taxon **53**: 945 (2004). [Fig. 26]

— *Trichomanes francii* Christ, Bull. Herb. Boissier II **7**: 648 (1907) — *Microtrichomanes francii* (Christ) Copel., Philipp. J. Sci. **67**: 37 (1938).

Type: Franc 163, Feb. 1906 (Mt. Mou, New Caledonia) [P; B BO NSW NY SING UC US] (see Ebihara *et al.*, 2005).

Trichomanes cuneatum Christ, Bull. Herb. Boissier II **7**: 649 (1907).

Type: Franc 165, July 1906 (Mt. Mou, New Caledonia) [P].

Distribution: New Caledonia (endemic).

Chromosome number: unknown.

Note: This is the only species whose systematic position we could not assume from the morphological characters. Although it was formerly treated as a member of *Microtrichomanes*, its wiry root strongly suggests that it be included in *Hymenophyllum*, contrary to the proposition by Iwatsuki (1975).

Doubtful species

Hymenophyllum lobbii T. Moore ex Bosch, Ned. Kruidk. Arch. **5**(3): 176 (1863).

— *Meringium lobbii* (T. Moore ex Bosch) Copel., Philipp. J. Sci. **67**: 43 (1938).

Note: This dwarf species has been recorded from Queensland only once, but it is quite unnatural for this Bornean species to have an isolated distribution in Australia. It is possibly a mislabeling of the collections by the collector (P. Bostock, personal communication).

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