

TREE-FERNS OF THE GENUS CYATHEA IN JAVA

by

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A full taxonomic study of the genus *Cyathea* has recently been published in Flora Malesiana (Ser. II, vol. 1, part 2, Dec. 1963). In that work the genus is construed in a broad sense, to include *Alsophila* and *Hemitelia* (also *Gymnosphaera* and *Schizocaena* of Copeland's Genera Filicum), the total number of species being 191, and a new subdivision of this comprehensive genus is proposed. The keys in Flora Malesiana, dealing with such a large number of species, are complex, and not very easy to use for local purposes. I have therefore made a simpler key to cover the species of Java only, and hope this will be of service to botanists in Java.

In my opinion, some of the species concerned have not been clearly characterized in earlier publications, and much confusion has resulted. In particular, the species *C. junghuhniana* and *C. raciborskii* (*Hemitelia crenulata*), both common in the forest above Tjibodas, have never been clearly distinguished, and the former has also been confused with *C. latebrosa*, which does not occur in Java. *Cyathea crenulata* and *C. oinops* have also been confused, and *C. oinops* has not always been clearly distinguished from *C. orientalis*, though in fact the indusia of *C. oinops* are of quite different structure. For such reasons, the concepts of species in Flora Malesiana are different from those in former works (of Raciborski, van Alderwerelt van Rosenburg, Backer & Posthumus), references to which are not here given. A full synonymy, with references to these earlier works and to some of what appear to me to be misidentifications, will be found in Flora Malesiana.

In preparing the key, I have not found it possible to use only characters observable with the unaided eye; characters of hairs, scales and indusia need to be distinguished. Indusia are never easy to see clearly without a binocular microscope of magnification 25, but it is possible to see the characters necessary for the key with a hand-lens of magnification 10. I hope that some local worker, having learned to identify the species, will be able to find distinguishing characters which can be seen in the field with the unaided eye. For example, I believe that both *C. orientalis* and *C. crenulata* have the upper part of the trunk clothed with the pendulous

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old fronds, whereas in other species this does not occur; but this needs checking to discover how good a field character it may be. The colour of scales of stipe-bases, and the colour of rachises, of living ferns may also afford good characters; also the size and spacing of the pneumathodes on each side of the stipe (at present known for a few species, and rarely shown by herbarium specimens).

KEY TO THE SPECIES OF CYATHEA IN JAVA

1. Scales at base of stipe firm, glossy, with thinner fragile edges which are often abraded on old fronds.
 2. Indusium present (sometimes almost covered by ripe sporangia).
 3. Lower surface of pinna-rachis closely hairy throughout; indusium a firm disc about as large as base of sorus. 1. *C. javanica*
 3. Lower surface of pinna-rachis not closely hairy throughout.
 4. Indusia at maturity distinctly cup-shaped, cups with smooth rim (sometimes torn when old). 2. *C. orientalis*
 4. Indusia not forming a distinct cup.
 5. Indusia covering sorus almost to maturity, then breaking irregularly.
 6. Indusium very thin, pale, broken parts often lost from old sori; basal stipe-scales dark with pale edges; flat elongate scales not abundant on costae; some bullate scales on costules. 3. *C. crenulata*
 6. Indusium rather firm and dark, breaking but persistent; basal stipe-scales pale; flat elongate scales bearing dark setae abundant on costae; no bullate scales on costules. 4. *C. oinops*
 5. Indusia not covering sorus, attached only on costular side of receptacle and often inconspicuous.
 7. Bullate scales abundant throughout lower surface of costae & costules; pinnules usually less than 6 cm long, abruptly narrowed at apex; pneumathodes on stipe 2—5 mm long, usually in a single row. 5. *C. raciborskii*
 7. Bullate scales present only on costules; pinnules often 10 cm long, acuminate; pneumathodes on stipe 5—14 mm long, in a double or triple row. 6. *C. jimghuhnicma*
 2. Indusium lacking.
 8. Scales on lower surface of costules of sterile pinnules bullate; fertile lobes usually much narrower than sterile and quite covered by sporangia. 7. *C. lurida*
 8. Scales on lower surface of costules not bullate; fertile lobes not much narrower than sterile.
 9. Pinnules lobed halfway to costa or more; sori on lowest veins not near costule, those on higher veins progressively nearer to costule; basal basisopic vein of each group often from costa, not from costule. 8. *C. gigantea*
 9. Pinnules lobed less than halfway to costa; sori on all veins about equidistant from costa; basal basisopic vein of each group attached above base of costule. 9. *C. glabra*

1. Scales at base of stipe usually pale and rather thin, edges not of different texture from the rest and bearing rather regular oblique short dark setae.
 10. Most segments of pinnules free as tertiary leaflets; sori apparently indusiate but actually covered with closely overlapping scales. 10. *C. tripinnata*
 10. Most segments of pinnules not free; sori not indusiate.
 11. Ferns of open places; pinnules lobed almost or quite to costa; veins 10—12 or more, basal basisopic vein of each group not attached conspicuously below base of costule.
 12. Rachises, costae and costules densely scaly throughout; scales on costules bearing long flexuous hairs which become entangled. 11. *C. tomentosa*
 12. All parts less densely scaly; costular scales not bearing long tangled hairs.
 13. Costae and costules beneath conspicuously scaly; some bullate scales always present; mountain plants at 1500—2500 m.
 14. Scales on costae mostly strongly setiferous, only those near apex bullate; copious long hairs on lower surface of costae and costules. 12. *C. persquamulifera*
 14. Scales on lower surface of costae throughout bullate, not setiferous; long hairs on lower surface of costae and costules confined to apices of pinnules. 13. *C. tenggerensis*
 13. Costae and costules beneath almost glabrous at maturity; scales never bullate; from low country to 1500 m. 14. *C. contaminans*
 11. Ferns of shady forest; pinnules lobed 1/2—2/3 towards costa; veins 6—9 pairs, basal basisopic vein always attached to costa below base of costule. 15. *C. squamulata*

DISTRIBUTION OF SPECIES WITHIN AND OUTSIDE JAVA

1. *C. JAVANICA* Bl. — In forest, or by shady river-banks, 250—1500 m; West Java, Sumatra.
2. *C. ORIENTALIS* (Kze.) Moore — In forest, 1000—1800 m; throughout Java, eastwards to Flores.
3. *C. CRENULATA* Bl. — In forest, 1700—2700 m, throughout Java, eastwards to Flores.
4. *C. OINOPS* Hassk. — In forest, 2000—2500 m, throughout Java; also Sumatra, Lesser Sunda Islands (to Flores) and S.W. Celebes. Careful inspection shows that the indusium in this species is hood-shaped, not cup-shaped (as often reported), being open on the side towards the edge of the leaflet.
5. *C. RACIBORSKII* Copel. (*Hemitelia, crenulata* Mett.) — In forest, 1200—1600 m; West Java and S. Sumatra. Very abundant in the forest just above Tjibodas garden.
6. *C. JUNGHUHNIANA* (Kze.) Copel. — In forest, 1000—2000 m; West Java, South and Central Sumatra. Abundant with *C. raciborskii* above Tjibodas, and always distinct.

7. *C. LURIDA* (Bl.) Copel. — Apart from the original collection, I have seen only one other, from West Java. In Sumatra and the Malay Peninsula this species is found in ridge forest (not in exposed places) at 1250—1800 m.

8. *C. GIGANTEA* (Wall, ex Hook.) Holttum — In Java at low elevations, in the West only. This species is very widely distributed, occurring in Ceylon and South India, from N.E. India to Burma, Thailand and Indochina to Penang and Kedah, also in central Sumatra. It grows in more open places than *C. glabra*.

9. *C. GLABRA* (Bl.) Copel. — In forest, to 1650 m, West Java; very few collections, and now apparently rare. In Borneo, Sumatra and the Malay Peninsula this species occurs in wet lowland forest, and in mountain forest to about 1500 m.

10. *C. TRIPINNATA* Copel. — Only two collections known from West Java, from forest at 700 m. This species occurs at altitudes of 250—1700 m throughout the Philippines, also in N. Borneo and Ambon; one collection has been made on Pulau Tioman, off the east coast of the Malay Peninsula.

11. *C. TOMENTOSA* (Bl.) Zoll. & Mar. — At 2200 m and above, in ridge forest and in open swampy places in gullies, on mountains from West Java to Flores.

12. *C. PERSQUAMULIFERA* (v.A.v.R.) Domin — On mountains, 1500—2500 m, apparently in open places, few times collected; also in Central Sumatra.

13. *C. TENGERENSIS* (Rosenst.) Domin — In open places at 1500—2300 m; East Java to Flores and in S. Celebes. Locally abundant on Mt Tengger.

14. *C. CONTAMINANS* (Wall, ex Hook.) Copel. — In clearings and open places in forest, especially near streams, throughout Java, 200—1600 m, the commonest tree-fern; also throughout Malesia and northwards to Mergui.

15. *C. SQUAMULATA* (Bl.) Copel. — A small tree-fern of forest in lowlands and to 1500 m, West Java; also in Sumatra, Malay Peninsula, Borneo and Sulu Archipelago.

THE GENUS *ACIOA* Aublet (Rosaceae - Chrysobalanoideae)
IN MALESIA

by

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SUMMARY

1. The first record of *Aciov*, Aublet from S.E. Asia.
2. Three species are described: *Acioa heteropetala* (Scortechini ex King) Kosterm., based on *Parinarium heteropetalum* Scortechini ex King and the new species: *Acioa malayana* Kosterm. and *A. percoriacea* Kosterm.
3. *Parinwrium kunstleri* King and *P. myriandrum* Merr. are reduced to synonymy of *Acioa heteropetala* Kosterm.

ACIOA Aublet

ACIOA Aublet, Hist. PL Guiane fr. 2: 698, t. 280. 1775; Scopoli, Introd. 291. 1777; Lamarck, Encycl. méth. Bot. 2: 146. 1786; de Jussieu, Gen. PL 342. 1789 (ed. Usteri 378. 1791); Gmelin, Syst. 1028. 1791 (*Acioja*); Schreber, Gen. 458. 1791; Willdenow, Spec. PL 3(1): 717. 1800 (as a syn. of *Ada*-Schreber); Batsch, Syn., tab. p.4. 1802; St. Hilaire, Expos. Fam. 2: 194. 1805 (*Ada* Schr.); Hedwig, Gen. 25. 1806; Persoon, Enchir. 2: 238. 1807; Poiret, Diet. Sciences 11: 222. 1818 (*Coupi*); Steudel, Nom. 9. 1821; ed. 2, 1: 17. 1840; DC, Prodr. 2: 526. 1825; Sprengel, Syst. Veg. 3: 84. 1826 (sub *Ada* Schr.); Gen. 2: 552. 1831; Martius, Nova Gen. & Sp. PL 2: 79. 1826 (as a syn. of *Moquilea* Mart. & Zucc.); Reichenbach, Consp. 171. 1828; Bartling, Ordin. nat. 406. 1830; G. Don, Gen. Syst. 2: 478. 1832; Spach, Hist. nat. Veg. phan. 1: 371. 1834; Meissner, Gen. 102 (72). 1836—43 (section of *Moquilea*); Zuccarini in Flora 15(2): 87—93. 1832; Endlicher, Gen. PL 1252, no 6410. 1840 (sub *Moquilea* Mart, et Zucc.); Benth'am in Bentham & Hooker F., Gen. Pl. 1: 608. 1865 (as a syn. of *Couepia*, Aublet); Dietrich, Syn. 4: 811. 1847 (*Avioa*); Blume, Mus. bot. Lugd. bat. 2: 92. 1856 (subgenus of *Moquilea* M. & Z.); Müller in Walp. Ann. 4: 643. 1857 (subgenus of *Moquilea* M. & Z.); Hooker in Martius, Fl. Bras. 14(2): 40. 1867 (as a syn. of *Couepia* Aublet); Baillon in Adansonia 7: 222. 1867; Hist. PL 1: 437 et 482. 1869; Diet. Bot. 1: 31. 1876; Oliver, Fl. trop. Afr. 2: 371. 1871 (sub *Griffonia* Hk. f.); Pfeiffer, Nom. bot. 1: 24. 1873; Durand, Index 111. 1888 (sub *Couepia* Aublet); K. Fritsch in Ann. K.K. naturh. Hofmus. Wien 4: 36, 37, 38. 1889; Focke in Engler & Prantl, Nat. Pfl. fam. 3(2): 60. 1891; de Dalla Torre & Harms, Gen. siph. 211. 1901; Post & Kuntze, Lexikon 5. 1904; de Willdeman in Bull. Jard. bot. Etat Bruxelles 7: 188—190. 1920; Cardot in Mem. Mus. Hist. nat. Paris 191—93. 1922; Lemee, Diet. Genres 1: 38. 1929; Hauman in Fl. Congo beige et Ruanda Urundi (Spermatoph.) 3: 44. 1952.

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