

## Native and Naturalised Species of *Adiantum* in Ceylon

by

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(With twelve text figures)

Species of *Adiantum*, the Maidenhair ferns, are familiar and decorative plants. Their elegant foliage has long made them popular with gardeners and species from many parts of the world, especially tropical America, are commonly cultivated. Several of these cultivated species have escaped and become established in Ceylon as naturalised plants.

All species of *Adiantum* are terrestrial ferns with fronds which may be simply pinnate, flabellately divided or decomposed but which are especially characterised by bearing marginal sori with the sporangia borne on the under sides of reflexed lobes which are modified to serve as marginal indusia.

Of the six indigenous species in Ceylon four are widespread and common ferns. Eight other, introduced species occur, some of them very frequently, as weeds of cultivation in plantations or on suitably shaded banks. Their escape from gardens and naturalisation has evidently taken place relatively recently since they are not represented in the collections of nineteenth-century botanists. Their occurrence as given below is largely based on my own observations and collections; too little information is at present available to estimate the relative frequency of these exotic species though there seems little doubt that *A. raddianum* is the most abundant. Those now established in few localities however seem likely to become increasingly widespread in future.

### KEY TO SPECIES

Fronds simply pinnate

Leaflets stalked

Sori elongate

*A. philippense*

Sori round

*A. diaphanum*

Leaflets sessile or subsessile, fronds attenuate above and rooting at apex

Rhachis hairy above and below, leaflets prominently striate,  
clothed beneath with white, unicellular, hooked hairs

*A. caudatum*

Rhachis glabrous beneath (save at distal extremity), leaflets not  
conspicuously striate, lacking white hooked hairs beneath

*A. zollingeri*

Fronds pedately divided, bipinnate or decomposed

Fronds pedately divided

Stipe and leaflets hairy

*A. hispidulum*

Stipe and leaflets glabrous

*A. flabellulatum*

Fronds bipinnate to decomposed

With elongate terminal pinna like lateral ones

Stipe and rhachis glabrous, black and glossy

Leaflets small—up to 1 cm.

*A. diaphanum*

Leaflets large—up to 6 cm.

*A. trapeziforme*

Stipe and rhachis hairy, not glossy

Upper margin of leaflet with one long sorus (rarely 2) *A. pulverulentum*

Upper margin of leaflet with many sori *A. latifolium*

Without elongate, conform terminal pinna

Margins of sterile segments sharply serrate,  
the veins ending in the teeth

Fronds 2-pinnate, rhachis glabrous

*A. capillus-veneris*

Fronds 3-4 pinnate, rhachis hairy

*A. formosum*

Margins of sterile segments with veins ending in sinus  
between indefinite teeth or shallow crenations

Lowermost upper leaflet of pinnae  
overlapping main rhachis

*A. concinnum*

Lowermost upper leaflet of pinnae not  
overlapping main rhachis

Short-creeping, stipes clustered ;  
leaflets with cuneate bases, sori  
orbicular to sub-orbicular

*A. raddianum*

Long-creeping, stipes spaced ; leaflets  
mostly with broadly cuneate to  
reniform bases, sori oblong to  
lunate

*A. poiretii*

**Adiantum philippense** L., Sp. Pl. 2 : 1094 (1753). Fig. 1.

*R. lunulatum* Burm. f., Fl. Ind.: 235 (1768). Bedd., Ferns South. Ind.: t. I (1863).  
Handb. Ferns Brit. Ind.: 82 (1883).

Recognisable by its once pinnate fronds with up to 12 pairs of alternately arranged, long-stalked, glabrous leaflets, the lowermost of which have their two lower edges meeting the stalk in a more or less straight line ; the terminal leaflet cuneate-flabellate or the frond axis sometimes prolonged into a leafless portion which bends over and roots at the apex. The oblong-linear sori fill the lobes between the shallowly incised outer margins of the leaflets.

Frequent in moist forest and on shady banks.

Widely distributed in the Old World tropics: also in Central and S. America, but perhaps introduced there.

***Adiantum caudatum*** L., Mant. 2 : 308 (1771). Bedd., Handb. Ferns Brit. Ind. : 83, excl. fig. 44 (1883). Fig. 2.

Fronds generally radiating from the centre and arching over or lying on the ground, each frond with the rhachis hairy above and below and with up to 50 pairs of subsessile leaflets which are striated or pleated and hairy above and below, on the lower side with a mixture of long, pleuricellular, brown hairs and abundant short, white, unicellular hairs with hooked tips. The fronds gradually taper to a long, narrow end which is generally terminated by a naked, wiry extremity which roots and produces new plants at its apex.

One of the commonest Ceylon ferns in the wet zone, growing on moist rocks or on the ground in forest and on roadside banks in shaded places. The illustration in Beddome's Handbook (fig. 44) represents *A. incisum* Forssk., a related species occurring in Africa, Arabia and India.

Described from Ceylon ; also in S. India, Assam, Burma, Thailand, Indochina and Malaya.

***Adiantum zollingeri*** Mett. ex Kuhn in Ann. Mus. Lugd.-Bat. 4 : 280 (1869). Fig. 3.

*A. caudatum* var. *subglabrum* Holtt., Fl. Malaya 2 : 600 (1954).

Differs from *A. caudatum* in its rhachis being hairy above but glabrous and glossy beneath (save in the distal parts of the frond where hairs may be present on both surfaces) ; in its leaflets being greener, not prominently striated and either glabrous or, if sparsely hairy beneath without any admixture of short, white, unicellular, hooked hairs.

As widespread in Ceylon as *A. caudatum* with which it sometimes grows, as at Kurunegala Rock, but it is notably more frequent at low altitudes within the dry zone as at Trincomalee and on the fringes of the high rainfall areas bordering the dry zones as at Weragamtota or Nalanda between Matale and Dambulla. In such places *A. zollingeri* usually replaces *A. caudatum*.



Fig. 1. *Adiantum philippense* : frond  $\times \frac{1}{2}$ .

Fig. 2. *A. caudatum* : frond  $\times \frac{1}{2}$ .

Fig. 3. *A. zollingeri* : frond  $\times \frac{1}{2}$ .

Earlier botanists in Ceylon e.g. Ferguson and Wall, usually referred to this as the "glabrous form" of *A. caudatum*. Thwaites (in Enum. Pl. Zeyl., 387, 1864) called it *A. rhizophorum* Sw., a quite different species described from Mauritius and Reunion. C.P. 3102 represents *A. zollingeri*.

Described from Java : also in Ceylon, S. India, Thailand, Indochina, Malaya and east to New Guinea.

***Adiantum hispidulum*** Sw. in Schrad. Journ. Bot. 1800, 2 : 82 (1801).

Bedd., Ferns South. Ind. : t.3 (1863)—Handb. Ferns Brit. Ind. : 86, fig. 300 (frontispiece (1883)). Fig. 4.

The fan-shaped fronds with leaflets hairy, especially beneath, with small, white hairs, are sufficient to distinguish this from all other species occurring in Ceylon. The dark chestnut to black stipe and rhachis are hairy and the more or less orbicular "indusia" are also pilose with brown hairs.

A common species in forest and on moist banks of streams from below 1000 ft. to over 6000 ft.

Australia and New Zealand to Polynesia, India and Africa.

***Adiantum flabellulatum*** L., Sp. Pl. 2 : 1095 (1753). Bedd., Ferns South. Ind. : t. 218 (1864)—Handb. Ferns Brit. Ind. : 88 (1883).

Differs from *A. hispidulum* in its glabrous stipe and leaflets. The dorsal grooves of the rhachis and stalks of the leaflets are finely pilose ; all other parts are glabrous including the "indusia" which are more transversely elongated than in the preceding species.

Very rare in Ceylon and only collected near Balangoda and in the Uva District about Haputale.

N. India, China, Japan, Philippine Islands, Malaya and Java.

***Adiantum diaphanum*** Blume, Enum. Pl. Jav. : 215 (1828). Fig. 5.

A small species with fronds up to 20 cm. tall, usually with a pair of branches at the base of the median, terminal branch and so consisting of three pinnately divided branches, but sometimes the lateral branches are absent and the frond is then simply pinnate. The bipinnate form is most like *A. hispidulum* in appearance from which it differs in its glabrous stipe and rhachis, the former not being dichotomously divided above to give a fan-shaped frond. Scattered hairs are usually present on the under surface of the leaflets but these are never as hairy as in *A. hispidulum*. The round sori are situated in the notches of the upper and outer margins of the leaflets.

Roadside banks. Introduced in Ceylon.

Java to Fiji, New Zealand and E. Australia.

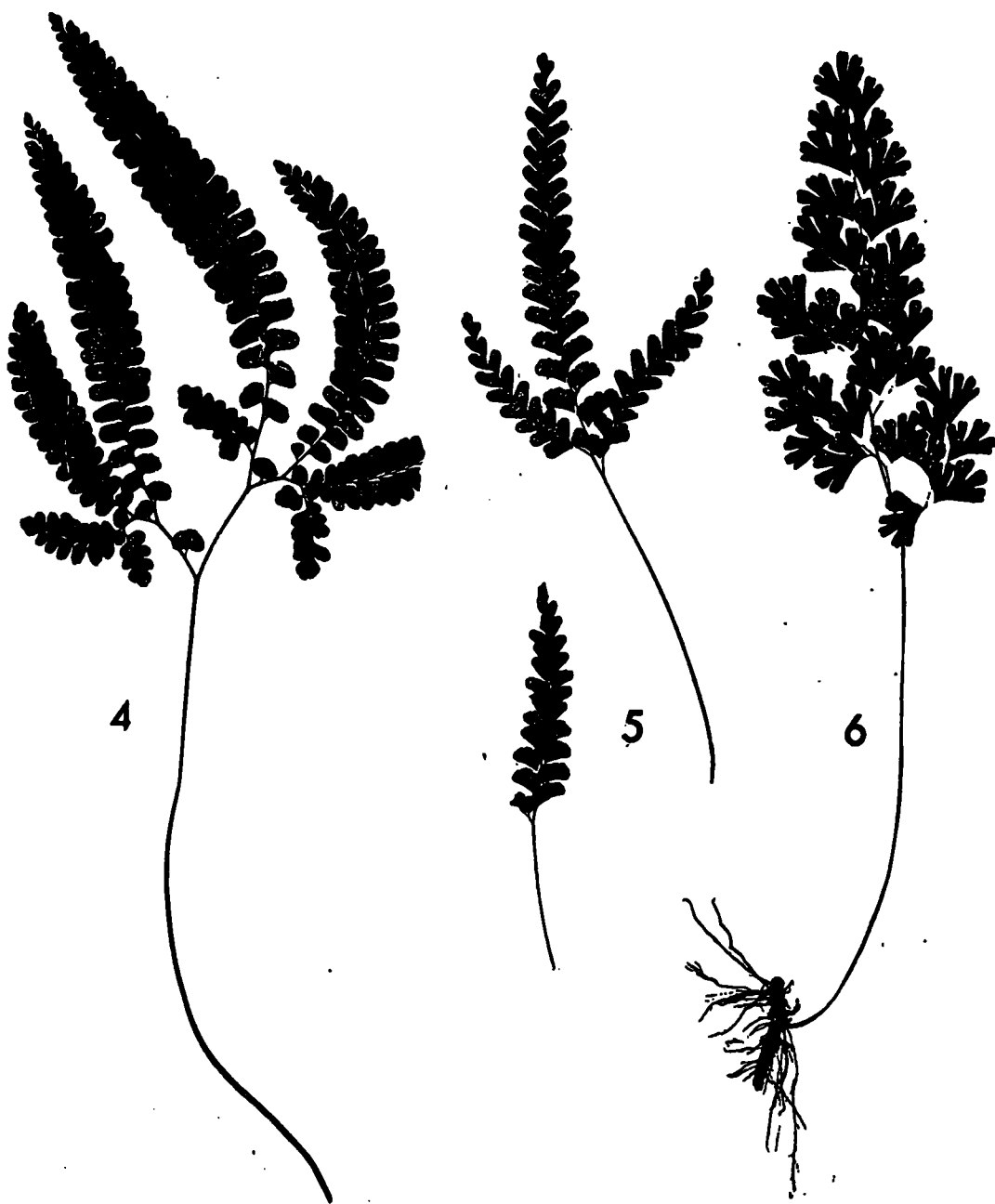


Fig. 4. *A. hispidulum* : frond  $\times \frac{1}{2}$ .

Fig. 5. *A. diaphanum* : Simply pinnate and bipinnate fronds  $\times \frac{1}{2}$ .

Fig. 6. *A. capillus-veneris* : frond  $\times \frac{1}{2}$ .

***Adiantum trapeziforme*** L., Sp. Pl. 2 : 1097 (1753). Fig. 7.

A tall, striking and beautiful species at once recognisable by the large size of its long-stalked, trapeziform, acute to acuminate leaflets with numerous round to lunate sori on the upper margin and on the outer part of the lower margin, the rest of the lower margin being cut away in a straight line.

Seen by me in two localities near Kandy in secondary forest and on a shady roadside bank. I have seen no Ceylon examples in herbaria but it doubtless occurs elsewhere.

Native of tropical America from Mexico to Brazil and in the West Indies.

***Adiantum pulverulentum*** L., Sp. Pl. 2 : 1096 (1753). Fig. 8.

A stout species with short-creeping, thick rhizome and fronds 60-90 cm. high, easily recognised by the single long sorus spreading throughout the upper margin of the leaflets. The dark stipe and rhachis are scurfy with brown hairs and the 3-8 pairs of lateral, alternately arranged, spreading pinnae are 12-20 cm. long, oblong in outline and bearing numerous leaflets. Occasionally more than one sorus is produced on the upper margin and often a shorter one is formed on the outer margin.

There are specimens collected by Freeman between 1908-1923 at Kandy "at more than one spot" in the British Museum and I collected it in secondary jungle at Kandy Catchment in 1954. Doubtless elsewhere.

Native of West Indies and continental tropical America from Mexico to Brazil.

***Adiantum latifolium*** Lam., Encycl. 1 : 43 (1783). Fig. 9.

Rhizome slender, long-creeping with fronds well spaced ; fronds bearing from one to three pairs of alternate, wide-spreading pinnae (occasionally simply pinnate fronds are produced by suppression of branches) ; leaflets of the young fronds glaucous beneath with a well-marked midrib, sterile segments sharply serrated, the fertile ones bearing numerous sori on the outer parts of their lower as well as on their upper margins.

Beneath trees on roadside banks and in plantations at low elevations. My four gatherings of this from near Colombo, near Ratnapura, Kitulgalle and Pahale Hewissa are all from stations between 0-500 ft., and two gatherings from Ceylon in the British Museum are also from the low country.

Tropical America and West Indies.



Fig. 7. *A. trapeziforme* : frond  $\times \frac{1}{4}$ .

Fig. 8. *A. pulverulentum* : frond  $\times \frac{1}{4}$ .

Fig. 9. *A. latifolium* : frond  $\times \frac{1}{3}$ .



**Adiantum formosum** R. Br., Prod. Fl. N. Holl. : 155 (1810). Fig. 10.

A larger fern than the next species with creeping rhizome and fronds commonly 4-pinnate with very numerous leaflets with narrow wedge-shaped bases. The stipe and rhachis are black and glossy as in the next four species but differ from all these in the axes of the pinnae and stalks of the leaflets being pubescent with short brown hairs on their upper surfaces.

I have only seen two gatherings of this, from Nuwara Eliya and from roadside banks between there and Kandy. Doubtless it occurs elsewhere.

Native of New Zealand and E. Australia.

**Adiantum capillus-veneris** L., Sp. Pl. 2 : 1096 (1753). Bedd., Ferns South. Ind. : t. 4 (1863)—Handb. Ferns Brit. Ind. : 84 (1883). Fig. 6.

Fronds bipinnate, leaflets 1-1½ cm., rather deeply divided into 3-4 lobes which are again often shallowly lobed : stipe, rhachis and stalks of leaflets black, glossy and glabrous.

This has been confused with one or other of the next three species from all of which it can be distinguished by the sharply toothed margins of the sterile leaflets with the veins running into the teeth and not terminating in the sinus between them. The fern described by Nayar (in Bull. Nat. Bot. Gard. Lucknow no. 52, 37 (1962)) as *A. capillus-veneris* var. *dissecta* var. nov. is typical *A. capillus-veneris* and what he there treats and illustrates as the typical form of the species is *A. concinnum*.

Shaded, moist rock faces ; rare. I have met with it only once by the road between Hakgalla and Badulla.

Cosmopolitan in distribution.

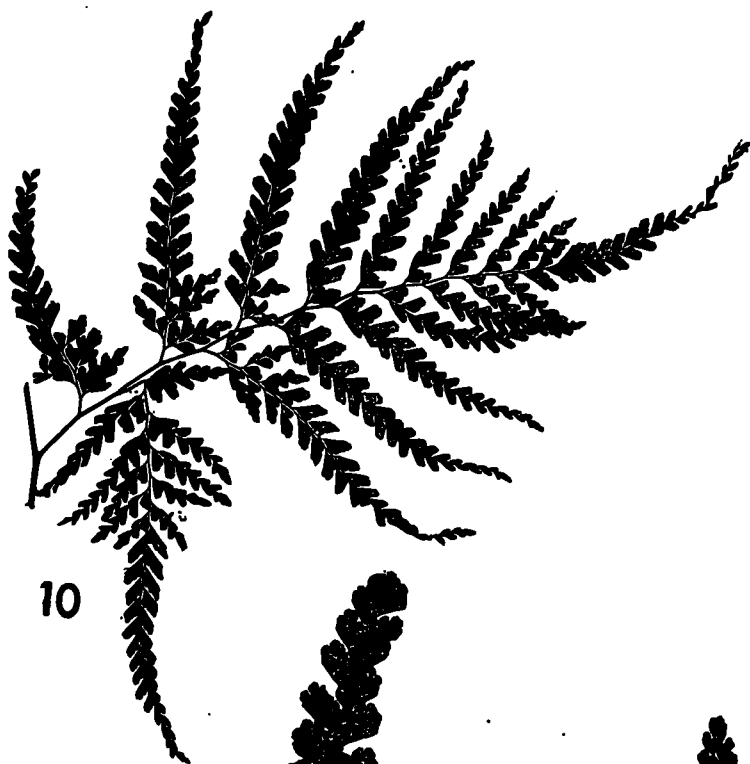
**Adiantum concinnum** Willd., Sp. Pl. 5 : 451 (1810). Fig. 11.

The leaflets in this species are about the same size as those of *A. capillus-veneris* (1-cm)<sup>2</sup> from which it differs in its generally larger size and tripinnately divided fronds with the veins of the leaflets ending between and not in the marginal teeth. The leaflets are also mostly less deeply lobed and the branches (pinnae) are so shortly stalked that the inner, upper leaflet overlies the main rhachis. The sori are orbicular in shape rather than lunate to oblong as in *A. capillus-veneris*.

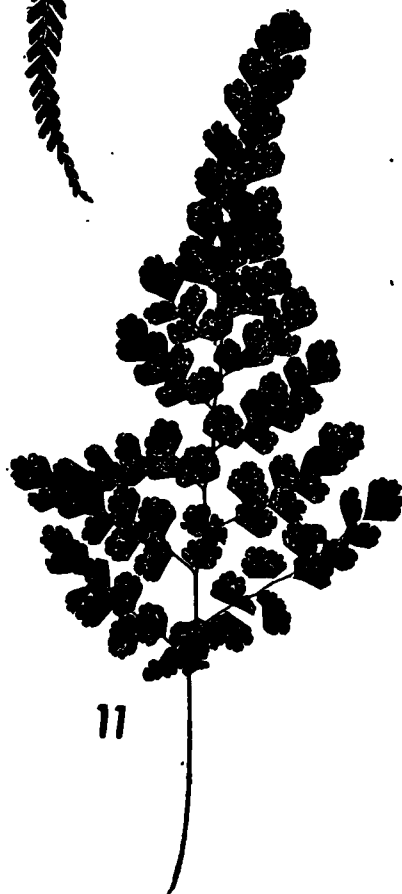
Shady roadside banks both in the low country and in the mountains.  
Mexico to Peru, West Indies.

**Adiantum raddianum** Presl, Tent. Pterid. : 158 (1836). Fig. 12.

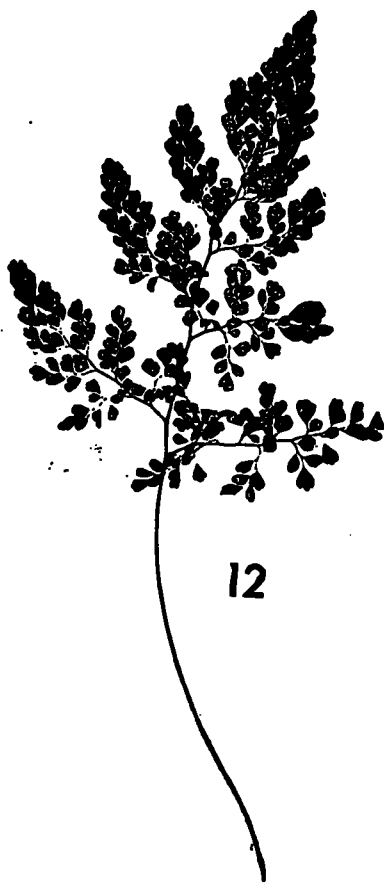
*A. cuneatum* Langsd. & Fisch., Ic. Fil. : 25, t. 26 (1810) non Forst. (1786).



10



11



12

Fig. 10. *A. formosum* : a pinna  $\times \frac{1}{2}$ .

Fig. 11. *A. concinnum* : frond  $\times \frac{1}{2}$ .

Fig. 12. *A. raddianum* : frond  $\times \frac{1}{2}$ .

A smaller species than the preceding ; fronds tripinnate to quadripinnate with very numerous, small leaflets (0.5-1.0 cm.) and more or less orbicular "indusia" with broad, pale margins.

On stream banks in forest and in plantations. Now the commonest of the introduced species though the earliest gathering of it which I have seen is dated 3 July 1927, Castlereagh Estate : Alston 1857 in Herb. Peradeniya.

A widely cultivated South American species (type from Brazil) which has escaped and become widely naturalised in many tropical and subtropical parts of Africa and Asia.

**Adiantum poiretii** Wikstr., Vet. Akad. Handl. 1825 : 443 (1826).

*A. thalictroides* Willd. ex Schlecht. Adumbr. Pl. pt. 5 : 53 (1832).

*A. aethiopicum* sensu Bedd., Handb. Ferns Brit. Ind. : 84 (1883).

In addition to the characters given in the key this also differs from *A. raddianum* in its leaflets being articulated to their stalks and becoming deciduous with age, so leaving the bare leaf-stalks attached to the rhachises of the old fronds.

This is the species recorded from Ceylon by Beddome and others as *A. aethiopicum*. There are no Ceylon specimens of it at Kew but the sheets from S. India so named are *A. poiretii*. A sheet of Ferguson's at Peradeniya from "Above Elgin, Dimbula. Feb. 1881" named *A. aethiopicum* is the only Ceylon gathering I have seen.

Tropical and Temperate Africa, India, Central and South America from Mexico to Chile and Argentina.

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