

# FERNS (POLYPODIOPHYTA)

A Division of terrestrial, epiphytic or aquatic homosporous or heterosporous vascular plants in which the sporangia are usually aggregated into sori borne on the undersurface of the frond.

## MARSILEACEAE

Aquatic or semiaquatic *plants*; rhizome creeping. *Fronde*s simple and filiform or with 2 or 4 leaflets at the apex of a stipe, with circinate vernation, apparently modified leaves forming sporocarps. *Sporocarps* thick-walled, sessile or stalked, with several sori in each sporocarp and each sorus containing megasporangia and microsporangia.

A family containing three genera (two in Australia) and about 70 species. Only *Marsilea*, with about seven species, in NT.

### MARSILEA L.

*Rhizomes* long-creeping. *Fronde*s scattered along rhizome, the lamina of 2 pairs of opposite, closely spaced leaflets at the end of a long stipe, the whole having the appearance of a 4-leaf clover; leaflets glabrous or hairy, margins entire or crenate, veins radiating from the base. *Sporocarps* 2-valved, stalked, solitary or clustered at the base of or along the stipes, smooth or ribbed, glabrous or hairy, usually with 1 or 2 basal teeth. *Sori* exuded in a gelatinous mucilage. *Nardoo*.

A cosmopolitan genus of about 70 species with perhaps eight in Australia. It is difficult to distinguish species, particularly those with widely obovate to widely depressed-obovate leaflets and basal teeth.

Hairs on the leaflets, peduncles and sporocarps are irregularly T-shaped, having a very short arm and a much longer arm, so much so that they may appear to be simple, particularly when the long arm is spreading rather than appressed.

Taxonomic references: Andrews (1990), Chinnock (1986).

- |    |                                                                                                                                                       |                        |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1  | Leaflets mostly narrowly elliptic and at least 3 times as long as wide .....                                                                          | <b>M. angustifolia</b> |
| 1: | Leaflets widely obovate to widely depressed-obovate, not or barely longer than wide .....                                                             | 2                      |
| 2  | Sporocarps lacking basal teeth; leaflets with obvious banding (1:) .....                                                                              | <b>M. mutica</b>       |
| 2: | Sporocarps with 2 basal teeth; leaflets lacking obvious banding .....                                                                                 | 3                      |
| 3  | Sporocarps 6–13 mm long; peduncles mostly 10–85 mm long and usually more than 2 times the length of the sporocarp (rarely equal in length) (2:) ..... | <b>M. drummondii</b>   |
| 3: | Sporocarps 2.5–6 mm long; peduncles 0.5–6 mm long, shorter than the sporocarp or less than 2 times the length of the sporocarp .....                  | 4                      |
| 4  | Capsule teeth unequal, the upper larger and pointed (3:) .....                                                                                        | <b>M. crenata</b>      |
| 4: | Capsule teeth more or less equal, both blunt .....                                                                                                    | <b>M. hirsuta</b>      |

#### **M. angustifolia** R.Br.

*Rhizomes* glabrous except for tufts of orange-brown hairs on growing tips. *Stipes* 4–22 cm long, slender, glabrous or sparsely hairy. *Leaflets* mostly narrowly elliptic, 0.8–3.4 cm long, 0.2–0.9 cm wide, entire or with apices with irregular small teeth, glabrous or sparsely hairy; hairs irregularly T-shaped. *Sporocarp* c. 6 mm long, densely hairy, basally with a single

blunt tooth; peduncle about the length or to *c.* 1.5 times the length of the sporocarp. *Fertile plants:* Apr. Fig. 8 (*Rankin 2315*).

The circumscription of the species and the application of the name seems unresolved (Andrews, 1990) but in the broad sense this species is widespread, and is found in all mainland States of Australia. There are few specimens in DNA which, on the basis of leaflet shape, can be referred to *M. angustifolia s. lat.* and only *Rankin 2315* contains sporocarps. It seems to be uncommon in the Top End where it grows on clay substrates on the margins of seasonal swamps (*e.g.* along the Marrakai Track) and streams.

#### **M. crenata** C.Presl

*Rhizomes* long-creeping, mostly glabrous or sparsely hairy but usually densely hairy at base of peduncles and stipes. *Stipes c.* 2–15 cm long, glabrous or sparsely hairy. *Leaflets* widely obovate to widely depressed-obovate, 0.4–2 cm long, 0.4–1.9 cm wide, at least the largest leaflets glabrous or with scattered hairs; hairs irregularly T-shaped and slightly spreading; margins entire or apically crenate. *Sporocarp* 2.5–3.5 mm long, mostly hairy but some of the surface often glabrous, appearing uniformly dark reddish brown or black (with hairs removed) and commonly red-punctate, unribbed, with 2 basal teeth; upper tooth somewhat larger and pointed; lower tooth smaller and apically rounded; peduncles 2.5–6 mm long, shorter to nearly 2 times the length of the sporocarps. *Fertile plants:* Apr.–Aug. Fig. 8 (*Cowie 7051*).

South-east Asia (including the Philippines), New Guinea and Australia (WA, NT, Qld). In NT restricted to the Top End where it grows on black soil plains, around lagoons and in *Melaleuca* forest. Usually on clay soils. Localities include Fogg Dam, Melacca Swamp and floodplains of the Adelaide and Daly rivers.

#### **M. drummondii** A.Braun

*Rhizomes* long-creeping, more or less glabrous to conspicuously hairy, densely hairy at bases of stipes. *Stipes c.* 1.5–30 cm long, more or less glabrous or sparsely to densely hairy (at least in part). *Leaflets* widely obovate to widely depressed-obovate, (0.4) 1.2–2.6 cm long, (0.4) 1.1–2.7 cm wide, sparsely to densely hairy; hairs irregularly T-shaped and appressed or spreading; margins entire or apically somewhat crenate. *Sporocarp* 6–13 mm long, more or less densely hairy, appearing uniformly dark reddish brown (with hairs removed) and sometimes inconspicuously ribbed, with 2 basal teeth; peduncles mostly 10–85 mm long, rarely equal to and mostly 2 times or more the length of the sporocarp. *Fertile plants:* Apr.–Nov. Fig. 8 (*Cowie 2116*).

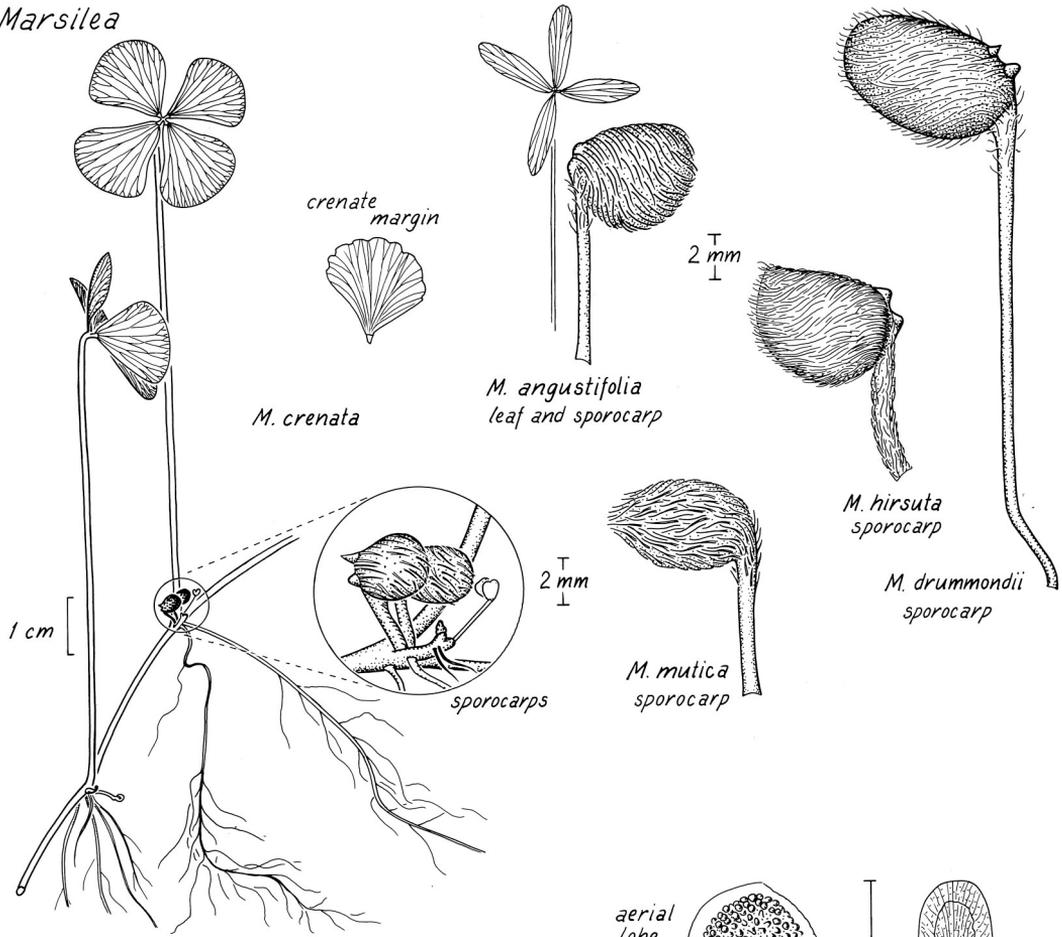
A polymorphic species found in all mainland States of Australia and particularly widespread in inland areas. Top End localities include Calvert River Gorge and floodplains of the East Alligator and Mary rivers. Some specimens with peduncles and sporocarps of equal length have been observed but on such plants there are also sporocarps with peduncles exceeding the length of the sporocarps.

#### **M. hirsuta** R.Br.

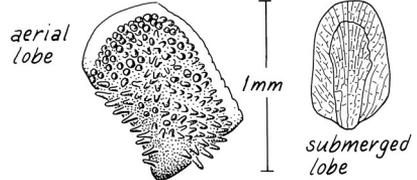
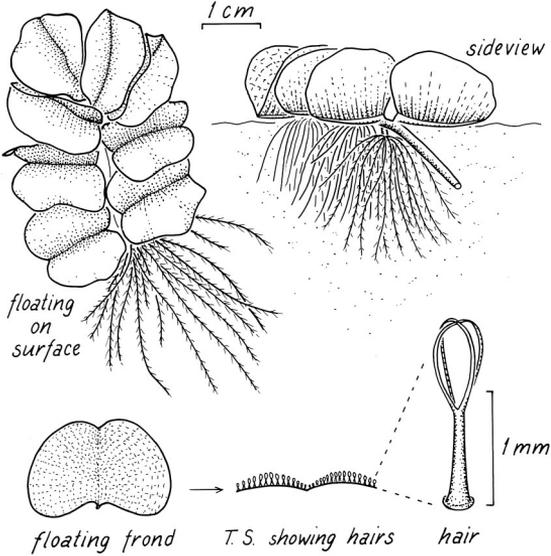
*Rhizomes* long-creeping, mostly glabrous or sparsely hairy but usually densely hairy at base of peduncles and stipes. *Stipes c.* 1–28 cm long, glabrous or sparsely hairy. *Leaflets* widely obovate to widely depressed-obovate, 0.4–1.7 cm long, 0.4–1.5 cm wide, more or less glabrous to conspicuously hirsute; hairs irregularly T-shaped and spreading; margins entire or apically crenate. *Sporocarp* 4–6 mm long, hairy, unribbed, with 2 basal, blunt teeth of more or less equal size; peduncles 0.5–3.5 mm long, shorter than the sporocarps. *Fertile plants:* *c.* Mar.–June. Fig. 8 (*Albrecht 5800*).

In all mainland States of Australia. Probably most likely to be confused with *M. exarata* A.Braun, although that species seems to be absent from floodplains and is characterised by having sporocarps in which the lower tooth is usually recurved and the longer of the two.

Marsilea



*Salvinia molesta*



*Azolla pinnata*

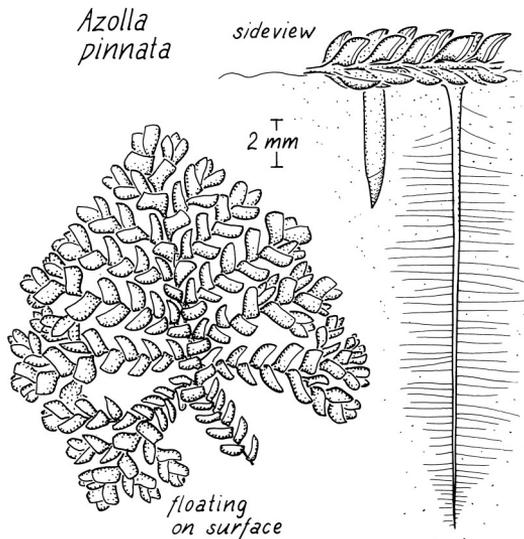


FIGURE 8

**M. mutica** Mett.

*Rhizomes* long-creeping, mostly glabrous or sparsely hairy but growing points and base of stipes may be densely hairy. *Stipes* c. 2.5–30 cm long, glabrous. *Leaflets* widely obovate to widely depressed-obovate, 0.5–2.7 cm long, 0.4–2.8 cm wide, the distal green part of the leaf separated from the lower yellowish part by a brownish band, glabrous when mature except for a few hairs at the base of the leaflets; margins entire or apically somewhat crenate. *Sporocarp* 4.5–6 mm long, densely hairy, appearing uniformly dark reddish brown (with hairs removed); peduncle 3–6 mm long, c. the length or shorter than the sporocarp. *Fertile plants*: June. Fig. 8 (*Thomson 1882*).

All mainland States of Australia and in New Caledonia. In the Top End typically around lagoons, swamps and billabongs.

All but one of the specimens at DNA which have been referred to this taxon by virtue of their mostly glabrous leaflets are sterile, and some may therefore be incorrectly determined. Only *Thomson 1882*, from a freshwater swamp at the mouth of the Calvert River, has sporocarps. It is on this collection that the above description has been based, and by virtue of the toothless sporocarps and their generally glabrous leaflets the plants seem referable to this species. However, the short peduncles are apparently atypical, peduncles are usually much longer than the sporocarps.

The banding on the leaflets is diagnostic for the species (R. J. Chinnock, *in litt.*, 1997), but the feature is only readily apparent in fresh material.

## SALVINIACEAE

Aquatic, free-floating *ferns*; rhizomes hairy but lacking roots. *Fronds* simple, in whorls of 3, with 2 of each whorl green and floating and 1 submerged and divided into root-like segments. *Sporocarps* borne on the submerged leaf, containing either megasporangia or microsporangia or in some species both.

A monogeneric family, with the genus *Salvinia* containing about ten species and being widely distributed throughout subtropical and tropical regions of both the Old and New Worlds.

Taxonomic reference: Andrews (1990).

### SALVINIA Séguier

**\*S. molesta** D.Mitch.

*S. auriculata* auct. non Aublet

*Rhizomes* branching. *Floating fronds* shortly stalked, circular or ovate, 0.8–3.5 cm long, 0.5–3.5 cm wide, cordate, apically rounded or emarginate, with a prominent midrib; upper surface covered with stiff, erect hairs; hairs usually terminating in 4 upwardly curved arms united at their extremities; lower surface with brownish, appressed septate hairs. *Submerged frond* shortly stalked, much dissected, to c. 30 cm long. *Sporocarps* sterile; microsporocarps many, arranged in 2 rows on segments of the lower frond; megasporocarps several at the base of segments (not seen). Plate 11, Fig. 8.

Apparently native to South America but now widespread in warmer regions of Africa, southern Asia and Australia (WA, NT, Qld, NSW). It grows on still or slow-flowing water and can rapidly spread to blanket waterways and catchments and is a declared noxious weed in NT. Plants are sterile, any spores that may be produced usually being visibly deformed, and spread of plants is by vegetative fragmentation.