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# A new species of *Marsilea* (Marsileaceae) from arid Australia

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## Abstract

*Marsilea cryptocarpa* Albr. & Chinnock is a new fern from three widely disjunct populations growing in cracking clay depressions in arid central Australia. Superficially it is similar to *M. drummondii* A.Braun and is probably mistaken for vegetative plants of this species. *Marsilea cryptocarpa* is readily distinguished from *M. drummondii* by the dense cluster of very small short-stalked sporocarps that are completely enveloped in cottony hairs. Its conservation status is considered 'data deficient'.

## Introduction

A localised population of a distinctive new species of *Marsilea* L. was discovered in July 2000 approximately 300 km north of Alice Springs. This remained the only known location until 2007, when two additional specimens, from the Lake Eyre region and Simpson Desert, were located in the collections held at the State Herbarium of South Australia (AD) and Alice Springs Herbarium (NT), respectively. This new species was included in a recent treatment of ferns of the Northern Territory (Short et al. 2003) under the name *Marsilea* (Neutral Junction entity). The opportunity is taken here to formally describe the species to facilitate its recognition and conservation.

## Taxonomy

***Marsilea cryptocarpa* Albr. & Chinnock, *sp. nov.***

*Ab omnibus aliis speciebus Australianis sporocarpis minimis in fasciculis densis quoque 6–12 sporocarpio occultibus in pilis longis ad basim stipitis, conceptaculi dente superno vix evoluto vel absenti et inferno plerumque absenti differt.*

**Typus:** WNW of Claypan Bore, Neutral Junction Station, N.T., 20 Oct. 2006, *D.E.Albrecht 12094 & P.K.Latz*; holo: DNA A112376; iso: NT, AD, BRI.

*Marsilea* (Neutral Junction entity): Short et al., Beagle 19: 29 (2003).

*Marsilea* sp. Neutral Junction (*D.E.Albrecht 9192*): Albrecht et al., Vasc. Pl. Checkl. S. Bioreg. Northern Terr. (ed. 2): 34 (2007).

Perennial fern with ventrally attached filiform snow white (aging fawn or yellowish) hairs over most parts, hairs slightly dilated towards attachment. *Rhizome* long-creeping, branched, rooting at the nodes, initially densely hairy becoming sparsely hairy or glabrous later; hairs 3–7 mm long. *Fronds* usually clustered. *Stipe* stout, to c. 20 cm long, 0.8–1.3 mm diameter, initially densely cottony hairy with hairs 1.5–7 mm long, those towards base of stipe longest, sometimes glabrescent. *Leaflets* obdeltoid, pulvinate, 8–35 mm long, 8–35 mm wide, flanks straight, outer margins rounded, crenate, sometimes deeply so, initially villose on under surface with mostly ascending hairs c. 0.8–1.5 mm long forming a thick indumentum, sparsely to moderately densely hairy on the upper surface with hairs appressed to ascending, c. 0.5–1 mm long, later leaflets glabrous on both surfaces or hairy in patches on under surface, green finally turning orange-brown from the margin inward; venation obscure except in older dried leaves, veins close, anastomosing. *Sporocarps* closely packed together and enveloped by dense cottony hairs to such an extent that individual sporocarps are difficult to discern, 6–12 in a row on one side of the stipe base; *stalks* yellowish-brown, simple or sometimes two arising from the same point and appearing branched, 1–2 (–3) mm long, fine and c. 0.2 mm wide at midpoint, broader towards base, hairy to almost glabrous, shorter than or rarely equal to the conceptacle, rather fragile and readily breaking; *conceptacle* subrectangular to obtusely triangular in lateral view, oblong-narrow elliptic in dorsiventral cross-section, dorsally slightly convex to almost flat, ventrally curved, 2–3 mm long, 2–3 mm wide, densely and persistently cottony hairy with hairs 3–6 mm long; lateral ribs obscure or faint beneath hairs, minute pits on surface apparently absent; *raphe* distinct, attached along c. three-quarters the length of the conceptacle base; *inferior (lower) tooth* absent or rarely represented by a slight protuberance; *superior (upper) tooth* absent or obscure and represented by a yellowish-orange protuberance where the basal and dorsal sides of the conceptacle meet. Megasporangia 2–5 per sporocarp, oval, c. 1-1.2 x 0.6-0.9 mm, white, apical cap brown; embedded in mucilage containing numerous small microsporangia. Fig. 1–4.

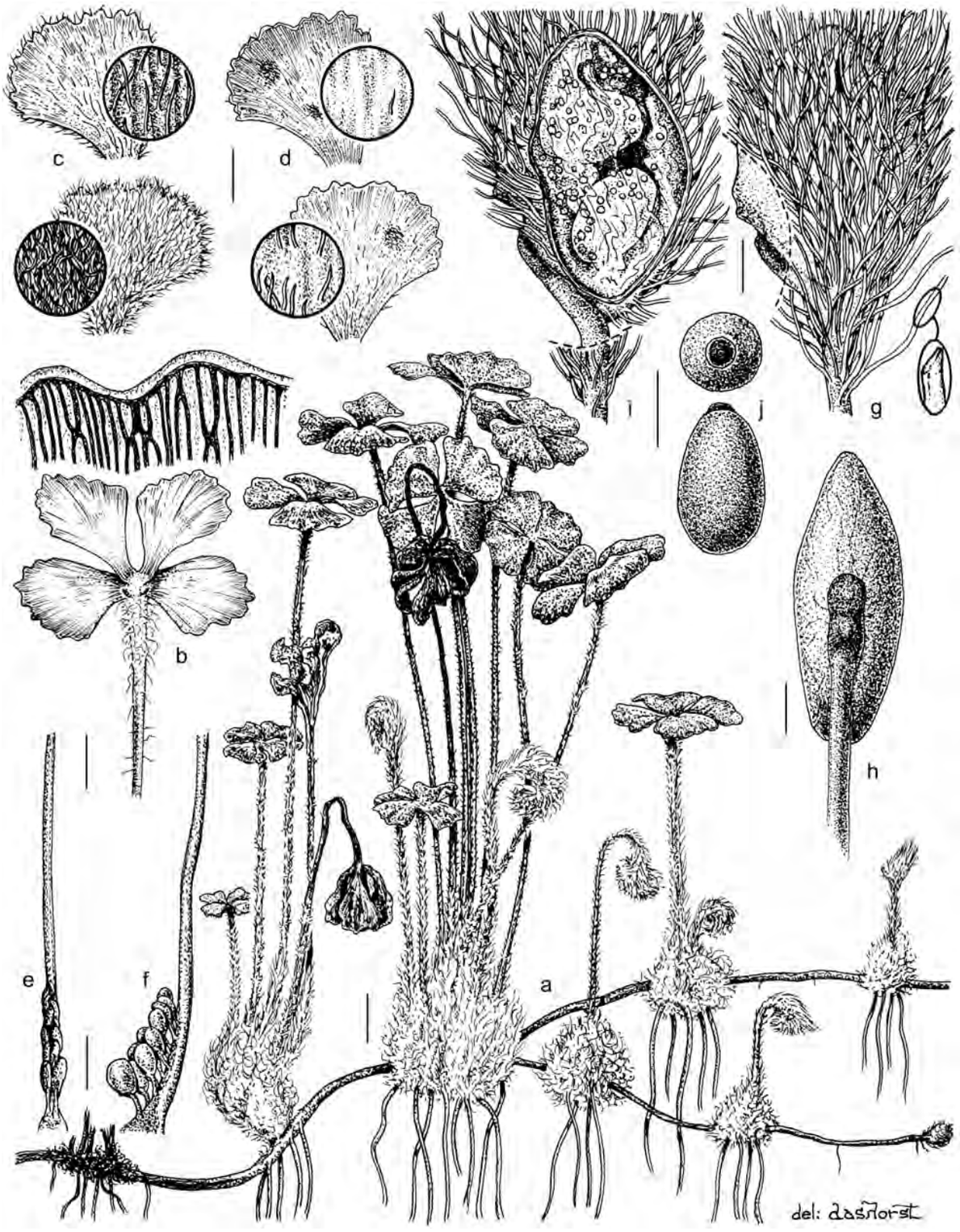


Fig. 1. *Marsilea cryptocarpa.* a plant habit; b arrangement of frond leaflets with enlargement (above) showing anastomosing veins; c–d upper and lower surfaces of leaflets showing variations in hair density; e–f front and side view of stipe base showing developing sporocarps (hairs removed); g lateral view of sporocarp with hair partially removed to show poorly developed tooth and enlargement of hair; h dorsal view of sporocarp (hairs removed); i longitudinal section through sporocarp showing two megasporangia embedded in mucilage with numerous microsporangia (small circles); j top and side view of megasporangium. Scale bars: a–b 10 mm; c–d 5 mm; e–f 5 mm; g–j 0.5 mm. a–c, e–j *Albrecht & Latz 12094*; d *Weber* 5837.

Fig. 2. *Marsilea cryptocarpa* population at Neutral Junction Station. *D.E.Albrecht 12094 & P.K.Latz.*

Fig. 3. Branch of *Marsilea cryptocarpa* showing the crowded stipe bases and the dense matted hair enveloping the rhizome and sporocarps. A small portion of hair has been removed to show the hidden sporocarps.

Fig. 4. Enlargement to show three sporocarps of *Marsilea cryptocarpa* and orange (when fresh) protuberance.

***Distribution and habitat.*** *Marsilea cryptocarpa* is currently known from only three widely separated sites (see Fig. 5). Two occur in the Northern Territory: one approximately 300 km north of Alice Springs and the other approximately 280 km ESE of Alice Springs. The only known South Australian population is in the Lake Eyre region some 1000 km to the south-southeast of the northern-most Northern Territory population. Due to its superficial resemblance to some forms of the widely distributed *Marsilea drummondi* A.Braun, the species may have been overlooked and be more common than might appear, especially if growing sympatrically with other species with obvious sporocarps which would be collected in preference to an apparently 'vegetative' plant.

At the type locality in the Northern Territory *Marsilea cryptocarpa* is localised in clay depressions on an open stony plain, where it forms monospecific patches, one of which is approximately 1 km by 200 m. The clay depressions are periodically water-filled and have a distinctive smooth cracking chocolate-like surface texture when dry. The type locality is within the Burt Plain bioregion (Albrecht et al., 2007) and habitat of this nature appears to be very rare in that bioregion. The other Northern Territory population occurs in the Simpson-Strzelecki Dunefield bioregion (Albrecht et al., 2007), which would appear to have more areas of suitable habitat. The South Australian population appears to occur in a similar habitat to the Northern Territory populations, being described as a muddy pool on a gibber plain (plain mantled by loose rock fragments).

***Conservation status.*** Although the species could be regarded as threatened on the basis of the limited population numbers, the lack of focused field survey in areas of potentially suitable habitat and its close superficial resemblance to infertile specimens of *Marsilea drummondii* would suggest that 'DD' (data deficient) sensu IUCN (2001) or nationally poorly known (3K) sensu ROTAP (Briggs & Leigh 1996) is the appropriate conservation code. Based on present knowledge the species is unreserved.

***Etymology.*** The specific epithet is derived from the Greek *crypto-*, covered, hidden, concealed and *-carpos*, fruit; referring to the hidden sporocarps characteristic of this species.

***Notes.*** *Marsilea cryptocarpa* is distinguished from other Australian species of *Marsilea* by the dense clusters of small (to 3 mm long) short-stalked conceptacles that have at most one poorly developed basal tooth and are covered in dense long cottony hairs. The hairs on adjacent sporocarps become entanged to such an extent that individual sporocarps in a cluster are not distinguishable without microscopic examination. It is for this reason that fertile specimens are frequently passed over as being sterile.

Fig. 5. Distribution of *Marsilea cryptocarpa*.

Using the treatment of Jones (1998), fertile specimens of *Marsilea cryptocarpa* would key to *M. crenata* C.Presl or *M. costulifera* D.L.Jones. However both of these species are less robust with finer stipes and smaller leaflets, the sporocarps are readily detected, and the conceptacles have shorter hairs (<3 mm long) and at least one prominent basal tooth. *Marsilea cryptocarpa* is probably more likely to be confused with *Marsilea drummondii* as the latter can have a similar disposition and similar sized fronds, crenate leaflets and dense masses of cottony hairs on the rhizome, stipe bases and primordial fronds. However, *Marsilea drummondii* is readily separated from *Marsilea cryptocarpa* when fertile as its conceptacles are long-stalked and are considerably larger (4–9 mm long) with prominent teeth.

### *Specimens examined*

Northern Territory: WNW of Claypan Bore, Neutral Junction Station, 25 July 2000, *D.E.Albrecht 9192* (NT A099150); 112 km SSE of Atula Homestead, Simpson Desert, 19 Sep. 2001, *P.K.Latz 18019* (NT A0104483).

South Australia: **Lake Eyre:** c. 20 km S of Stuart Creek Homestead, 6 Oct.1978, *J.Z.Weber 5837* (AD 97842372).

## Identification key

The key to *Marsilea* in *Flora of Australia* (Jones 1998, p. 167) should be modified as follows:

**1:** Stalks of sporocarp c. as long as conceptacles

**4.** Conceptacles to 3 mm long

**5.** Sporocarps 6–12 in a dense row at very base of stipe; conceptacles completely hidden in long cottony hairs 3–6 mm long, upper tooth poorly developed, lower tooth usually absent . . . . . **M. cryptocarpa**

**5:** Sporocarps solitary on in small groups of < 6 at stipe bases; conceptacles not hidden by indumentum, hairs < 3 mm long, two well-defined teeth present

**5A.** Conceptacles ribbed; upper surface concave . . . . . **M. costulifera**

**5A:** Conceptacles not ribbed; upper surface convex . . . . . **M. crenata**

**4:** Conceptacles more than 4 mm long

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