

THE AUSTRALIAN SPECIES OF WOLFFIA (LEMNACEAE)

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Two species of *Wolffia* are known from Australia; these can be easily identified by means of the following key.

1. Dorsal side slightly convex; ventral side laterally compressed, with a slight bulge below the budding pouch; width greatest in the dorsal plane 1. *W. australiana*
1. Dorsal side flat near the apex and convex near the base; ventral side globular; width greatest below the dorsal plane at \pm half the height. 2. *W. globosa*

1. *Wolffia australiana* (Benth.) den Hartog & v. d. Plas, *nov. comb.* — *W. arrhiza* var. *australiana* Benth., Fl. Austr. 7 (1878) 162; Evans, Contr. N.S.W. Nat. Herb. 4 (1970) 88; den Hartog & v. d. Plas, Blumea 18 (1970) 367. — *W. michelii* (non Schleid.) F. v. M., Fragm. 8 (1874) 187. — *W. arrhiza* (non L.) Willis, Handb. Fl. Vict. 1 (1962) 270; Moore & Edgar, Fl. New Zeal. 2 (1970) 55, f. 10. — Fig. 1.

*Fronde*s with elliptic dorsal outline, up to twice as long as wide; 0.50—0.95 mm long, 0.30—0.52 mm wide, and 0.79—1.32 mm high, base and apex obtuse; margin with a few small papillae, almost smooth; dorsal side slightly convex with a few small, median papillae; ventral side inflated, not globular but laterally compressed, with a slight bulge below the budding pouch; width greatest in the dorsal plane; green, without brown pigment cells. *Budding pouch* funnel-shaped, laterally compressed; collar indistinct.

Lectotype: Victoria, Mount Emu Creek, von Müller (K).

Other material studied:

VICTORIA. Lake Kangaroo, in open spots along the banks between stands of *Typha*, together with *Spirodela punctata*, *Azolla filiculoides*, and *Ricciocarpus natans*, 7-12-1967, den Hartog 1186 (L).

The species is known to occur in the states of Victoria, New South Wales, and South Australia (Evans, l.c.). Moore & Edgar l.c. record *W. arrhiza* for New Zealand, but their description and figure match *W. australiana*.

Note. There has been uncertainty regarding the status of the Australian species of *Wolffia* from the time that a representative of this genus was found in Australia. F. von Mueller (Fragm. 8, 1874, p. 187) who collected a *Wolffia* 'in paludibus prope Mount Emu' accepted the name '*Wolffia michelii* Schleid.' for it, on the authority of Hegelmaier who was not able to distinguish it from the European species in dried condition. Von Mueller's doubt is apparent from the following remark: 'Planta Australiana mihi apparet magis compressa et deorsum turgidior quam legitima'. He referred to the illustrations of Kurz' 'Enumeration of Indian Lemnaceae' (J. Linn Soc. 9, 1867, p. 264—268, pl. 5) which, however, give a picture of *Wolffia globosa* (sub nomine *W. delilii*). The dorsal view of this species is indeed very similar to that of Von Mueller's plants.

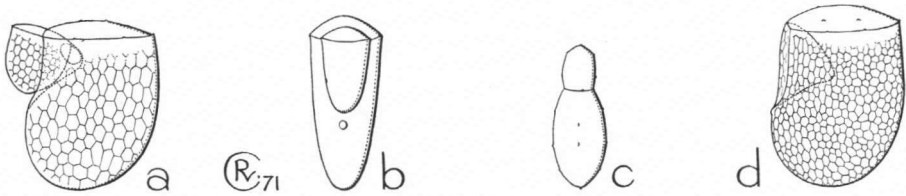


Fig. 1. *Wolffia australiana* (Benth.) den Hartog & v. d. Plas. — a. Lateral view, showing internal structure. b. View towards the pouch. c. Dorsal view. d. Lateral view, showing the pattern of the epidermis cells. (a—d: $\times 20$; den Hartog 1186).

Bentham (Fl. austr. 7, 1878, p. 162) distinguished the Australian material as a separate variety of the European species: *Wolffia arrhiza* var. *australiana*, and recorded it from Mount Emu Creek, Lake Towang, and swamps near Mount Gilibrand. Regrettably its description was very cryptic, and did not really contribute to a clarification of the characters of the Australian material, except for a rectification of the measurements as given by von Mueller.

Willis (Handb. Pl. Vict. 1, 1962, p. 270) stated that it is uncertain whether the Victorian specimens really are conspecific with *W. arrhiza*, but according to Eichler (Black, Fl. S. Austr. ed. 2, Suppl., 1965, p. 78) there is no doubt that the collections of *Wolffia* made in South Australia do not belong to *W. arrhiza*, and are 'probably conspecific with *W. arrhiza* var. *australiana*'. Eichler hesitated, however, to give the varietal name specific rank, 'because of the inadequate type specimen'. It is not clear which specimen he meant as so far no lectotype of this variety has been indicated, but we agree that this 'variety' represents a very distinct species. We propose to choose as the lectotype the material collected by von Mueller near Mount Emu. This material has been cited by Bentham, and is in excellent condition. Similar material has been collected and preserved in alcohol by the senior author from Lake Kangaroo (den Hartog 1186) and this material has been used for the description.

2. *Wolffia globosa* (Roxb.) den Hartog & v. d. Plas, Blumea 18 (1970) 367; v. d. Plas, Fl. Males I, 7 (1971) 222, f. 8a — *Lemna globosa* Roxb., [Hort. Beng. (1814) 66, nomen] Fl. Ind. ed. Carey 3 (1832) 565 — *Wolffia* sp. Evans, Contr. N.S.W. Nat. Herb. 4 (1970) 88.

*Fronde*s with elliptic to oblong dorsal outline, ca. $1\frac{1}{2}$ times as long as wide, 0.30—0.73 by 0.20—0.33 mm, 0.23—0.55 mm high; base and apex obtuse; margin with a few distinct papillae; dorsal side flat near the apex and convex near the base, with a few papillae; ventral side strongly inflated, globular, with large cells; width greatest below the dorsal plane, at about half the height; green, without brown pigment cells in the epidermis, chlorophyll restricted to the subepidermal marginal zone; when looked at from above the margins appear green and the central part pale. *Budding pouch* funnel-shaped, often with a distinct collar of elongate cells.

WESTERN AUSTRALIA. Kimberley District, Oobagooma, in shallow muddy pools shaded by *Melaleuca* and *Eucalyptus*, S. of Round Hill, c. 10 miles S. of Oobagooma, forming a closed layer on the surface of the pools, almost without any admixture of *Lemna perpusilla*, 25-9-1967: den Hartog 653 (L).

QUEENSLAND. Cairns, Rumula, Hunters Creek, together with *Spirodela punctata*, November 1967: den Hartog s.n. (L). Townsville, Bohle River, rather numerous in pond together with *Spirodela punctata*, fl., 11-10-1967: den Hartog 778 (L); *ibidem*, 21-10-1967, den Hartog 853 (L). Brisbane, March 1956: Com Bailey (K).

The species is widely distributed in South and East Asia, Malesia, and Australia. In Australia it is known from the states of New South Wales, South Australia, Western Australia, and Queensland (Evans, l.c.). There is also a record from tropical Africa (Hegelmaier, Monogr. Lemnac. 1868, as *W. cylindracea* Hegelm.). A record of *W. cylindracea* from California (Mason, Fl. marshes Calif., 1957, p. 341, f. 165 h—l.) may relate to the same species, but we have not been able to check the material.

Most of the material was collected by the senior author during a journey through Australia, which was subsidized by the Netherlands Foundation for the Advancement of Tropical Research (WOTRO), The Hague.