

Elatine macrocalyx (Elatinaceae), a new species from central and western Australia

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Abstract

Albrecht, D.E. *Elatine macrocalyx* (Elatinaceae), a new species from central and western Australia. *Nuytsia* 14(3): 319–324 (2002). *Elatine macrocalyx* Albr. sp. nov. is described and illustrated, with notes on its distribution, conservation status and ecology. A key to Australian species of *Elatine* L. is provided.

Introduction

The genus *Elatine* L. (Elatinaceae), with approximately 30 species, has a cosmopolitan distribution, though most species occur in temperate or cool areas. The classification of some taxa is in a state of flux, with few authors in agreement (Schmidt-Mumm & Bernal 1995) and the genus is in need of revision on a worldwide basis.

A single species, *Elatine gratioloides* Cunn., has been recognised for Australia. It is widely distributed, occurring in all States and Territories. Various other names have been applied to the Australian species. For example Backer (1951) included it under a very wide circumscription of *E. triandra* Schkuhr, and Tucker (1986) considered that it should be referred to *E. americana* Arn. Backer's proposition has not gained acceptance in Australia (Willis 1973; Aston 1977) and it is unlikely that Tucker's has been seriously investigated. The Australian material is referred to here as *E. gratioloides sens. lat.* as it differs from the type of *E. gratioloides* from New Zealand and may require a new name (Dennis Morris pers. comm.).

During the course of ground-truthing a vegetation map of the Alice Springs municipality (Albrecht & Pitts, in press), shortly after a period of exceptional rainfall in central Australia, material of an apparently new species of *Elatine* was collected. Subsequent examination of *Elatine* material housed at DNA revealed that this taxon had been collected on several previous occasions, as long ago as 1973, but has hitherto been included with *E. gratioloides*. This new species is here described.

Taxonomy

Key to species of *Elatine* in Australia

1. Sepals 2–3 mm long, equal to or longer than the petals; fruit indehiscent, firm-textured, not moulded to the shape of the enclosed seed mass; seeds with 7–10 pits in each longitudinal row; diminutive herb forming small prostrate mats on margins of clay pans ***E. macrocalyx***
1. Sepals < 1 mm long, *c.* half the length of the petals; fruit dehiscent, thin-textured, in dried specimens collapsed and moulded to the shape of the enclosed seed mass prior to dehiscence; seeds with *c.* 12 or more pits in each longitudinal row; weak herb growing either as an aquatic or in wet mud beside waterbodies and watercourses ***E. gratioloides sens. lat.***

Elatine macrocalyx Albr., *sp. nov.*

Herba annua prostrata. Folia opposita, obovata plerumque, 3–7 mm longa, 1–3 mm lata, nervatura non manifesta. Flores trimeri, solitarii, sessiles, in axilla uni folii ulli paris. Sepala 2–3 mm longa. Petala 1.5–2.5 mm longa, sepala aequantes vel breviores. Stamina carpellis alternantibus. Fructus globosus depressus, non membranaceus, 1–2 mm longus, 2–4 mm latus. Semina brunnea, subcylindrica, recta vel curva parum, 0.4–0.5 mm longa; testa tessellata, foveis plus minusve hexagonis in 7–10 seriebus dispositis.

Typus: 6 km S of Newhaven Homestead, Northern Territory, 2 October 2000, P.K. Latz 16798 (*holo*: DNA (A100434); *iso*: NT, PERTH).

Prostrate glabrous annual *herb* forming dense small mats. *Stems* rooting at the nodes. *Leaves* opposite, light to mid green when plants are alive, lamina mostly obovate, sometimes somewhat spatulate, tapering to an indistinct petiole, 3–7 mm long, 1–3 mm wide, entire but usually with an apical hydathode and 1–3 marginal hydathodes, venation not evident in fresh material, apex obtuse; stipules membranous, narrowly triangular-subulate, 1.4–2.4 mm long, attenuate apically, \pm toothed. *Flowers* 3-merous, solitary and sessile in axil of only one leaf of any pair. *Sepals* 3, shortly united at base, oblong-elliptic to oblong-ovate or oblong-obovate, 2–3 mm long, 1.2–1.8 mm wide, sometimes with irregular marginal teeth, obtuse. *Petals* 3, white, sometimes with a green tinge externally towards the distal end, strongly concave, mostly oblong-elliptic, occasionally oblong-ovate or oblong-obovate, 1.5–2.5 mm long, 1.1–1.8 mm wide, equal to or shorter than the sepals. *Stamens* 3, alternating with the carpels, filaments 1.6–2.2 mm long, appressed to carpel surface, anthers 0.2–0.3 mm long, apiculate. *Carpels* 3; styles 3, *c.* 0.1 mm long. *Fruit* green or pink-tinged, drying brown, depressed globose, not membranous, 1–2 mm long, 2–4 mm wide, apparently indehiscent. *Seeds* brown, subcylindrical, straight to slightly curved, 0.4–0.5 mm long, *c.* 0.2 mm thick, obtuse at both ends but also with a tiny apiculum at one end; seed coat tessellate with longitudinal rows of 7–10 more or less hexagonal pits. (Figure 1)

Other specimens examined. WESTERN AUSTRALIA: Lake Cronin (near Forrestiana, E of Hyden), 7 May 1978, G.J. Keighery 1666 (PERTH); Goongarrie Station, 21 km NNE of homestead, 5 Nov. 1995, G.J. Keighery 14142 (PERTH).

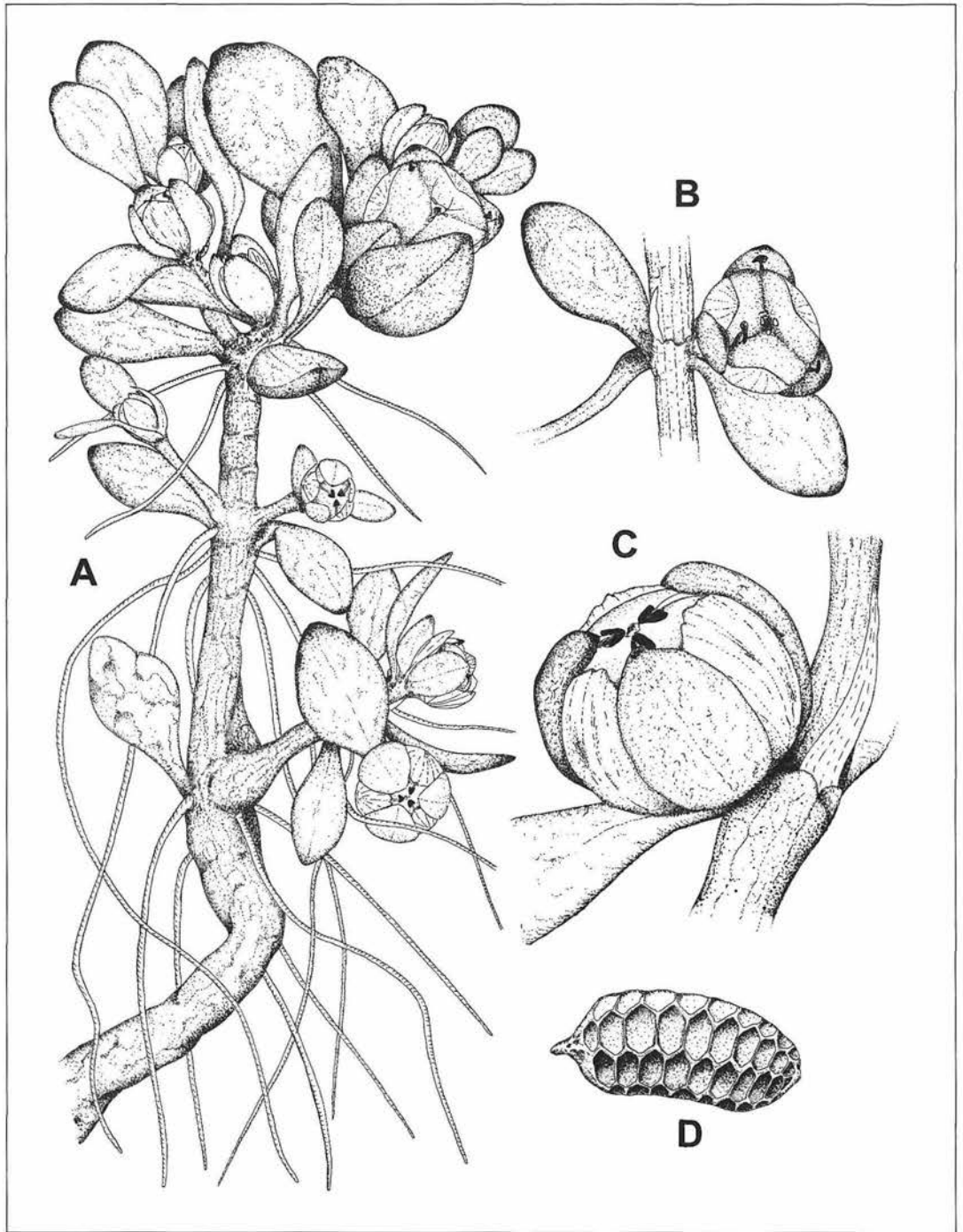


Figure 1. *Elatine macrocalyx*, drawn from Albrecht 9320. A – habit, x7; B – flower, x6; C – fruit, x12. D – seed, x80.

NORTHERN TERRITORY: Ilparpa clay pans, 4 Aug. 2000, *D.E. Albrecht* 9320 (NT); Napperby Station, 8 May 1975, *Henshall* 1014 (DNA); 14 miles [22 km] S of Rabbit Flat, 21 July 1973, *P.K. Latz* 4069 (DNA, NT, BRI, CANB); 4 km E of Wycliffe Well, 24 June 1974, *P.K. Latz* 5545 (DNA); Rabbit Flat Road House, 30 May 1980, *P.K. Latz* 8391 (DNA, PERTH); Fat Dingo Swamp, Tanami Desert, 14 July 1980, *P.K. Latz* 8415 (DNA, NSW, MEL); 75 km NW of Lake Surprise, 19 Aug. 1991, *P.K. Latz* 12212 (DNA, NT, AD, MEL).

Distribution. *Elatine macrocalyx* is presently known from eight locations in arid parts of the Northern Territory and two locations in Western Australia (Figure 2). Most collections made in the Northern Territory are from the Tanami bioregion, with fewer collections from the Great Sandy Desert and MacDonnell Ranges bioregions. In Western Australia collections have been made from the Murchison and Mallee bioregions.

Habitat and ecology. With the exception of a single occurrence in the South West Botanical Province of Western Australia, *Elatine macrocalyx* appears to be restricted to locations with an Eremaean climate. All known populations occur in herbfields on temporarily moist margins of playa lakes and clay pans. The soils are typically shallow sands over clay. The soil pH at one site tested (Ilparpa clay pans) is 9. In the Northern Territory associated species include *Peplidium aithocheilum* W.R. Barker, *Glossostigma diandrum* (L.) Kuntze, *Triglochin calcitrapum* Hook., *Eragrostis kennedyae* F. Turner, *Schoenoplectus dissachanthus* (S.T. Blake) Raynal, *Cyperus rigidellus* (Benth.) J.M. Black, *Centipeda thespidioides* F. Muell., *Centipeda* D18576 Andado, *Bergia trimera* Fisch. & C.A. Mey., *Marsilea exarata* A. Braun and *Eucalyptus victrix* L.A.S. Johnson & K.D. Hill.

The extent of occurrence spans a considerable latitudinal range and includes several bioclimatic zones. In the north of its geographic range rainfall occurs predominantly in summer, whereas in the south rainfall occurs predominantly in winter. It is probable therefore that the species is able to germinate over a range of temperatures provided there is sufficient rain. There is anecdotal evidence that *Elatine macrocalyx* may require exceptional rainfall events to germinate, at least at some locations. It was seen for the first time near Alice Springs following the big rains of 2000 in an area that has been closely scrutinised for a number of years by local botanists. At this site the sandy claypan margins were fully inundated for several weeks in 2000. Some other co-occurring annual species in arid NT, such as *Elacholoma hornii* F. Muell. & Tate and *Stylidium inaequipetalum* J.M. Black have a similar germination strategy and are rare in 'time' rather than 'space'.

Phenology. Flowering and fruiting specimens have been collected between May and October. It is likely that flowering and fruiting could occur at any time of the year if there were sufficient moisture. Transplants grown in glasshouse conditions flowered and fruited throughout summer in Alice Springs.

Conservation status. Conservation codes for Western Australian Flora: Priority Three. *Elatine macrocalyx* occurs within a region that is relatively poorly surveyed and further field work after good rains is required to determine the area of occupancy throughout the rather large extent of occurrence. The species may be locally common at some sites following adequate rainfall, however, individual populations are spatially very small. *Elatine macrocalyx* is unlikely to be threatened at present, however, it may be rare. As a tentative measure *Elatine macrocalyx* is assigned a risk code of 3K. No populations are presently known from a gazetted biological reserve, though the type population occurs on a former pastoral station being managed for conservation by Birds Australia.

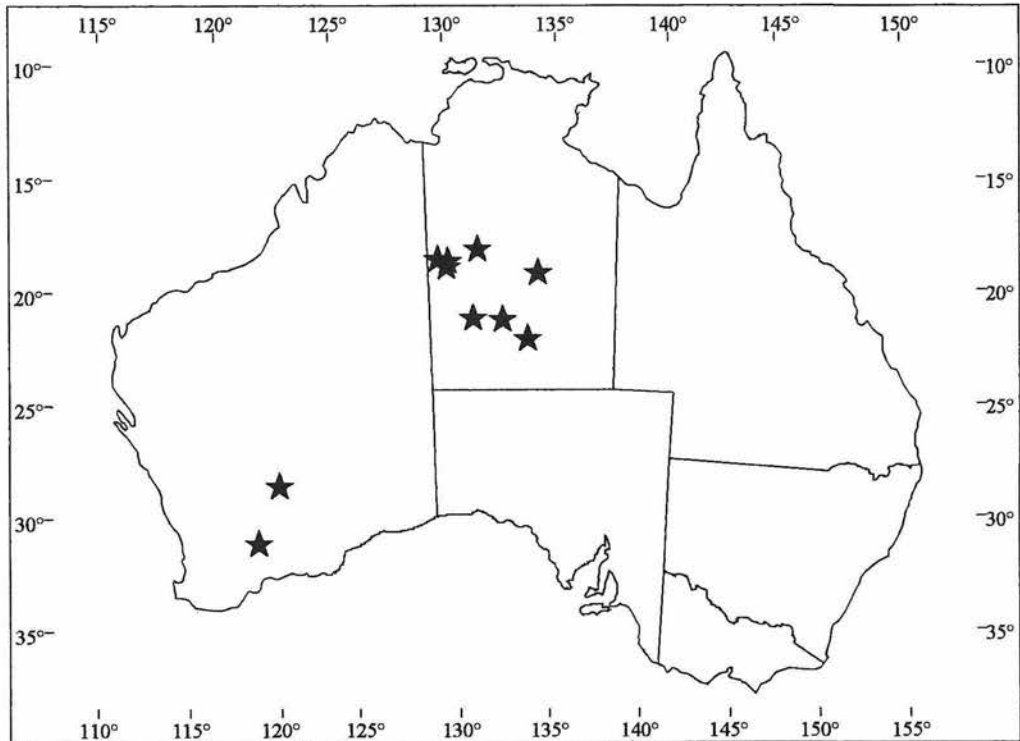


Figure 2. Distribution of *Elatine macrocalyx* based on herbarium specimens lodged at DNA and PERTH.

Etymology. The specific epithet is of Greek origin and refers to the large calyx, one of the salient characteristics distinguishing this new species.

Notes. Within the Northern Territory *Elatine macrocalyx* has been informally known by the phrase name *Elatine* D14201 (claypans).

Elatine macrocalyx is placed in the section *Crypta* (Nutt.) Seub., having opposite (rather than whorled) leaves and stamens equal in number to the petals. Available descriptions and keys for extra-Australian *Elatine* species (e.g. Niedenzu 1925; Fasset 1939; Schmidt-Mumm & Bernal 1995) were consulted, however, specimens of extra-Australian *Elatine* were not examined. Resolution of the relationship between *Elatine macrocalyx* and other members of the genus will only be possible when *Elatine* is monographed on a worldwide basis.

Elatine macrocalyx can be distinguished from *E. gratioloides sens. lat.*, the only other recognised Australian species, using the key provided above. Additional characters differentiating *E. macrocalyx* from *E. gratioloides* are the narrower stipules with an attenuate tip and leaf venation that is not obvious. The two species are sympatric in central Australia, however, *E. macrocalyx* occurs on the margins of playa lakes and claypans, whereas *E. gratioloides* occurs in or around permanent or semi-permanent waterholes in range systems.

Compared with *E. gratioides*, specimens of *E. macrocalyx* show relatively little variation in vegetative characteristics, however, there is some variation in the colour of the fresh fruit, ranging from green to pink-tinged, and in fruit width.

All specimens observed in the herbarium and in the field have had cleistogamous flowers. Keighery (1984) reported cleistogamy in *E. gratioides*, citing two specimens, one of which (Keighery 1666 from Lake Cronin) is *E. macrocalyx*. The Lake Cronin specimen is also illustrated in this paper. Cleistogamy has been reported in other taxa of *Elatine* (Salisbury 1967; Tucker 1986).

Elatine macrocalyx is possibly unusual in the genus in having apparently indehiscent fruits with non-membranous walls. The population at Ilparpa Swamp near Alice Springs was examined on several occasions between August 2000 and February 2001. Plants died in late September 2000 owing to lack of available moisture. Over the following five months of observation the plants turned a rich brown colour and the fruit remained indehiscent. An accumulative total of approximately 50 mm of rain fell during this five-month period, producing no influence on fruit dehiscence.

Acknowledgements

Greg Keighery and Dennis Morris kindly checked specimens in PERTH and HO respectively and provided useful comments on the distinctiveness of *E. macrocalyx*. Robyn Barker and Dean Cunningham checked material in AD. Jurgen Heucke and Birgit Dorges translated Niedenzu's treatment from German. Neville Walsh prepared the Latin description, Angus Duguid prepared the map and Thomas Bosch prepared the illustration.

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