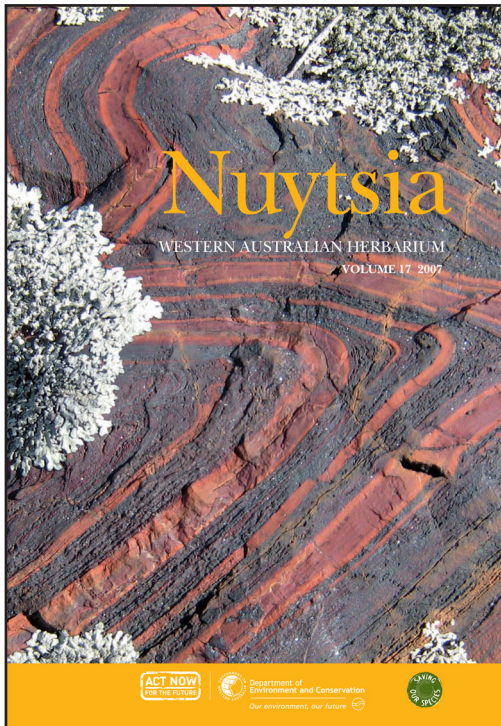


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## ***Wurmbea inflata* (Colchicaceae), a new species from the Gascoyne region of Western Australia**

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### **Abstract**

Macfarlane, T.D. & Case, A.L. *Wurmbea inflata* (Colchicaceae), a new species from the Gascoyne region of Western Australia. *Nuytsia* 17: 223–228 (2007). A new species of *Wurmbea*, *W. inflata* T.Macfarlane & A.Case, is described and illustrated with photographs and a distribution map. The new species is known from a number of populations from the Kennedy Range to east of Mt Augustus, where it grows on rocky hillsides. It is notable for the enlarged fruits composed of four carpels.

### **Introduction**

*Wurmbea* Thunb. (Colchicaceae) has been extensively studied taxonomically, with modern revisions having been published for Australia (Macfarlane 1980, 1987) and South Australia (Bates 1995, 2007) and occasional additional species described (e.g. Macfarlane 1993, Macfarlane & van Leeuwen 1996). The genus also occurs in Africa (Nordenstam 1978, 1986; Vinnersten & Manning 2007). Because of variation within the genus for sexual reproductive strategies, there has also been research on reproductive biology and phylogeny, as reviewed by Barrett and Case (2006).

The new species described here was unknown at the time of the earlier revisions covering Western Australian species. It was first collected by Ken Newbey in August 1987, in almost mature fruit. Because of the remoteness of its distribution and the earliness of its flowering, it has taken some time to see an adequate sample of flowering plants and to determine which populations belong to this species. Recent field work has documented a larger number of populations than was previously suspected and allowed variation and habitat characteristics to be investigated.

### **Description**

***Wurmbea inflata*** T.Macfarlane & A.Case, *sp. nov.*

Folia duo, lata, basalia. Flores 1–3 (plerumque 1 vel 2), vulgo rosei, plerumque tepalis 8 et carpellis 4; nectarium singulare, saccatum, concolorum vel pallidius quam tepala; styli ad basim conjuncti. Fructus grandis, inflatus; pedunculi fructiferi plerumque decumbentes.

*Typus*: Cobra Station, Cobra – Gifford Creek Road, 3.8 km NW of junction with Cobra – Dairy Creek Road, c. 40 km W of Mt Augustus, Western Australia, 29 May 2007, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 4022 (*holo*: PERTH 07636180; *iso*: CANB, MEL).

*Wurmbea* sp. Kennedy Range (K.R. Newbey 11582), in G. Paczkowska & A.R. Chapman, West. Austral. Fl.: Descr. Cat. p. 40 (2000).

*Plants* 5–15 cm to top of inflorescence. *Corm* c. 1.3–2.2 cm long, 1–1.8 cm diam., globular, 7–14 cm below soil surface. *Plants* 5–9 cm tall to top of inflorescence. *Leaves* 2, both basal or the second slightly higher but without a naked internode between them, similar but the second narrower, erect to somewhat spreading, rather stiff, relatively short, about equal to the inflorescence or exceeding it by c. 1 cm, lamina approximately linear, 4–5(–16) mm wide at the middle, wider basally but not abruptly dilated, the base of the lowest wrapped around the base of the second leaf, and the second wrapped around the stem for a short distance, tapering gradually to the apex, the sides curved upward to form a U-shaped channel above, dark glossy green. *Peduncle* erect in flower, the flowers upward-facing, well-spaced, the axis zigzagged. *Flowers* 1 or 2(3), pale to medium pink or occasionally white, sweet scented, all hermaphrodite or occasionally the uppermost one male. *Perianth* 8–9.5 mm long, forming a cup-shaped tube for c. 1–1.2 mm, the segments erect until near the apex where they become spreading, or spreading evenly from near the base. *Tepals* usually 8, sometimes 6 or 7, occasionally higher or lower numbers but then usually showing abnormalities, varying in width within populations, narrowly elliptical to narrowly obovate, acute. *Nectary* 1 per tepal, inconspicuous, concolorous or paler than the rest of the tepal, located c. 2 mm from base of perianth, just above the filament insertion and well below the middle of the tepal, somewhat concealed by the filament, consisting of a shallow pouch-like glandular depression across the full width of the tepal, wider than long, the lower and lateral margins thickened and also glandular, the lower margin slightly overhanging the depression to give the pouch-like appearance which is more pronounced when dried, the upper margin not raised. *Stamens* attached just above the top of the perianth tube; filament slightly broader basally, the rest more or less uniform in diam., held stiffly erect so that the anthers form a fairly narrow ring around the anthers; anthers relatively long, c. 1.6–1.9 mm long, more or less exerted from the flower, elongated oblong, versatile, attached below the middle, yellow or dark red. *Ovary* usually with 4 carpels, occasionally 3, rarely 5, obloid, the carpel wings contiguous, connate only at the axis, the carpel shoulders rounded; styles the same number as the carpels, sharply delimited from the ovary, relatively long, c. 6 mm long, reaching or slightly exceeding the anthers, connate for a short but distinct distance at the base (c. 0.6 mm), erect and scarcely spreading, each tapering gradually to a fine apex with a minute terminal stigma, not recurving in fruit. *Ovules* 20–30 per locule. *Fruiting peduncles* erect, leaning or decumbent. *Capsules* greatly enlarged compared with the ovary, c. 23 mm long, spheroidal to obloid in outline, angled on locule midlines. (Figure 1)

*Other specimens examined*. WESTERN AUSTRALIA: [arranged east to west and north to south, some localities obfuscated] 17.5 km W of Lyons River homestead, 19 Aug. 1987, *K.R. Newbey* 11582 (PERTH); Kennedy Range, gorge on E side, 26 June 2006, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 3872 (PERTH); same location as preceding specimen, 28 May 2007, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 4019 (PERTH); c. 300 m S of Mt Sandiman Homestead turnoff, N of Gascoyne Junction, 26 June 2006, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 3873 (AD, PERTH); same location as preceding specimen, 28 May 2007, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 4018 (K, PERTH); 15 km SE of Lyndon Homestead on Lyndon – Mangaroon Road, 6 July 2002, *R. Davis* 10309 (PERTH); 29 km along Lyndon – Minnie Creek Road from Lyndon – Towera Road, 28 May 2007, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 4017 (PERTH); type locality, 28 June 2006, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 3884 (PERTH); 2.6 km from Cobra – Gifford Creek Road along Cobra – Mt Augustus Road, W of Mt Augustus, 28 June 2006, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 3885 (PERTH); same location

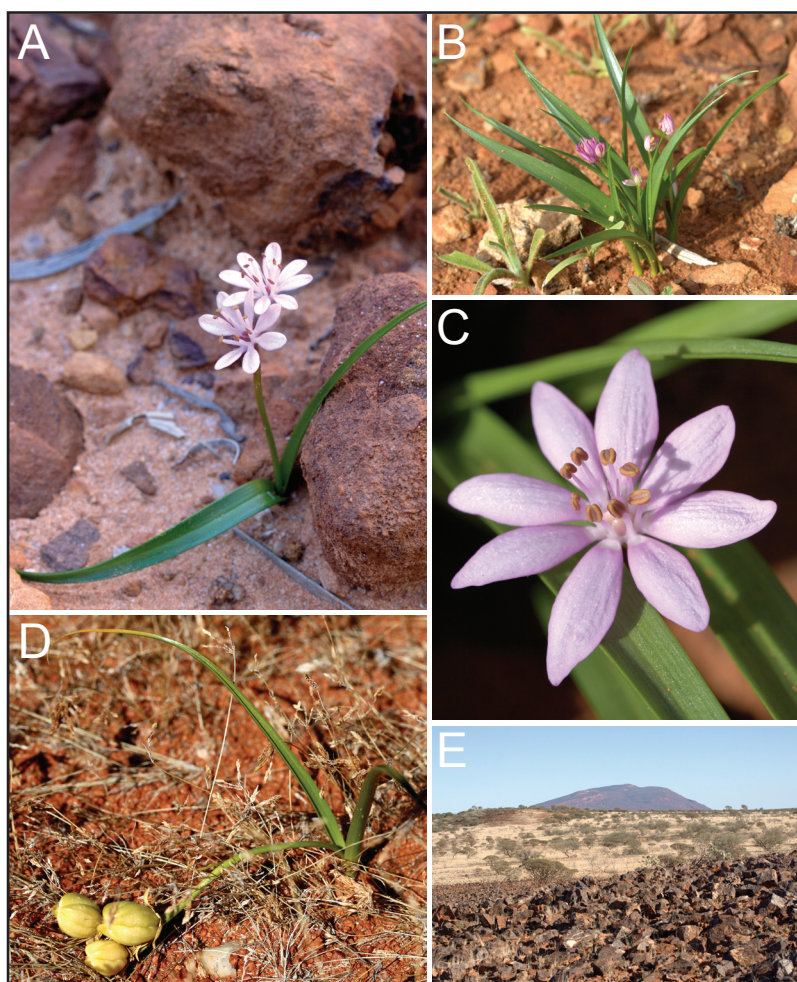


Figure 1. *Wurmbea inflata*. A – habit, a single flowering plant, *T.D. Macfarlane et al.* TDM 4019; B – habit, a group of plants with leaves wrapped around base of stem, *T.D. Macfarlane et al.* TDM 4018; C – flower, with pale nectaries visible at base of perianth lobes, *T.D. Macfarlane et al.* TDM 4018; D – fruiting plant with decumbent peduncle, *T.D. Macfarlane et al.* TDM 3887; E – habitat, among broken rocks in the foreground, with Mt Augustus (the site of another population) in the background, *T.D. Macfarlane et al.* TDM 4027. Photographs: A–D, Terry D. Macfarlane; E, Andrew P. Brown.

as preceding specimen, 29 May 2007, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 4023 (PERTH); 9 km from Cobra – Gifford Creek Road along Cobra – Mt Augustus Road, W of Mt Augustus, 28 June 2006, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 3886 (CANB, PERTH); same location as preceding specimen, 29 May 2007, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 4025 (PERTH); Mt Augustus, 27 July 1996, *A. Case & B. Cole* 59 (PERTH); Mount Augustus, 2 July 2003, *G. Byrne* 85 (PERTH); Mount Augustus, 21 June 1999, *T.D. Macfarlane & R. Davis* TDM 3306 (BRI, NSW, PERTH); Mount Augustus, 28 June 2006, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 3887 (PERTH); 8.8 km E along Mt Augustus – Woodlands Road from the Mt Augustus – Landor Road turnoff, 29 June 2006, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 3890 (CANB, PERTH); same location as preceding specimen, 30 May 2007, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 4027 (AD, PERTH); 28.6 km E of Gum Creek, 45 km E along Mt Augustus – Woodlands Road from the Mt Augustus – Landor Road turnoff, 30 May 2007, *T.D. Macfarlane, A.P. Brown & C.J. French* TDM 4030 (PERTH).

*Distribution and habitat.* Western Australia, Carnarvon and Gascoyne IBRA Bioregions (Thackway & Cresswell 1995), extending from the Kennedy Range and Lyndon River Station to 50 km E of Mt Augustus, and including Mt Augustus itself (Figures 1E, 2). This represents a west to east range of 220 km. *Wurmbea inflata* grows in shallow or sparse red loam between broken rocks on the slopes of rocky hills on the southerly aspect, occasionally also on the top or around the base of the hills, exceptionally around the northern base of Mt Augustus where it is watered by runoff. The hills range from small knolls to high ranges such as the Kennedy Range and Mt Augustus. The rocks are of various kinds including banded ironstone, and in different places the pieces range from the size of tennis balls to 0.5 m diameter, and may be angular, rounded or sharp and plate-like. Associated vegetation is a very open shrubland of various species from the genera *Acacia*, *Eremophila*, *Senna* and *Solanum*, with a sparse ground layer of subshrubs, herbs and grasses. Depending on the amount and season of preceding rainfall, some sites may have a relatively dense covering of species of *Aristida*, *Calandrinia* and *Ptilotus* or Asteraceae.

*Phenology.* Flowers in May to early June of years when there has been sufficient rainfall.

*Conservation status.* Currently without a conservation priority category. Approximately 11 populations are known over more than 200 km and including two national parks. Some populations are large, consisting of thousands of plants, others have relatively few plants. The association of the species with rocky hills including ironstones may represent a vulnerability of some populations to future exploitation of those hills.

*Etymology.* The specific epithet *inflata* is from a Latin adjective meaning bladdery, i.e. thin and swollen, alluding to the exceptional enlargement of the fruits.

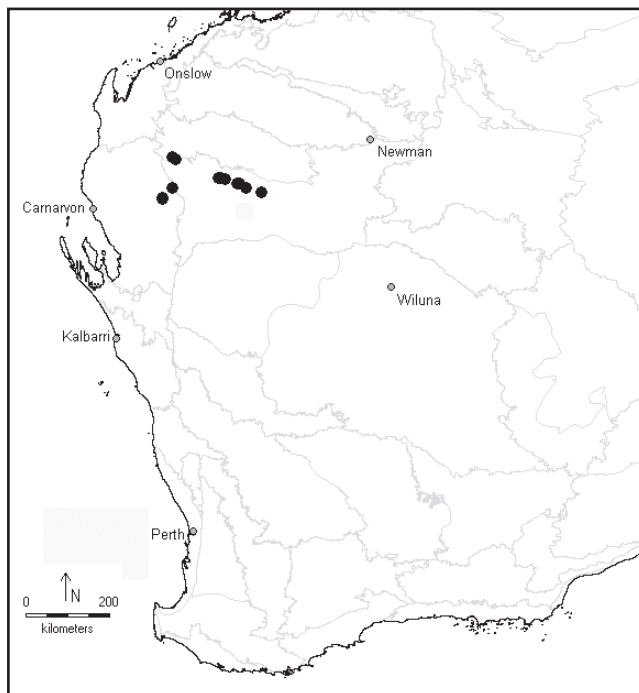


Figure 2. Distribution of *Wurmbea inflata* in Western Australia. Version 6.1 IBRA regions (Department of the Environment and Water Resources 2007) are indicated in grey.

*Notes.* *Wurmbea inflata* has a unique nectary form among Australian species, with its pouch-like form. The exceptionally enlarged fruit is a striking feature, and the usually 4-carpelled gynoecium is uncommon in the genus, although not unique (e.g. it is the normal condition in *W. tenella* (Endl.) Benth.). Characteristic of *W. inflata* is the broad but relatively short leaves which are wrapped around the lower part of the stem rather than curving away from the base of the lamina. The lack of a third leaf is unusual within the genus but not unique, being also found among the Western Australian species *W. odorata* T.Macfarlane and inconsistently in *W. pygmaea* (Endl.) Benth.

*Wurmbea inflata* is one of a group of species with pink flowers occurring mainly in the arid zone of the Gascoyne and Murchison regions of Western Australia, most of which are undescribed or only recently described. The most widespread of the group is the long-described *W. densiflora* (Benth.) T.Macfarlane which has a dense group of several flowers, notable for its long yellow anthers which are exserted; it differs from *W. inflata* by its nectaries, which are concealed at the base of the tepals and are poorly differentiated, by having three leaves, and by the basal leaves which do not wrap around the stem for a distance above their bases. North of the distribution of *W. inflata* is the recently described *W. saccata* T.Macfarlane & S.J.van Leeuwen from the Barlee Range (Macfarlane & van Leeuwen 1996), which also has a compact spike of several flowers, but differs from all other species by having the basal, concealed and poorly differentiated nectaries each located at the base of a funnel or tube formed from the fused edges of the adjacent tepal and staminal filament. A recently discovered undescribed species known informally as *Wurmbea* sp. Denham Pool (F. Hort et al. 2216) differs in several ways from *W. inflata* including having more flowers and concealed nectaries.

Within populations of *Wurmbea inflata* there is considerable variation in flower size, tepal width and number, and perianth colour, which ranges from pale to medium pink and occasionally white. The plants are often in groups, and usually these flower variations are characteristic of a group, which may represent occasional vegetative propagation from the secondary bud on the corm or from limited seed dispersal. Variation also occurs in whether the fruiting peduncle is erect, leaning or decumbent, and this tends to vary between populations.

No other *Wurmbea* species have been seen growing with *W. inflata* although at the Kennedy Range *W. inframediana* T.Macfarlane grows on sand dunes on top of the range including within metres of the top of the cliffs, on the slopes and base of which *W. inflata* grows. Similarly at Mt Augustus where *W. inflata* grows around the base in certain places, *W. deserticola* T. Macfarlane and *W. inframediana* have been collected on the upper slopes.

Little is known about the flower visitors and pollinators of *Wurmbea* species (Vaughton & Ramsey 1998; Case & Barrett 2004), especially in the arid zone, although it has been assumed that flies are the usual pollinators because of the relatively unspecialised flower structure and the abundant exposed nectar, as well as some observations of flies visiting flowers. *Wurmbea inflata* has exposed nectaries, which might suggest fly (Dipteran) pollination, although they are not contrastingly coloured as is the case in a number of species. Our field observations showed that flies are indeed avid visitors to the flowers of *W. inflata* and have been observed to probe the nectaries. They are large enough to make contact with the anthers and stigmas and their behaviour is such that pollen transfer is likely. At least two species were observed to visit flowers. However, other visitors were also frequently seen which also are likely pollinators, including two daytime species of Lepidoptera, and two species of bee (Hymenoptera), suggesting that this and perhaps other species of *Wurmbea* do not have specialised pollinator relationships. A similar spectrum of insect visitors to *W. dioica* (R.Br.) F.Muell. was observed by Vaughton and Ramsey (1998). Ants were also seen on the flowers but are not usually regarded as pollinators, and do not seem to exhibit pollinator behaviour such as contacting anthers.

*Wurmbea saccata*, which has nectaries located at the base of tubular structures resembling nectar spurs, has been suggested to be specialised for pollination by Lepidoptera although detailed field observations are lacking (Macfarlane & van Leeuwen 1996).

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