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CALLITRICHE (CALLITRICHACEAE) IN SOUTH AUSTRALIA

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Abstract

Two new records for the State, *C. hamulata* Ktzg., a European species previously known only from Victoria, and *C. umbonata* Hegelm., a native species previously known only from southern New South Wales, Victoria and northern Tasmania, are documented. A key and descriptions are provided for the four species now recognised as occurring in South Australia.

Black (1953) recognised only one species of *Callitriche* L. for South Australia, *C. verna* L. Eichler (1965), following Mason (1959) increased this to two, adding the native *C. sonderi* Hegelm., and correcting the name to be applied to the other species from *C. verna* to *C. stagnalis* Scop. Aston (1973), who also based her account largely on that of Mason, made no further additions. Recently, collections have been made which add a further two species to the State's *Callitriche* flora, the native *C. umbonata* Hegelm. and the adventive *C. hamulata* Ktzg. The four species can be distinguished as follows. Mature fruits are essential.

1a. Fruit broader than long, less than 1 mm long . . . . . 1. *C. sonderi*
b. Fruit round or longer than broad, 1-1.6 mm long.

2a. Lower leaves 3-nerved, ± spathulate; fruit faces ± flat . . . . . 2. *C. stagnalis*
b. Lower leaves 1-nerved, linear.

3a. Fruit umbonate at base, with inner margins of carpels distinctly appressed and raised at base . . . . . 3. *C. umbonata*
b. Fruit no umbonate, with ± flat faces . . . . . 4. *C. hamulata*

The descriptions below are based largely on those of Mason (1959), with minor alterations for some measurements. Specimens examined (all from AD) have been annotated.

1. C. sonderi Hegelm., Verh. bot. Ver. Brandenb. 9:18 (1867).

Published illustrations: Mason (1959) fig. 2 (a-d), fig. 2A (a-b); Aston (1973) fig. 18a.

Minute plant, terrestrial in areas subject to inundation, leaves all linear-obovate, 0.8-1.7 mm long, 0.4-0.7 mm wide, obscurely 3-nerved, the upper leaves not forming a rosette. Male and female flowers together in axils of both leaves of a pair, bracteoles present, linear-triangular, 0.2-0.3 mm long, pale. Stamen 0.4-1.0 mm long. Styles erect, 0.1-0.3 mm long. Fruit dark brown to greyish, ± cordate, 0.5-0.6 mm long, 0.7-0.8 mm wide, keeled and weakly winged, commissural groove shallow, bases of the nutlets at inner edge thickened and pushing against each other to form a small umbonate swelling. (Fig. 1, A-C.)

A minute species, mainly from inland areas of Queensland, New South Wales and Victoria. In South Australia it is only recorded from Cordillo Downs in the far north-east and from the floodplains of the River Murray near Loxton and Berri.

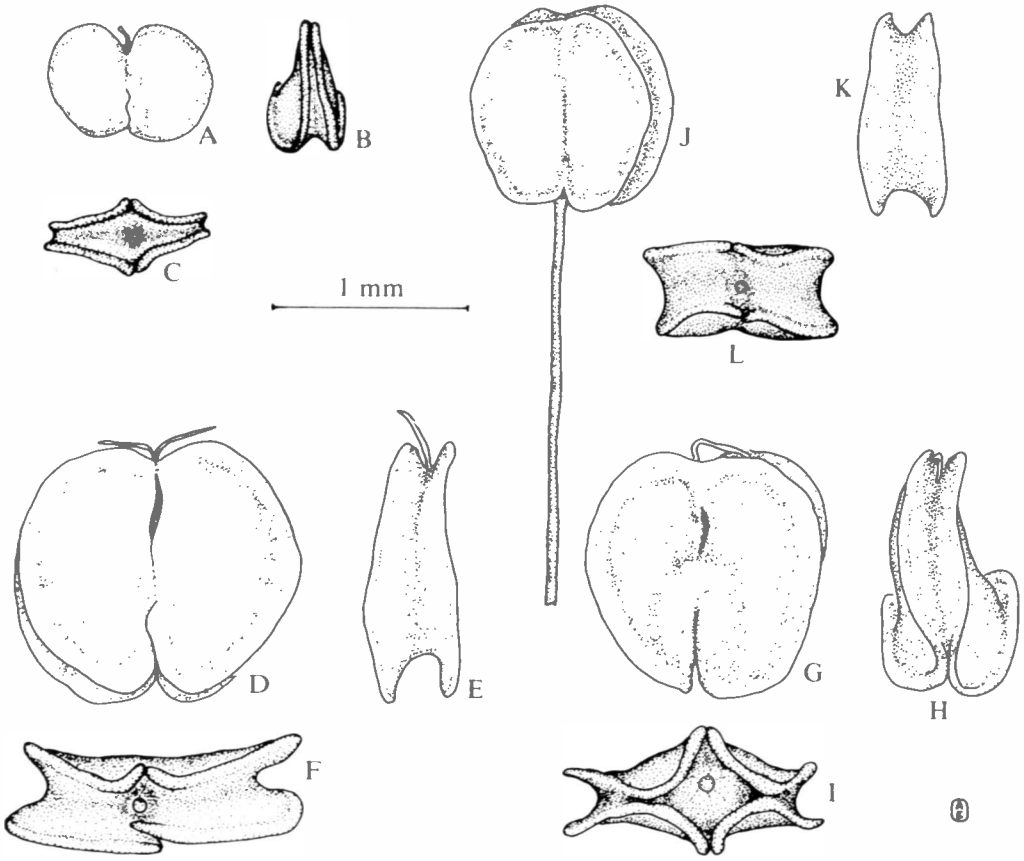

Fig. 1. Fruits of South Australian *Callitriche* (all to same scale). A-C, *Callitriche sonderi*. A, face view. B, side view. C, viewed from below. D-F, *Callitriche stagnalis*. D, face view. E, side view. F, viewed from below. G-I, *Callitriche umbonata*. G, face view. H, side view. I, viewed from below. J-L, *Callitriche hamulata*. J, face view. K, side view. L, viewed from below. (A-C. *Alcock s.n.*, AD 97041044. D-F. *Eichler 14337*. G-I. *Kraehenbuehl 476*. J-L. *Alcock 5*.)

2. **C. stagnalis** Scop., Fl. carniolica ed. 2, 2:251(1772).

Published illustrations: Schotsman (1954) pl. 9a; Mason (1959) fig. 10 (a-b), fig. 10A (a-e); Aston (1973) fig. 20 (a-g); Burbidge & Gray (1976) fig. 245.

Relatively robust plant, amphibious, leaves variable, from linear-spathulate through obovate to almost circular, (2.5-)7(-25) mm long, (1-)6(-9) mm wide, 3-, 5- or 7-nerved, upper leaves forming a rosette. Flowers solitary or male and female occurring together, bracteoles conspicuous and persistent, lanceolate, 0.8-1.5 mm long, white. Stamens 1.4-2.0 mm long. Styles 2.5-3.5 mm long, erect, becoming recurved in fruit. Fruit pale buff, about as long as broad, 1.2-1.7 mm diam., wing broad and running around the base and also usually the top of each nutlet, commissural groove wide and deep, faces of fruit ± flat. (Fig. 1, D-F.)

The largest of the *Callitriche* species in Australia, probably introduced, and found throughout the temperate regions of all States in damp places. In South Australia *C. stagnalis* is confined to the Mt Lofty and southern Flinders Ranges.

3. **C. umbonata** Hegelm., Verh. bot. Ver. Brandenb. 9:19 (1867).

Published illustrations: Mason (1959) fig. 5 (a-c), fig. 5A (a-b); Aston (1973) fig. 18d.

Amphibious herb, leaves in aquatic plants of two types. Lower leaves linear, 5-10 mm long, 0.4-0.5 mm wide, tapering to tip, emarginate, with a single midvein. Upper (rosette) leaves (± orbicular to) obovate, 6-8 mm long, 1.5-2.0 mm wide, with a broad petiole, 3-5-nerved. Flowers solitary in the axils of opposite leaves, bracteoles conspicuous and persistent, ca 0.7 mm long, white. Stamen with filament lengthening up to 3.5 mm long. Styles (0.6-) 1-2 mm long, spreading, deciduous. Fruit dark brown to grey, usually slightly longer than broad 1.1-1.5 mm long, 1.0-1.2 mm wide, wing narrow, pale brown and running around top, base and lower, inner edge of nutlets; the wings and edges of nutlets at base somewhat swollen and pressed against each other to form a prominent projection. (Fig. 1, G-I.)

Formerly known only from southern New South Wales, Victoria and northern Tasmania. There is one undoubted record from the south-east of South Australia (*Kraehenbuehl 976*, Wandillo road turnoff from main Mt Gambier to Glencoe West highway, 10.x.1963) and three other collections from the southern Mt Lofty Range that are somewhat intermediate between this species and *C. stagnalis* (*Cleland s.n.*, National Park, 8.xii.1962, AD 97233002. - *Cleland s.n.*, Mt Compass, 23.ii.1963, AD 96405205. - *Ising s.n.*, Stirling West, 26.xii.1956, AD 95707004).

The distinction between *C. umbonata* and *C. stagnalis* rests on two characters: the lower (submerged) leaves which in *C. umbonata* are linear and 1-nerved compared with spathulate and 3-nerved in *C. stagnalis*, and the umbonate swelling on the lower face of the *C. umbonata* fruit compared with the ± flat faces of the *C. stagnalis* fruits. The intermediate specimens referred to above have umbonate fruits but no sign of the lower linear leaves. I believe that they are anomalous specimens of *C. umbonata*, perhaps growing in a non-inundated situation. *Callitriche* is notoriously variable in its vegetative characters, and it has been shown experimentally (Schotsman, 1954) that some European species which, like *C. umbonata*, have linear leaves in the lower parts of the stem when growing in water sometimes fail to develop them when growing in a terrestrial environment.

4. **C. hamulata** Ktzg. in Koch, Synops. Fl. germ. et helv. ed. 1, 1:246 (1835)

Published illustrations: Schotsman (1954) pl. 7a, 13a, 14a, 16a; Mason (1959) fig. 11 (a-b); fig. 11A (a-c); Aston (1973) fig. 19 (a-d).

Aquatic or terrestrial herb, leaves in aquatic plants of two types. Submerged leaves linear, 6-30 mm long, 0.5-1.0 mm wide, deeply notched at tip, with a single midvein. Rosette leaves spathulate, ca 3-4 mm long, 1.3-1.7 mm wide, ± emarginate, 3-nerved. Leaves of land form linear-elliptic to elliptic, 1(-3)-nerved. Flowers solitary in the leaf axils, bracteoles absent or rarely present. Stamen 0.6-1.0 mm long, styles deflexed close to fruit, deciduous. Fruit sessile or on pedicel to 15 mm long, dark brown to greyish, longer than broad, or nearly circular, 1.1-1.2 mm long, 0.9-1.0(-1.4) mm wide, pale narrow wing running around top and base of nutlets, commissural groove broad and shallow, face of fruit ± flat. (Fig. 1, J-L.)

A European species introduced to New Zealand, Victoria and now South Australia. Only one South Australian collection has been made so far, from the south-eastern part of the State near the Victorian border (*Alcock 5*, Comaum, Dec. 1973). Aquatic plants of this species are easily identified as in the key. Terrestrial plants might key to *C. stagnalis* but are distinguished by their lack of bracteoles and dark coloured, usually pedicellate fruits.

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References

Aston, H.I. (1973). "Aquatic Plants of Australia" pp. 49-60. (Melbourne University Press: Carlton.)
Black, J.M. (1953). Callitrichaceae. "Flora of South Australia" (ed.2) p. 537. (Government Printer: Adelaide.)
Burbidge, N.T. & Gray, M. (1970). "Flora of the Australian Capital Territory". (Australian National University Press: Canberra.)
Eichler, Hj. (1965). "Supplement to J.M. Black's Flora of South Australia". (Government Printer: Adelaide.)
Mason, R. (1959). *Callitriche* in New Zealand and Australia. *Aust. J. Bot.* 7:295-327.
Schotsman, H.D. (1954). A taxonomic spectrum of the Section Eu-Callitriche in the Netherlands. *Acta Bot. Neerl.* 3:313-384.