

NEW SPECIES OF SCHOENUS (CYPERACEAE) AND TRITHURIA (HYDATELLACEAE)

by

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SUMMARY

Two new species, *Schoenus capillifolius* from Western Australia and *Trithuria lanterna* from the Northern Territory, are described. The significance of the basicarpic habit of the former is discussed.

DESCRIPTIONS

Schoenus capillifolius D. A. Cooke sp. nov.

Herba glabra annua subaquatica. *Caulis* brevissimus, suberectus in strato superiore substrati repetite ramificans caespes foliorum densi formans. *Folia* basales, vaginis apertis angustis scariosis sub-atropurpureis usque ad 3mm longis in laminis laxis filiformibus usque ad 10 cm longis 0.2 mm latis abrupte transientibus. *Culmi* nulli; spiculae sessiles in caespitibus foliorum ramos ultimos caulis terminans, solitariae uniflorae. *Glumae* 2 oppositae lineares subscariosae, tubum circum flosculum formandum arcte vaginantes; externa 7-10 mm longa, interna vix brevior. *Rhachilla* nulla. *Setae hypogynae* 6 plumosae albae sericeae c. 3mm longae, in situ saepe compactae intertextae circum ovarium tubi fundum basi complentes. *Stamen* 1 anticum, filamento capillario 7-12 mm longo; anthera pallida linearia c. 2 mm longa. *Stylus* tenuis c. 8 mm longus, glaber, cum ovario inarticulatus, stigmatis 3 brunneis filiformibus. *Nux* 1-1.3 mm longa, ovoidea turgida vix trigona, alba translucida fragilis, superficies ordinatione cellulosis hexagonis. *Semen* ovoideum 0.8 mm longum, testis laevi brunneis, endospermio albo farinaceo.

Glabrous subaquatic annual herb. *Stem* very short, semi-erect within the upper substrate, repeatedly branching to form dense leaf tufts at surface level. *Leaves* basal, with narrow scarious somewhat atropurpureous open sheaths up to 3 mm long passing abruptly into lax filiform laminae up to 10 cm long by 0.2 mm wide. *Culms* absent, the spikelets sessile in the leaf tufts, solitary, 1-flowered, terminating the ultimate branches of the stem. *Glumes* 2, opposite, linear, almost scarious, closely sheathing to form a tube around the floret; outer glume 7-10 mm long, the inner slightly shorter. *Rhachilla* absent. *Hypogynous bristles* 6, white silky plumose, c. 3 mm long, often packed and interwoven around the ovary to fill the expanded base of the tube. *Stamen* 1, anterior, with a capillary filament 7-12 mm long; anther pallid, linear, c. 2 mm long. *Style* slender, c. 8 mm long, glabrous, not articulate with the ovary, with 3 filiform stigmas. *Nut* 1-1.3 mm long, ovoid, turgid, scarcely trigonous, white-translucent, fragile, the faces with a hexagonal cell pattern. *Seed* ovoid, 0.8 mm long, with smooth brown testa and white farinaceous endosperm.

TYPE COLLECTION:

Western Australia—Upper Swan, 11.xi.1959, R. D. Royce 6148 (Holo: PERTH!)

ALSO EXAMINED:

Western Australia—Ellen Brook Tortoise Reserve (J. B. Martyn), 30 km north of Midland, 10.xi.1978, G. J. Keighery 2456 (MEL 5703851!, PERTH).

DISTRIBUTION:

Known only from seasonally flooded claypans along Ellen Brook north of Midland Junction, Darling District, Western Australia.

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Muelleria 4(4):299-303 (1981).



Fig. 1. Fruit of *Schoenus capillifolius* (Holotype), showing one of the six hypogynous bristles fully extended.

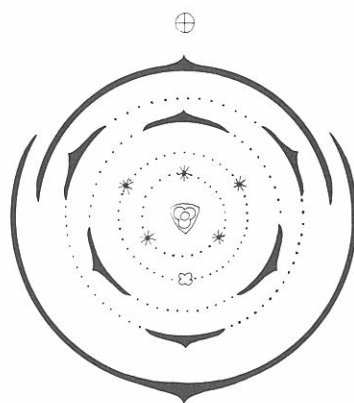


Fig. 2. Floral diagram of the spikelet of *Schoenus capillifolius*, showing outer and inner glumes, six hypogynous bristles, the single stamen with five "lost" stamens indicated by asterisks, and the tricarpellate ovary in the centre.

ECOLOGY:

The filiform leaves are associated with the semi-aquatic habitat, being supported by the water. Flowering occurs in the spring, when the water level has fallen to about 10 mm above the mud in which the plant is rooted (Keighery, pers. comm.). The function of the tube formed by the glumes is to hold the stigmas and stamen above water level; it is suggested that the function of the dense wadding formed around the ovary by the setae is to exclude water from the spikelet.

DISCUSSION:

BASICARPY: In addition to the complex terminal inflorescence typical of the family, several members of the Cyperaceae produce solitary florets at soil level. A group of amphicarpic *Scirpus* species produce glumeless florets, usually female, within the leaf sheaths at the base of the inflorescence; there is a trend towards basicarpity within this group by the development of these basal florets and reduction of the distal part of the inflorescence (Raynal, 1976). Basal spikelets, usually containing bisexual florets but distinct from the aerial inflorescence on the same plant, are known in *Bulbostylis* (Haines, 1971) and in at least one *Eleocharis* species (Raynal, l.c.). The development of basal spikelets may provide an additional or alternative reproductive strategy to the production of seed in aerial spikelets for dispersal away from the parent plant. Basicarpity can be a means to atelechory, defined by van der Pijl (1972) as the limitation of dispersal to the already occupied, obviously suitable spot. This represents an economy in seed production for species in a restricted habitat surrounded by unfavourable areas, and effectively replaces perennating organs in an annual.

The South African genus *Trianoptiles*, which, like *Schoenus*, is placed in the tribe Rhynchosporeae, produces tubular basal spikelets each containing a female floret and morphologically distinct bisexual florets in a scapose inflorescence. The habitats of the three species are swamps in Cape Province (Adamson & Salter,

1950). *Schoenus capillifolius*, also native to a swamp habitat, has developed superficially similar basal spikelets with bisexual florets while scape development has been suppressed. In line with the strategy of atelechory the nut is not adapted as a resistant diaspore with a hard pericarp since it is retained where it is produced; the pericarp is rather fragile, liberating the seed when the whole spikelet breaks up. Two other *Schoenus* species from the Western Australian sand heaths which have solitary spikelets terminating reduced scapes (Blake, 1949) have developed basicarpy independently.

AFFINITIES: *S. capillifolius* may be placed in the section *Helothrix* Kükenthal (1938), and is related to the aquatic *S. natans* (F. Muell.) Benth. and *S. tenellus* Benth. It resembles both species in its almost capillary foliage, reduced inflorescences, and herbaceous glumes, but differs in the greatly abbreviated stems and the one-flowered tubular spikelet. *S. capillifolius* is further distinguished from *S. natans* by the solitary stamen and glabrous, obscurely angled nut, and from *S. tenellus* by the presence of hypogynous setae.

Trithuria lanterna D. A. Cooke sp. nov.

Herba glabra annua rubescens caule brevissimo radicibus fibrosis. *Folia* basalia linearia 6-17 mm longa usque ad 0.8 mm lata, apicibus acutis. *Scapi* absentes. *Capitula* sessilia, plura, unumquodque flosculus masculis 1-2, flosculus foeminis 6-18, bracteis c. 4 herbaceis erectis angustolanceolatis 2-3 mm longis involucreto. *Stamen* anthero linear-elliptico purpurascens c. 0.7 mm longo, filamentum c. 1 mm longo. *Ovarium* flosculi non vidi. *Fructus* indehiscens, usque ad 0.4 mm longus 0.2 mm latus, ovoid-trigonus superficiebus 3 delicatis hyalinis inter costas 3 prominentes; in pedicello fragili usque ad 0.4 mm longo; pilibus stigmaticis 2-3 persistentibus, fructi maturi pilibus implexis coherentes. *Semen* unicum, ovoideum c. 0.3 mm longum, pallidum translucens praeter apicem fuscum opacum; testa mellea laevis nitens. (Descriptio typi.)

Glabrous annual herb, often becoming red-tinted, with a very short stem and fibrous roots. *Leaves* basal, linear, 5-18 mm long and up to 0.8 mm wide, tapering to acute apices, with anomocytic stomata on both surfaces. *Scapes* absent. *Heads* several, sessile, each with an involucre of about 4 erect narrow-lanceolate herbaceous bracts 2-3 mm long containing 6-20 female florets loosely grouped into 3-6 bundles and 1-2 male florets. *Stamen* with a \pm purple, linear-elliptic anther c. 0.7 mm long on a filament up to 1.5 mm long. *Ovary* ovoid, c. 0.2 mm long, shortly pedicellate, with about 3 terminal stigmatic hairs 1.5-2 mm long, each consisting of a single row of cylindrical cells. *Fruit* indehiscent, up to 0.4 mm long and 0.2 mm wide, ovoid-trigonous with 3 delicate hyaline panels between 3 prominent ribs containing vascular bundles. Fruiting pedicel up to 0.5 mm long, fragile, the mature fruits cohering by the tangled persistent stigmatic hairs. *Seed* 1, ovoid, c. 0.3 mm long, pallid and translucent except for a dark apex; testa honey-coloured, smooth, shining. (English description based on all material examined.)

The epithet *lanterna* is derived from the Latin noun *lanterna*, a lantern, and refers to the pericarp with three transparent panels and a framework of three opaque bars.

TYPE COLLECTION:

Northern Territory—South Bay, Bickerton Island, 14 June 1948, R. L. Specht 566 (Holo: MEL 1517931!; Iso: BRI 256564!)

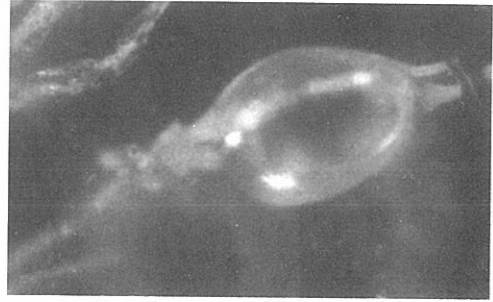
ALSO EXAMINED:

Northern Territory—Little Lagoon, Groote Eylandt, 27 May 1948, R. L. Specht 413 (MEL 1517930!; BRI 256563!).

DISTRIBUTION:

Known only from Bickerton Island and Groote Eylandt, Arnhem Land, Northern Territory, but apparently overlooked due to its small size. It may be ex-

Fig. 3. Fruit of *Trithuria lanterna* (Holotype). Pedicel at right; persistent tangled stigmas at left.



pected to occur elsewhere along the north coast of Australia. *T. lanterna* is the only species of *Trithuria* Hook. f. recorded for tropical parts of the continent.

ECOLOGY:

Annual, growing during the wet season and flowering at the beginning of the dry season in May. Both collections cited here are from seasonal swamps dominated by *Melaleuca leucadendron* (Specht, 1958).

DISCUSSION:

The collections upon which this species is based have been referred previously (Specht, 1958) to *Centrolepis pusilla* (R. Br.) Roem. & Schult.

The family Hydatellaceae (Hamann, 1976) contains two genera, *Hydatella* and *Trithuria*. The species here described is placed in the latter genus on the basis of its bisexual inflorescences and 3-ribbed fruits.

In *Trithuria submersa* Hook. f. the fruit dehisces by 3 caducous panels, leaving a framework formed by the 3 vascular ribs (Hooker, 1858). The released seed is the disseminule and has a thick, sculptured testa which may be an adaptation to hydrochory, rendering the seed unwettable and thus able to float on the surface film.



Fig. 4. Plant of *Trithuria lanterna* (several leaves and bracts removed), showing flowering heads, x18 (BRI 256563).

In *Hydatella*, the fruit is shed entire; there are about 3 main vascular bundles in the pericarp, but these are rather irregularly arranged and do not form definite ribs. The whole fruit is the disseminule and the testa, which is not exposed to the environment, is smooth and thin (Hamann et al., 1979). *T. lanterna* provides a morphological link between the two fruit/seed types. It has the prominently 3-ribbed fruits of *T. submersa* but these are indehiscent and contain seeds with smooth and thin testas as in *Hydatella*.

The leaves and bracts of *T. lanterna* lack the distinct midvein which is visible in material of *T. submersa*. The leaves grade into the involucre bracts rather indistinctly, as there is no scape; in *T. submersa* the scape is developed after anthesis or suppressed but the head is always defined by the short acuminate bracts.

The stomata of *T. lanterna* are similar to those of the subaquatic *T. submersa*, whereas two fully aquatic *Hydatella* species examined by Cutler (1969) lack stomata.

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