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SHORT COMMUNICATION

Tecticornia willisii (Chenopodiaceae), a new samphire from the Little Sandy Desert in Western Australia

Tecticornia willisii K.A.Sheph., *sp. nov.*

Type: Little Sandy Desert, Western Australia [precise locality withheld for conservation reasons], 16 August 2001, *K.A. Shepherd & S. van Leeuwen et al.* KS 829 (*holo*: PERTH 08592284; *iso*: CANB, MEL).

Tecticornia sp. Little Sandy Desert (K.A. Shepherd & C. Wilkins KS 830), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 20 January 2018].

Perennial shrub to 0.5–1 m high. *Vegetative articles* obovoid, cylindrical or narrowly obconic, dull green to red, 1.2–2.5(3.5) mm long, 1.1–2.3 mm wide, epidermis rough, apex apiculate, margin denticulate. *Inflorescence* 2.7–7 mm long, 1.2–2.4 mm wide, with single bisexual florets at the base of each bract forming a spike 2–6 nodes long, terminal to main or lateral branches, cylindrical, with a gently sinuate outline due to slight lateral compression of the bracts. *Bracts* obovoid, fused, upper edge straight to gently curved, appearing shallowly convex in face view and shallowly concave in side view, outer face of bract slightly rounded, epidermis rough, apex apiculate, margin denticulate. *Flowers* obscured or apex slightly exposed above subtending bracts, free from bracts below, slightly embedded in bract above. *Perianth* fused, dorsiventrally flattened, adaxial surface shallowly to steeply ascending, abaxial surface steeply ascending, apex apiculate, margin denticulate; two lateral lobes. *Stamen* 1, anther oblong, 0.7–0.9 mm long. *Ovary* free from the stem cortex, style bifid, membranous. *Fruiting spike* scarcely expanded, papery. Apical vegetative growth absent. *Fruitlets* hidden or the apex exposed above subtending bracts, somewhat fused to bracts above and below; fruiting perianth scarcely expanded and similar in shape to flowering perianth, papery, fused with the pericarp. *Pericarp* membranous enclosing the seed, not dehiscing in the medial plane. *Seed* horizontal to shallowly ascending relative to the stem axis, rounded, 0.6–0.8 mm long, beak small to 0.1 mm long, opaque, very brown to dark reddish brown with concentric rings of fused mammilate projections on the outer margin, sides granular. (Figure 1)

Diagnostic characters. Distinguished from other species of *Tecticornia* Hook.f. by the following combination of characters: erect subshrub to shrub; single florets in the axil of each bract; vegetative articles and bracts with a denticulate margin, apiculate apex and a distinctive rough epidermis; and 'Type 3' seed coat ornamentation (Shepherd *et al.* 2005).

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 16 Aug. 2001, *K.A. Shepherd & C. Wilkins* KS 830 (AD, NSW, PERTH); 17 Aug. 2001, *K.A. Shepherd & S. van Leeuwen et al.* KS 857 (PERTH); 21 Oct. 1996, *S. van Leeuwen* 2948 (PERTH); 14 Oct. 2017, *G. Wells* LSCR01-01 (PERTH); 14 Oct. 2017, *G. Wells* LSCT01Q03-01 (PERTH); 14 Oct. 2017, *G. Wells* LSCT01Q04-01 (PERTH); 14 Oct. 2017, *G. Wells* LSCT01Q06-01(PERTH).

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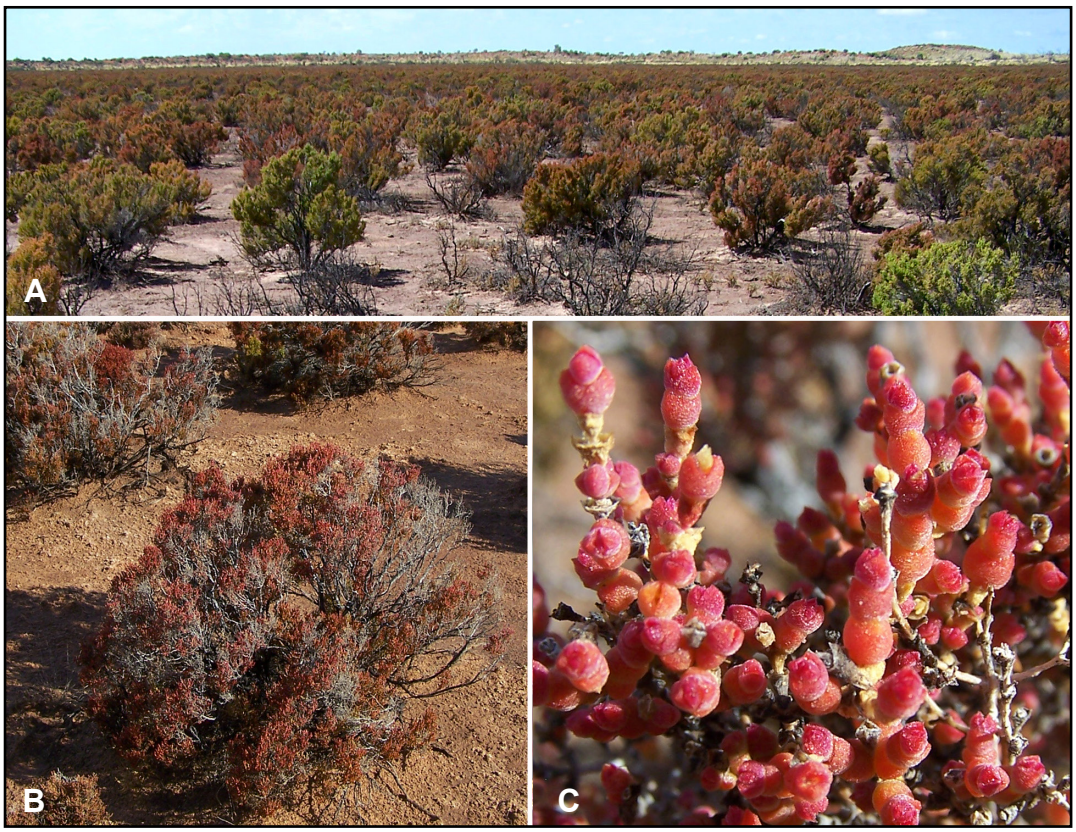

Figure 1. *Tecticornia willisii*. A – forming the dominant vegetation along the shore line of a salt lake in the Little Sandy Desert; B – habit; C – branchlets highlighting the rough epidermis of the vegetative articles. Images by G. Wells from *G. Wells* LSCT01Q03-01.

Phenology. The duration of flowering is not clear but flowers at anthesis are evident on specimens collected from August and October. Fruits appear to develop from late spring and are likely held on the plant through summer.

Distribution and habitat. *Tecticornia willisii* is endemic to the Little Sandy Desert bioregion of the Eremaean Botanical Province. It grows in seasonally inundated areas around the margins of gypsiferous playas and salt lakes or, as observed at one site, across the entire playa of a small lake. This species is found in red, brown and white sandy clay over calcrete and gypsum associated with *Tecticornia* spp. and *Maireana luehmannii* shrubland and isolated pockets of *Eragrostis dielsii*.

Conservation status. Currently listed as Priority One under Conservation Codes for Western Australian Flora (Smith & Jones 2018), under the name *T.* sp. Little Sandy Desert (K.A. Shepherd & C. Wilkins KS 830). There are only a few documented populations of this species, none of which are found within the conservation estate. Current threats include grazing by camels, and wildfire. Mineral exploration activity has also increased in the region in recent years due to interests in mining gypsum and potash, which may pose a threat to populations in the future.

Etymology. This species is named for my husband Spencer Robert Willis (1968–). Spencer has supported me in all things (as he said he would) and whilst he may not appreciate this recognition due to his own

unassuming nature, he is a worthy recipient of this honour. Spencer has often volunteered to undertake fieldwork with me during his holidays, usually working under hot and difficult conditions to collect samphires around arid salt lakes. He has also contributed to research on the family Goodeniaceae by driving field vehicles, collecting specimens and taking detailed floral photographs utilised in our floral morphometrics research (Gardner *et al.* 2016a, 2016b; Berger *et al.* 2017).

Vernacular name. Spencer's Samphire.

Affinities. Phylogenetic analyses of molecular data supports *T. willisii* as distinct and most closely related to *T.* sp. Sunshine Lake (K.A. Shepherd et al. KS 867) based on nuclear ribosomal DNA (nrDNA) internal transcribed spacer (ITS) sequences (Shepherd *et al.* 2004), and *T. fimbriata* (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson based on a more recent analysis using both ITS and external transcribed spacer (ETS) data (N. Dakin unpub. data). *Tecticornia* sp. Sunshine Lake is also a Priority One species from the Great Sandy Desert, Little Sandy Desert and Murchison bioregions (Western Australian Herbarium 1998–; Smith & Jones 2018), which sometimes co-occurs with *T. willisii*. It is easily recognised as distinct from it, having 3-flowered cymes rather than single flowers, articles and bracts that have a smooth epidermis (vs rough) and entire margins (vs denticulate), and smooth, golden brown seeds (vs dark brown ornamented seeds). *Tecticornia* fimbriata is a Priority Three species (Smith & Jones 2018) that occurs further south in the Avon Wheatbelt and Murchison bioregions (Western Australian Herbarium 1998–). Like *T. willisii*, this species has a rough epidermis and apiculate articles and bracts; however, it differs in having 3-flowered cymes, article margins that are fimbriate and seeds with a 'Type 1' ornamentation of small rounded bumps (vs 'Type 3'), as determined in Shepherd *et al.* (2005).

Tecticornia papillata K.A.Sheph., a Priority One species (Smith & Jones 2018) restricted to a small area in the Gascoyne bioregion (Western Australian Herbarium 1998–), also has a rough epidermis but this species has 3-flowered andromonoecious cymes, where each central floret is bisexual and the two lateral florets are male. The seeds of this species are smooth and golden brown (Shepherd 2008).

Notes. This rather nondescript new species was discovered more than 20 years ago during Department of Conservation and Land Management targeted surveys of the south-western Little Sandy Desert (National Reserve System Project N706) (van Leeuwen 2002). Recent material was collected during ongoing surveys by Dr Grant Wells (Phoenix Environmental Sciences), which facilitated the description of this species.

Galls of various shapes and size are frequently found on samphires, which are caused by gall midges (Veenstra *et al.* 2011). A number of grey, globular galls 3–4 mm diam. are present on the lower branches of various collections of *T. willisii*.

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