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PLANT PORTRAITS

23. *Spyridium tridentatum* (Steudel) Benth. (Rhamnaceae)

Spyridium tridentatum (Steudel) Benth., *Fl. Austral.* 1 (1863) 427.

Cryptandra tridentata Steudel in Lehm., *Pl. Preiss.* 1 (1845) 186. — *Stenanthemum tridentatum* (Steudel) Reisseck, *Linnaea* 29 (1858) 295.

Ic.: Apparently not previously illustrated.

Illustration: Based partly on fresh material collected at the same time as the population sample *P. Lang* DEP 8674-8681, partly on dried specimens as indicated.

Small rather intricate shrub with fine, erect to procumbent, often leafless, woody branches c. 8-25 cm long and with short lateral branchlets with clustered leaves at the apex, all but the oldest branches persistently stellate-tomentose with the hair arms ascending from the branch surface. *Leaves* 2-6 mm long, subpetiolate, with the blade broadly obovate, conduplicate by folding upwards on either side of the midrib, the margins c. 1-1.6 mm from the midrib at their widest point towards the apex, persistently densely stellate-pubescent to shortly stellate-tomentose, in younger leaves overtopped by sparse antrorse apparently simple rust-brown hairs, the apex broadly emarginate when the blade is flattened, with the midrib projected forward by the coherent mass of long antrorse hair arms surrounding a fine woody mucro if present, giving the flattened apex a 3-toothed appearance; paired *stipules* broadly ovate, c. 1.5-2 mm long, each irregularly sparsely finely dentate, long-caudate with the fragile long slender apical portion sometimes as long as the blade, mid brown ageing to dark brown, sparsely shortly pubescent inside, the midrib and margins predominantly antrorse-sericeous outside. *Flowers* sessile or subsessile usually few and clustered at the apex of short shoots, in clusters subtended by leaf-like bracts, rarely solitary in a leaf axil further back, subtended by small stipule-like brown bracts, stellate-pubescent with ascending hair arms outside; *hypanthium* very short; *sepals* ovate to broadly ovate, 0.8-1.2 mm long, acute to shortly acuminate, valvate in bud, erect at anthesis and on fruit. *Fruit* a capsule surrounded by the persistent ovary-wall and topped by the hardly enlarged hypanthium and sepals, broadly ellipsoid, 1.8-2.2 mm long, persistently stellate-pubescent, dehiscing into 3 valves; *seed* smooth, compressed broadly ellipsoid to broadly ovoid-ellipsoid, 1.2-1.5 mm long, the body smooth, cream or somewhat brown tinged, with scattered short dark brown longitudinal streaks, the apex dark brown and covered by a hyaline caruncular cap with an irregularly toothed margin.

Spyridium tridentatum is known from widely disjunct regions across southern Australia, outside South Australia being in the South-western Botanical Province of Western Australia (Wheeler 1987) and the north-western mallee regions of Victoria (Willis 1973). The species was only recently recognized in South Australia (Barker in Jessop 1983), but, although uncommon and at present known only from the northern half of Eyre Peninsula, it is relatively widespread there. There it occurs on deep sandy soils, although exceptions are two in the Gawler Ranges on the rocky outcrops of Scrubby Peak (*Bates* 3353, AD) and on a rocky hill face 9 km NNE of Yarna Homestead (*Culic & Williams* 9137, AD). It is particularly abundant in the bleached alkaline sands of tall dunes south of Kimba in the Hundred of Jamieson and further south near the western side of Hincks Conservation Park. It is also known to the north from the brown sands of the desert dune system extending along the northern fringe of Eyre Peninsula, where it is represented by collections from north of Ceduna, near Corrobinnie Hill and in Pinkawillinie Conservation Park. Typically, *Spyridium tridentatum* occurs on the slopes of dunes in *Eucalyptus incrassata* tall shrubland with a species-rich heath understorey ½-1½ m high.

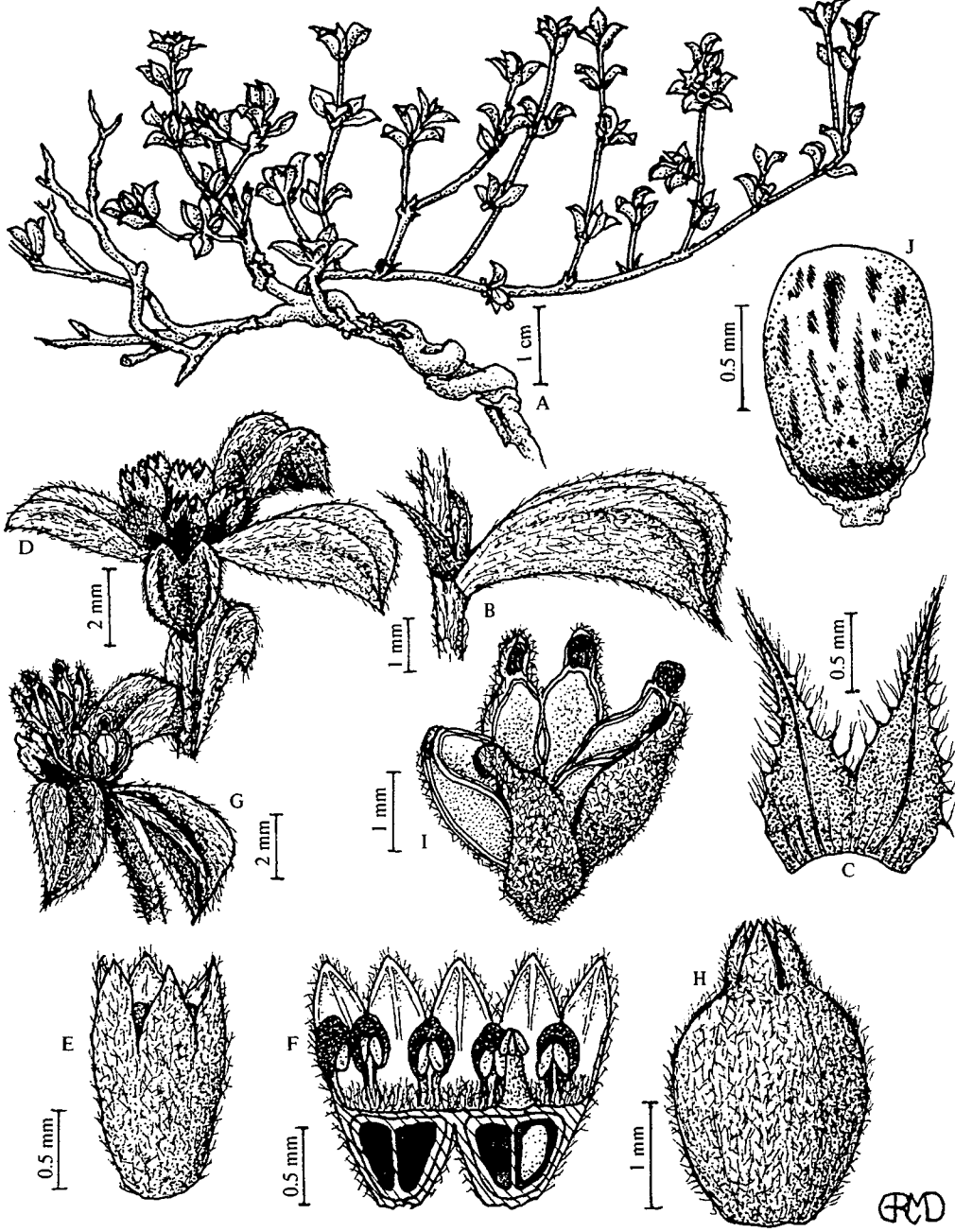


Fig. 1. *Spyridium tridentatum*. A, habit; B, leaf; C, paired stipules; D, short lateral branchlet in flower; E, flower; F, flower longitudinally sectioned and opened out, showing petals hooding anthers and short style; G, short lateral branchlet in fruit; H, fruit prior to dehiscence; I, fruit after dehiscence; J, seed. (A-C, G-I, fresh material, Lang DEP 8674-8681, AD; D-F, Lang DEP 8760, AD; J, Lang DEP 8807, AD).

On Eyre Peninsula *Cryptandra leucophracta*, a shrub of superficially similar appearance to *S. tridentatum*, is commonly associated with the *Spyridium*, for example at Mt Bosanquet (Lang DEP 8670-8681, AD), 12 km WSW of Waddikee (Lang DEP 8834, 8835, AD) and 20 km E of Peachna (Lang DEP 8807, AD). At Mt Bosanquet the two species were sampled along a transect up a major sandy rise where they were freely intermixed with no apparent differences in micro-habitat. Wider observations, however, show *C. leucophracta* to occupy a broader ecological range, including swales and flats with heavier soils and impeded drainage.

The confusion of *Spyridium tridentatum* with the more common *Cryptandra leucophracta* has often occurred in the herbarium since its first South Australian collection made in 1967. The morphological similarities encompass all organs. Both species are small semi-prostrate woody perennials covered by a stellate indumentum. Their leaves are almost identical in shape with upwardly folded (conduplicate) spatulate blades and persistent tomentum extended at the apex as if into a mucro. Their flowers and fruits form in terminal clusters of leaves or bracts morphologically similar to adjacent leaves. At a more microscopic level both species have a stellate indumentum; flowers composed of 5 sepals, 5 tiny petals hooding the anthers and an inferior ovary; and similarly ellipsoid capsular 3-valved fruits. Their seeds are also almost identical; they are smooth and streaked and capped by a removable caruncle. Like other Australian members of these genera (Berg 1975) they are obviously dispersed by ants. A comparative study of pollination and dispersal of these sympatric species would be of interest.

The current published means of separation of the two species (Canning 1986; Willis 1973) is based solely upon the character of hypanthium length which separates the two genera.

In the field the two species can be difficult to distinguish, particularly in summer when bushes are often desiccated. *Spyridium tridentatum* has relatively uniform, pale bluish-green, fine foliage in contrast to the darker green, more coarse leaves of *Cryptandra leucophracta*. The leaves of the *Spyridium* are consistently dull and concolorous from being tomentose on both surfaces, while in *C. leucophracta* they may become somewhat shiny above through an absence of hairs, and are generally paler and often rust-coloured through their persistent tomentum below.

Reliable field identification is, however, easiest when flowers and fruits are present. The inflorescence provides the most conspicuous diagnostic feature. In *Cryptandra leucophracta* the flowers are clustered in strict terminal heads surrounded by spreading flat leaf-like inflorescence-subtending bracts which are distinctively white velvet pubescent above. Such conspicuous bracts surrounding the inflorescence (often called 'floral leaves', a poor term as they are not associated with each flower) are generally associated with *Spyridium* (Black 1952; Canning 1986; Suessenguth 1953; Willis 1973). In *S. tridentatum* inflorescence-subtending bracts are not conspicuous and white above, but are identical to adjacent leaves, a feature uncharacteristic of a member of the genus (Suessenguth 1953).

Apart from the presence of inflorescence-subtending bracts, the next most obvious diagnostic feature lies in the generic character of the length of the hypanthium, the floral tube above the ovary which supports the sepals, petals and stamens. In *Cryptandra leucophracta* it is much longer than the sepals and, partly through persistence of the associated long style, frequently persists with the attached sepals as a slender elongated cylinder on the summit of the mature fruits. In *Spyridium tridentatum* the hypanthium is almost absent in the flower, which is consequently much shorter; the sepals form a much shorter apical projection on the mature fruit.

Longer petioles, a prominence of the lateral veins on the underside of the leaves, a longer antrorse-sericeous to woolly tomentum external on the flowers, and the glabrescent ribbed capsules are other differences distinguishing *C. leucophracta* from *S. tridentatum*.

The comparison of these two species, each atypical of its genus, indicates a need to review the delimitation of *Cryptandra* and *Spyridium*. Such a review should encompass close generic relatives such as *Pomaderris* and *Trymalium*. Generic delimitation should reflect phylogeny.

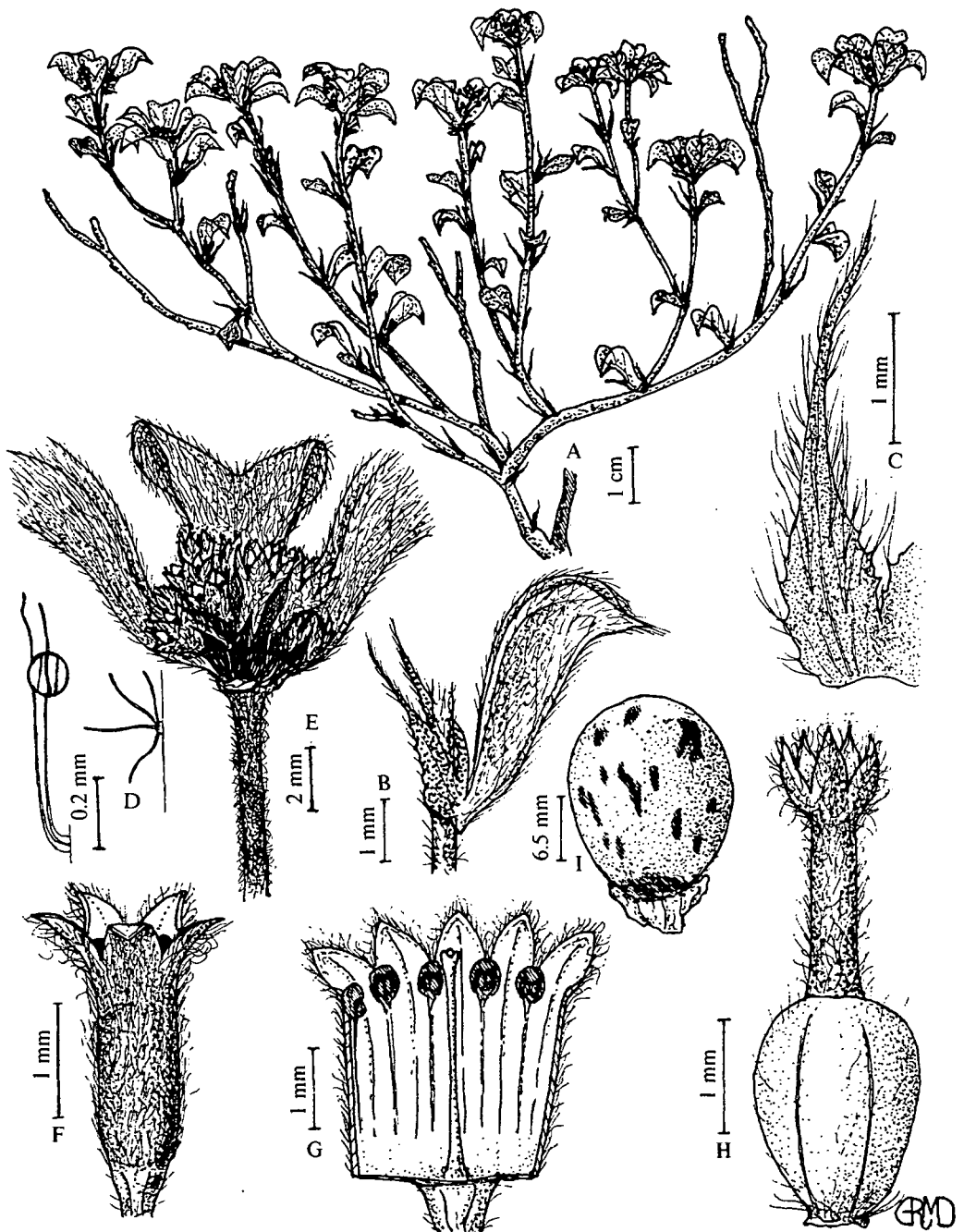


Fig. 2. *Cryptandra leucophracta*. A, habit; B, leaf; C, stipule of fused pair; D, stellate hair and pair of overlying antorse simple hairs from abaxial side of leaf; E, terminal inflorescence showing 3 subtiending bracts, a fourth removed from the front; F, flower; G, flower opened out above the ovary to show the long hypanthium, the anthers hooded by the petals, and the long style; H, fruit; I, seed. (A, fresh material, Lang DEP 8670-8673, AD; B, D-F, Kraehenbuehl 4084, AD; C, Lang DEP 8835, AD; F, Alcock 3475, AD; G-H, Reynolds 51, AD).

Each of the two genera as presently constituted contains other species or groups of species anomalous in the above characters. It is possible, as a consequence, that the single character state of hypanthium length currently used to distinguish each genus could have arisen more than once. In these genera further characters, such as style length, the presence or absence of the tiny petals and whether or not they hood the anthers, the crowding of flowers into heads, and the presence or absence of conspicuous leaf-like inflorescence-subtending bracts, could well have evolved more than once in particular combinations of states as adaptations, for example, to different types of pollinators.

The current circumscription of *Cryptandra* and *Spyridium* apparently dates from the survey of Weberbauer (1895-6) in Engler & Prantl's monumental survey of the vegetable kingdom. Before that time other genera had been variously recognised. The additional genus *Stenanthemum* was segregated by Reisseck (1858) and subsequently, for example J.D. Hooker (1862) and Bentham (1863), to cover several species including *Cryptandra leucophracta*. Of this genus Bentham said, "The floral characters are those of *Cryptandra*, with the inflorescence of *Spyridium*". Weberbauer (1895-6, p. 421) himself stated (in translation), "The limits between the genera *Pomaderris*, *Trymalium*, *Spyridium* and *Cryptandra* are rather weak; they seem based less on habit characters than on the form structure of the flowers and fruit." In the second edition of Engler & Prantl's work Suessenguth (1953) retained the two genera but provided infrageneric frameworks in each genus, formal in *Cryptandra* and informal in *Spyridium*. Such a history of uncertainty indicates that a generic review is long overdue.

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24. *Teucrium grandiusculum* F. Muell. & Tate ssp. *pilosa* Toelken (Labiatae)

Teucrium grandiusculum F. Muell. & Tate ssp. *pilosa* Toelken, J. Adelaide Bot. Gard. 7:299 (1985).

Illustration: Based mainly on fresh material preserved under *H.R. Toelken 7796*, 30.ix.1987, 0.6 km S of railway crossing at Ooldea siding, 30°29'S, 131°50'E; fruit: *D.J.E. Whibley 729*, 20.ix.1960, same locality.

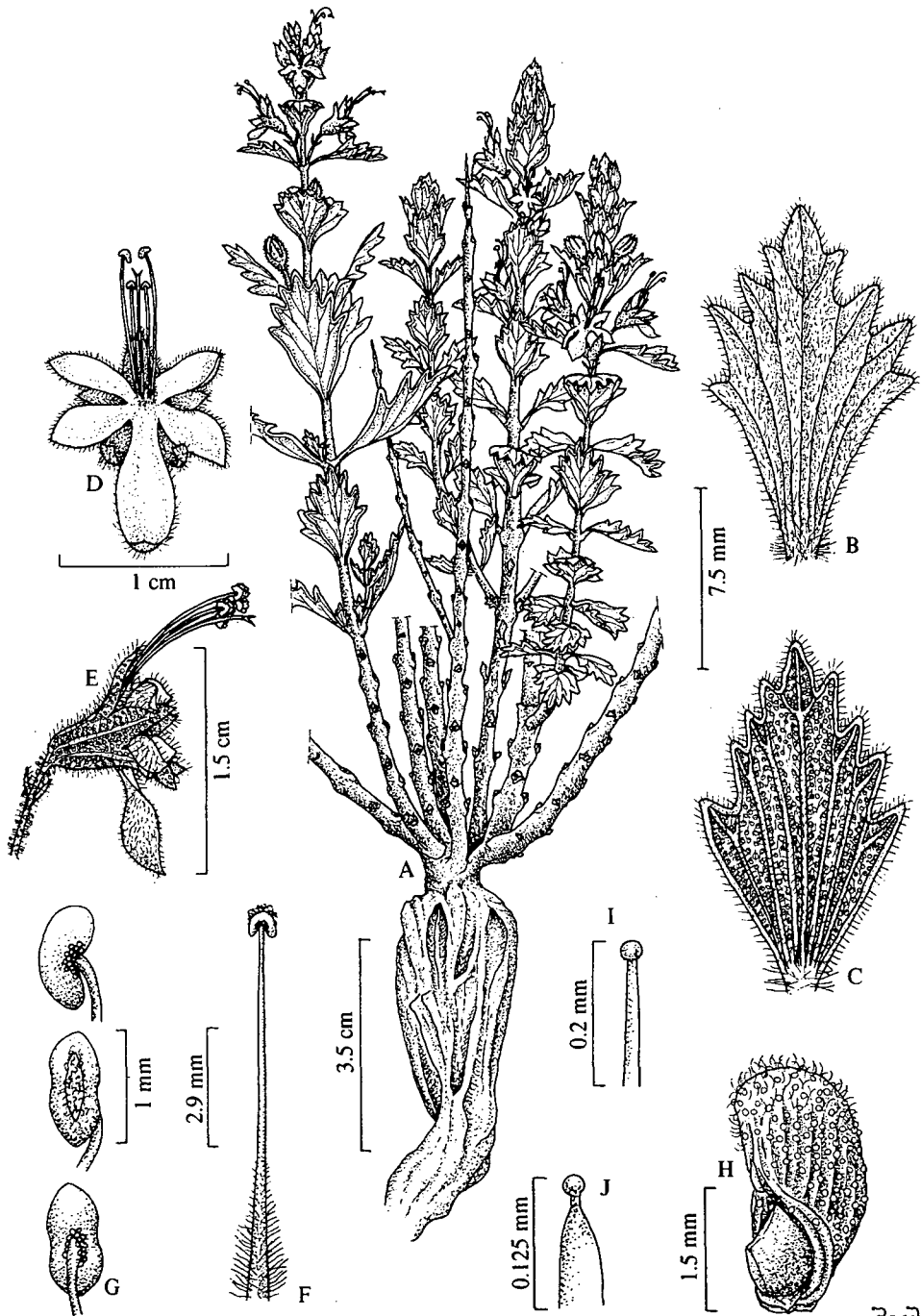
Perennial shrub 15-35 (-45) cm tall, usually much branched especially from the woody rootstock with its pale fluted bark; young branches at first quadrangular in section but soon becoming terete, pilose with long and short eglandular hairs up to 1.5 mm long. *Leaves* sessile or subpetiolate, obovate to angular-oblongate, (0.6-) 0.8-1.8 (-2.2) x 0.6-1.2 (-1.4) cm, coarsely toothed or shallowly lobed with (7-) 9-12 lobes almost right around the leaf and fanned venation at the base, or with (3-) 5-7-toothed towards the apex and with sinuate veins below the inflorescence, puberulous above, below pubescent especially along the distinctly raised veins and recurved margins as well as with sessile glands. *Inflorescence* a raceme-like thyrse with leaf-like bracts subtending each stalked single-flowered cymule; bracteoles linear, placed between the lower third and half the length of the pedicel. *Sepals* regularly connate to about half their length, with spreading usually eglandular hairs and sessile glands mainly on the outside; lobes often toothed, 3-4 mm or up to 5 mm long when fruiting. *Corolla* white, 1-lipped, with deep posterior split, 2 posterior lobes longer or subequal to 2 lateral ones and usually about half the length of the anterior lobe, with spreading eglandular hairs and sessile glands outside, and inside with spreading eglandular hairs around the insertion of the stamens, on the lower filaments and particularly long ones in front of an anterior pouch; stamens 4, inserted near the base of the corolla, arched well above the anterior lobe; anthers 2-celled, dehiscing by incomplete longitudinal slit. *Ovary* slightly 4-lobed, with slender style inserted near the apex and then curved like the stamens, with bifid stigma situated between the anthers. *Mericarps* narrowly cylindric-obovoid, c. 3 mm long, attachment scar a large concavity in the lower half of the inner surface but partly concealed by a prominent tooth in its centre, vaguely rugose, with few hairs towards the apex and many sessile glands over the exposed surfaces.

On a recent expedition to Ooldea a special effort was made to collect more material of this subspecies which is poorly represented in herbaria. This is where it was realised how rare the plant seems to be, as it was found only in one small area where the sandy soil of the dune formation comes in contact with those encrusted by surface limestone. This population of not more than 30 plants was the only one found in an extensive area investigated. It is hoped that this publication will urge exploration of the area to hunt for more populations. The plants were growing near or on top of a rise quite unlike the typical subspecies which is usually recorded from sandy soil along creeks or at the base of ravines.

A few old plants with their woody rootstock continued in a pronounced tap root had resprouted and just started flowering. A number of small plants occurring around the above mature plants were at first thought to be suckers as they are commonly found in *T. racemosum*, but proved to be seedlings when taken out. They grew well at first in sandy soil in Adelaide and then died one-by-one without any apparent reason.

The plants within the population showed little variation as one would expect in such a small population. The variation of the shape of leaves is, however, considerable as lower ones are often more frequently and deeply toothed, or rather lobed with lobes occurring almost right around it. This type of leaf was thought to be characteristic of the typical subspecies when the original description was drawn up, but might only be more common in that taxon. It is obviously a juvenile character that is retained for a longer or shorter period in individuals from different populations.

The typical pilose hairs of subsp. *pilosa* were obvious in these plants but it is important to note that at the flowering stage glandular hairs are often present on the pedicels and



தாவரம்

Teucrium grandiusculum F. Muell. & Tate subsp. *pilosum* Toelken. A, flowering plant; B, C, lower leaf with fanned venation from above and below; D, front view of flower; E, side view of flower; F, stamen; G, anther in side, front and rear view; H, mericarp in side view; I, glandular hair from pedicel; *T. grandiusculum* subsp. *grandiusculum*; J, typical glandular hair. (A-G, I, H.R. Toelken 7796; H, D.J.E. Whibley 729; J, W.S. Reid 108).

occasionally on the lower part of the calyx. The actual glands at the tip of the hairs have, however, usually been worn off by the time the fruits are mature.

The indumentum of subsp. *pilosa* is capillaceous whereas in the typical subspecies hairs are usually ampule-like. The latter trichomes have a broad base followed by cylindrico-conical body which is abruptly constricted into a longer or shorter narrow stalk below the terminal spherical gland. The only exceptions are specimens collected from the Palm Valley (Northern Territory), which have a hair-like indumentum but the hairs are gland-tipped unlike those of subsp. *pilosa*.

Teucrium grandiusculum which has been recorded from often widely separated localities shows a number of local variations and might best be understood in terms of several subspecific taxa.

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