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TAXONOMIC STUDIES IN *STACKHOUSIA* SM. (STACKHOUSIACEAE) IN SOUTH AUSTRALIA

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Abstract

A key to the South Australian species of *Stackhousia* is presented. *S. monogyna* Labill., *S. aspericocca* Schuch. (typified and reinstated as a distinct species although possibly better treated in a future revision as a race of *S. monogyna*), *S. annua* (a new species), *S. spathulata* Sieb. ex Spreng., and *S. megaloptera* FvM. (a probable new record for South Australia) and several other probably undescribed taxa of Sect. *Stackhousia* Subsect. *Cincinniferae* Mattf. are recognized as occurring in South Australia. Subsect. *Cincinniferae* and the polymorphic *S. aspericocca* require taxonomic study in the context of a revision of the whole genus.

The family Stackhousiaceae is predominantly Australian, with single species in New Zealand and Malesia. The family has been divided by various taxonomists into two or three genera, with *Stackhousia* Sm. the largest and distributed throughout the range of the family. *Macgregoria* FvM., monotypic and occurring in central Australia, differs markedly from the rest of the family. The monotypic genus *Tripterococcus* Endl., confined to Western Australia, has flowers similar to *Stackhousia* and the two genera are often combined; they differ, however, in gynoeical and fruit characters.

Pampanini (Pampanini & Barglagi-Petrucci, 1905-6) provided the most recent revision of the family seventy years ago. His monograph was based solely on material housed in the herbaria of continental Europe. Today it is clear that the taxonomy of the family, in particular *Stackhousia*, is in need of revision. This is most evident in the two major widespread complexes of *Stackhousia*, to the bulk of which the names *S. monogyna* Labill. (Bentham, 1863; Eichler, 1965), and *S. viminea* Sm. and *S. intermedia* F. M. Bail. (Willis, 1973), respectively, have been commonly applied. These two complexes, in which many species have been described, together constitute Sect. *Stackhousia* (= Sect. *Reticulatae* Mattf.), characterized by wingless but sculptured cocci. In Mattfeld's (1942) review of the supraspecific classification of the family they were placed in separate subsections, namely Subsect. *Cincinniferae* Mattf. with flowers arranged in clusters along the inflorescence axis and containing the *S. viminea* s.l. group, and Subsect. *Racemosae* Mattf. characterized by flowers arranged singly in the inflorescence and containing the *S. monogyna* s.l. complex.

This paper gives an insight into the morphological variation and ecological and geographical distribution of the taxa of *Stackhousia* in South Australia, and is preliminary to an intended monograph of the family. The investigation is based on the collections of the State Herbarium of South Australia (AD), and a brief study of the holdings of the National Herbarium of Victoria (MEL).

Key to the Species of *Stackhousia* in South Australia

- 1a. Flowers arranged in compact clusters along the inflorescence axis. (Fig. 6) 5. Sect. *Stackhousia* Subsect. *Cincinniferae*
- 1b. Flowers arranged singly along the inflorescence axis.
 - 2a. Cocci winged. Leaves spathulate, fleshy. (Fig. 5) 4. *S. spathulata*
 - 2b. Cocci lacking wings, sculptured. Leaves lanceolate, often narrowly so, thin to thick.
 - 3a. Annual Cotyledons usually persistent until after flowering. Corolla tube short 4.0-5.2 mm long adaxially, 3.5-4.5 mm long abaxially. Peduncle 1-3(-4) cm long. Gynoeceum 3-5-partite. Cocci probably to ca. 1.5 mm long. (Figs. 3 & 4) 3. *S. annua*
 - 3b. Perennial. Cotyledons caducous before flowering. Corolla tube long, 5.5-8.1 mm long adaxially, 4.8-7.5 mm long abaxially. Peduncle 8-25 cm long. Gynoeceum 3(-5)-partite. Cocci (1.9-)2.1-2.4(-2.8) mm long (*S. monogyna* sensu Black, 1926, 1952).

- 4a. Bracteoles membranous and or greatly reduced. Inflorescence cylindrical. Branches usually simple, rarely branched above ground level. (Fig. 1)..... 1. *S. monogyna*
- 4b. Bracteoles herbaceous, prominent. Inflorescence cylindrical or one-sided. Branches simple or branched above ground level. (Fig. 2)..... 2. *S. aspericocca*

1. ***Stackhousia monogyna*** Labill., Nov.Holl.Pl.Spec.1(1804) 77, t.104, p.p. (as to element of mixed type to which the name has been universally applied since the protologue; lectotype to be selected from this element as indicated in Int.Code Bot. Nom.Rec.7B and, by inference, by Bentham, Fl. Austral.1(1863)407); Pampanini, Bull.Herb.Boiss.Ser.II,5(1905)916; Black, Fl.S.Austral.(1926)359, p.p.; Black, Fl.S.Austral.(ed.2) (1952)537, p.p.

S. linariifolia Cunn.: Tate, Hdbk.Fl.Extratrop.S.Austral. (1890)29,211, p.p. (specimen leg. Richards in Herb. Tate in AD) "linariifolia".

S. obtusa Lindl.: Schuch., Linnaea 26(1853)6 (at least as to Mueller MEL503702).

S. flava auct. non Hook. f.: Tate, Hdbk. Fl. Extratrop. S. Austral. (1890)29, 211, p.p. (specimen leg. Menzel in Herb. Tate in AD).

In South Australia *S. monogyna* is confined to mallee and woodland areas west of the River Murray, chiefly in red and grey loams and sandy loams. It extends as far north as Moolooloo, near Blinman in the Northern Flinders Range, and as far west as Fowlers Bay. It is noteworthy that in the Mount Lofty Ranges, throughout which *S. aspericocca* abounds, the species only occurs in the foothills and margins of the ranges.

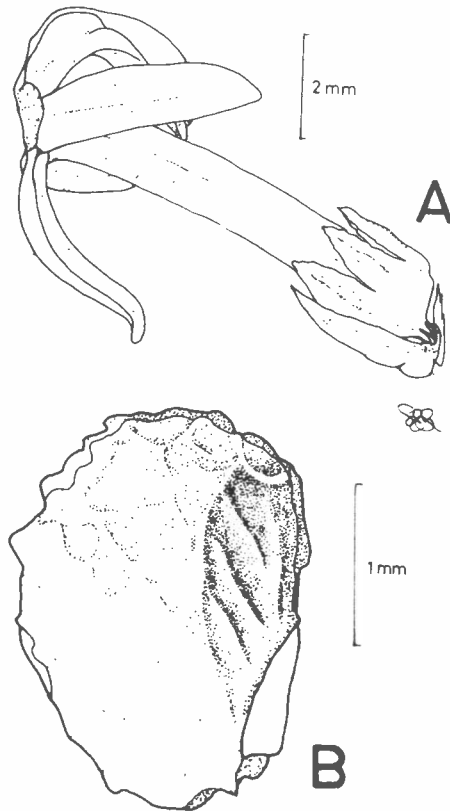


Fig. 1. *S. monogyna*. A, flower, with bract and reduced bracteole (Barker 648); B, coccus (Copley 2299).

The habitats occupied by the species in South Australia are very different from those of the many populations of the species which I have seen in New South Wales, Victoria and Tasmania, where it flourishes in sclerophyll forest and subalpine woodland. These two races, each of which is very homogeneous morphologically, diverge only in the apparently more fleshy leaves of the South Australian plants and the broader leaves and more frequent occurrence of branching well above ground level of the plants occurring in the other states.

The distinction between *S. aspericocca* and *S. monogyna* based on the nature of the bracteoles is very constant in South Australia. In a number of instances I have observed on Yorke Peninsula populations of the two species within a few metres of each other and flowering simultaneously. Invariably the plants of *S. aspericocca*, in these cases belonging to the race with one-sided inflorescences (*Race 2*), occupy well-drained limestone outcrops, while *S. monogyna*, differing by its cylindrical inflorescences and reduced and/or membranous bracteoles, occurs in the shallow sandy loam between the outcrops. No intergradation has been observed. However, in view of the paucity of diagnostic characters, a future revision of *Stackhousia* may show that *S. monogyna* should best be considered a race of a polymorphic species encompassing *S. monogyna* and *S. aspericocca*, and possibly *S. huegelii* Endl. and *S. pubescens* A. Rich. of Western Australia.

Representative and cited specimens

SOUTH AUSTRALIA (ca. 165 specimens seen): *Alcock 2421*, 12.x.1968, Eyre Peninsula, Hincks National Park, Blue Range area, AD. — *Barker 648*, 14.x.1968, Yorke Peninsula, scrub, off the Curramulka-Port Vincent road, Hundred of Ramsay, Section 141, AD. — *Barker 1826*, 25.viii.1974, Southern Lofty, western half of Sandy Creek Conservation Park, which is ca. 1 km south of main Sandy Creek-Lyndoch road, AD. — *Carrick 3571*, 30.vii.1974, Murray, Monarto New Town area, ca. 15 km west of Murray Bridge, Narringen hills, AD. — *Copley 2299*, 30.ix.1968, Northern Lofty, railreserve, ca. 50 m east of first road crossing ca. 2 miles east of Barunga Gap, AD. — *Hunt 1356*, 4.xi.1962, South-eastern, near Bordertown, AD. — *G. Jackson 37*, 17.ix.1960, Kangaroo Island, Kingscote, AD. — *Menzel s.n.*, ix.1898, Northern Lofty, Port Wakefield, AD96916023 (Herb. Tate). — *Mueller s.n.*, s.dat., Southern Lofty, Mons Kaiserstuhl, MEL503702. — *Richards s.n.*, i.1880, Eyre Peninsula, Fowler's Bay, AD96916032. — *Symon 7355*, 14.ix.1971, Flinders Range, Oraparinna National Park, on the E face of the Heysen Range below Mt Hayward and above Aroona Valley, AD.

VICTORIA (24 specimens seen): *Ackland 90*, 2.x.1963, Nhill-Jeparit road, 0.4 miles S.W. of Glenlee junction, AD. — *Barker 1487*, 24.xii.1971, on the Moroka Road, which is between Mt Arbuckle and the Moroka River, at the beginning of the track to Mt Wellington and Lake Tali Karng, AD. — *Barker 1619*, 12.i.1972, Cobberas Mountains, on the extreme summit area of Mt Cobberas No. 1, AD.

NEW SOUTH WALES (7 specimens seen): *Barker 1639*, 18.i.1972, Brindabella Range, ca. 20 m below and to the E of the summit of Mt Ginera, AD.

TASMANIA (29 specimens seen): *Barker 891*, 4.xi.1970, the south-eastern side of George Bay, ca. 10 km east of St Helens, on track to St Helens Point, AD. — *Barker 959*, 13.xi.1970, Eaglehawk Neck; on the north shores of Pirates Bay, ca. ¼ km east of "Tesselated Pavement", AD. — *Barker 989*, 24.xi.1970, ca. 1 km from Arthur River holiday resort on the Marrawah road, AD.

2. *Stackhousia aspericocca* Schuch., *Linnaea* 26(1854)12; Pampanini, *Bull. Herb. Boiss. Ser. II*, 5(1905)1048; Eichler, *Suppl. Black's Fl.S.Austral.* (1965)213. LECTOTYPUS HIC PROPOSITUS: *Anon. s.n.*, s.dat. Mount Gambir, MEL503706 (for typification see p. 73-74).

S. muelleri Schuch., *Linnaea* 26(1854)16 (at least as to MEL syntypes seen). TYPIIFICATION: see p. 73/74.
S. linariifolia auct.non Cunn.: Tate, *Hdbk. Fl. Extratrop.S.Austral.* (1890)29, 211 pp. (as to *Tepper AD96916035* and *Anon. AD96916033* in Herb. Tate in AD) "*S. linariifolia*".
S. flava auct.non Hook.f.: Tate, *Hdbk. Fl. Extratrop.S.Austral.* (1890)29, 211, p.p. (as to *Anon. AD96916024* from Victoria in Herb. Tate in AD; other specimens, unnamed, of same taxon from S. Austral. in Herb. Tate).
S. monogyna auct.non Labill.: Black, *Fl.S.Austral.* (1926)359, p.p.; Black, *Fl.S.Austral.* (ed.2) (1952)537, p.p.
S. spathulata auct.non Sieb.ex Spreng.: Black, *Fl.S.Austral.* (1926)359, p.p. (as to *Cleland AD966090192* at least p.p., & *Cleland AD96905033* p.p., *AD966090249*); Black, *Fl.S.Austral.* (ed.2) (1952)537, p.p. (as to same specimens).

Although this species was recognized to be distinct from *S. monogyna* in both the last monograph of Stackhousiaceae (Pampanini & Barglasi-Petrucci, 1905-6) and the review of the family in Engler & Prantl, 'Die natürlichen Pflanzenfamilien' (Mattfeld, 1942), like many works of similar nature these have been overlooked or ignored in the floras of the past 50 years in preference for the concepts proposed in Bentham's 'Flora Australiensis' (1863) and Mueller's 'Fragmenta Phytographiae Australiae' (1862), in which the two species were united.

S. aspericocca, as defined here, is very polymorphic in South Australia. There are a number of ecotypes separable on the basis of habit, inflorescence and fruit surface characters. The rank to be attributed to these taxa can only be decided in a revision of the whole genus. In the sclerophyll forest of the Mount Lofty Ranges, on Kangaroo Island.

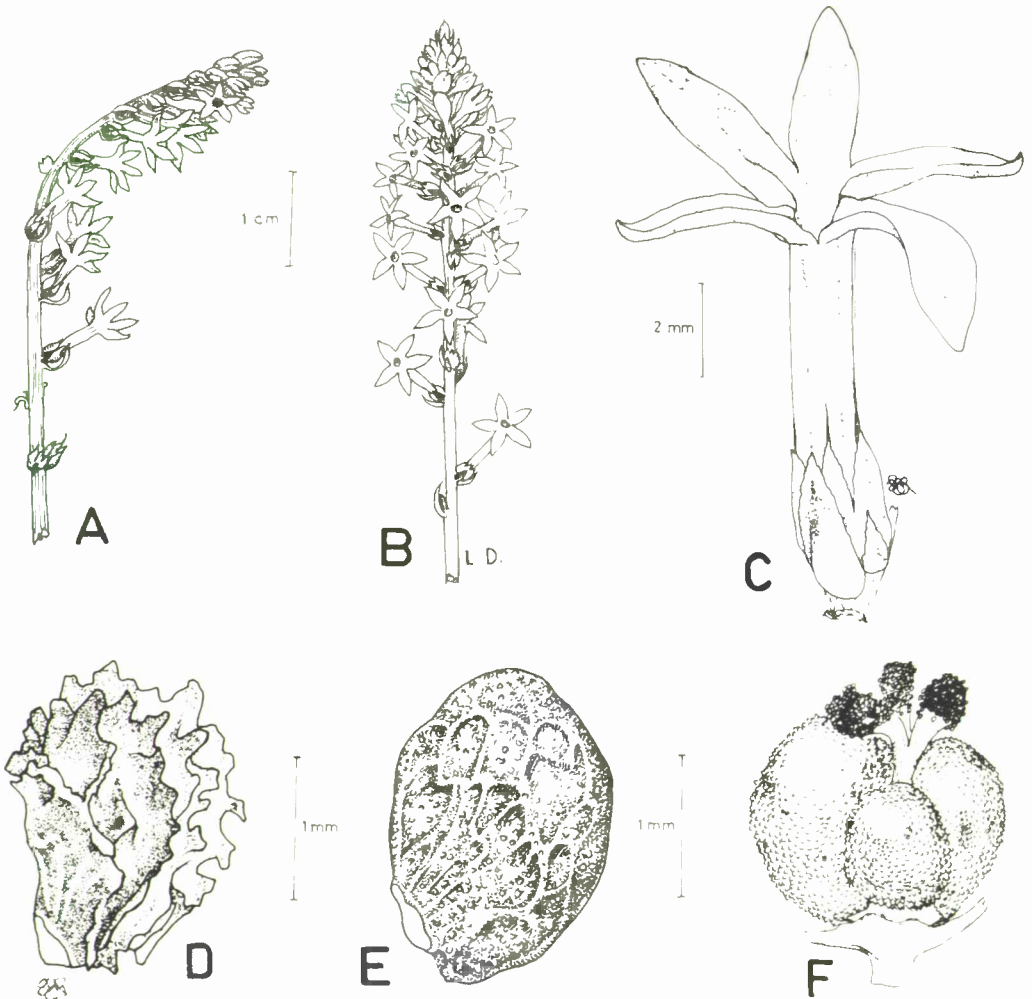


Fig. 2. *S. aspericocca*. A, unilateral inflorescence (Race 2: *Barker 658*); B, cylindrical inflorescence (Race 1: *Barker 555*); C, flower, with bract and prominent bracteole (Race 1: *Barker 671*); D, coccus (Race 2: *Alcock AD96524036*); E, coccus (Race 1: *Barker 682*); F, gynoecium after anthesis, showing asperate surface (Race 1: *Barker 676*).

and in the South-East of South Australia extending into western Victoria are populations distinguished by plants branched well above ground level and cylindrical inflorescences (fig. 2B) with usually white or pale yellow flowers (*Race 1*); this race has been rarely found on Yorke and Eyre Peninsulas. On poorer drier soils in such forest areas (often on very steep slopes) or in mallee communities throughout South Australia including the Mt Lofty Ranges and western Victoria, occurs a second variant (*Race 2*) characterized by branching confined to ground level and unilateral inflorescences, i.e. with flowers directed to one side (fig. 2A). Flower colour is pale to deep yellow. Syntype material of *S. aspericocca* in Herb. Sonder (MEL) belongs to this race. From annotations on specimens in MEL this variant constitutes part of the "frequent form" of *S. monogyna* of Willis (1973) in Victoria, "in Mallee sand-hill country, also heaths and around the Grampians"; the other component is *S. monogyna* s. str. The unilateral inflorescences usually arise by curvature of the pedicels, but rarely are produced by early bud drop on one side of the rachis (Barker 698, 699). The cocci of this variant tend to be deeply tuberculate in populations in mallee areas (fig. 2D), and shallowly rugose-reticulate in more forested regions. A third variant (*Race 3*) with branching from ground level only, broad thick leaves, a cylindrical inflorescence with white to pale yellow flowers, and shallowly rugose-reticulate cocci is confined to coastal heath on the cliff-tops of the southern ends of Yorke and possibly Eyre Peninsulas. Poor flowering collections (Cleland AD966090192, AD966090249, AD96905033 p.p.) from Rocky River and Cape du Couedic, Kangaroo Island, which approach *S. spathulata* in habit and leaves, belong with this race of *S. aspericocca*.

On central Yorke Peninsula and in the Mount Lofty Ranges, the Upper and Lower South-East and south-western Victoria, I have observed numerous populations, sometimes with two races growing sympatrically but in different habitats with no evidence of intergradation. Field studies are required, however, to test whether *Races 2* and *3* intergrade or are maintained as distinct populations on Eyre Peninsula. Herbarium material attributable to either of these races from localities throughout Eyre Peninsula is difficult to place as the inflorescence character is often obscured in pressing. Hence future collections should bear reference to the nature of the inflorescence.

Typification of S. aspericocca and S. muelleri

In the protologue of *S. aspericocca* Schuchardt (1854) cited several collections thus:-

"In Nova Holland.austr.detexit Ferd. Muller, Specimen. vidi in Herb.Sonder. — Mons Gambir — Barrossa-range. — In insula Van Diemen legit Dr Stuart."

I had the opportunity of searching the material of Stackhousiaceae in the Sonder Herbarium in MEL, and located several specimens clearly studied by Schuchardt in view of determinations such as "*Stackhousia aspericocca, mihi*" and others in an identical hand in the form "*Stackhousia aspericocca Schuchardt*".

In the case of *S. aspericocca* specimens located were:-

- (1) a syntype from "Mount Gambir" (MEL503706) annotated "*Stackhousia aspericocca mihi*" in presumably Schuchardt's handwriting;
- (2) probable syntypes which come from the Barossa region, north of Adelaide, which Schuchardt probably summarized as "Barrossa-range" (there being no specimen with this locality in the Sonder Herbarium). One from Tanunda, collected by Behr (MEL503707) bears the identification "*Stackhousia aspericocca mihi*" in Schuchardt's putative hand. The other (Anon. MEL503695) with a similar identification has the annotation "Pf inter P. et L.". This abbreviated annotation almost certainly corresponds to the locality provided on a collection in Herb. Sonder (*Dr Behr MEL503696*) which bears in another hand the annotations "*Stackhousia aspericocca Schuch.*" and the locality "inter Pfeiffers Section et Lyndocvalley". These three collections are probably syntypes, although the latter may be an isosyntype.

The only syntype which I have not seen is the one collected by Stuart allegedly from Tasmania ("Van Diemen's Land," abbreviated as "V.D.L."). I have seen no material attributable to *S. aspericocca* (i.e. with prominent herbaceous bracteoles) from Tasmania. Labels on Stuart collections from South Australia were sometimes annotated by Mueller not only with Stuart's locality but also with "V.D.L. explor. F.M.," meaning Tasmanian occurrence confirmed by F. Mueller; an example is the syntype of *S. muelleri* Schuch. from the Mt. Lofty Ranges, South Australia (*Stuart MEL503704*; see later), which Schuchardt considered came from Tasmania. Mueller further contracted the above additional annotation to the confusing "V.D.L. F.M." in material of *Euphrasia collina* R. Br. collected by Stuart near the River Torrens (Barker, 1974). It is therefore possible that the Tasmanian occurrence attributed by Schuchardt (l.c.) to *S. aspericocca* may have arisen from misinterpretation of such annotations accompanying a Stuart collection from South Australia.

All the syntype, or probable syntype material of *S. aspericocca* seen belongs to the variant with unilateral inflorescences and branching confined to ground level (*Race 2*). Since the type description is also descriptive of this variant I choose as *lectotypus* of *S. aspericocca* Schuch. the Mount Gambier collection (*Anon. MEL503706*) which is in excellent condition and exhibits well the diagnostic characters of the taxon.

Syntype material of *S. muelleri* Schuch. published simultaneously with *S. aspericocca* was also seen in Herb. Sonder in MEL. The specimens seen by Schuchardt were cited in the protologue (Schuchardt, l.c.) as —

"In Nova Hollandia austr. legit Ferd. Muller in Herb. Reg. Berol. et Sonder., in ins. Van Diemen, Dr Stuart, in Herb. Sonder."

Immediately following the diagnostic description and prior to his expanded description Schuchardt cited his species as "St. Muelleri Schuch. in Herb. Sonder." In not mentioning the "Herb. Reg. Berol." it would seem best that material from Berlin (B) be excluded from lectotypification, providing syntype material suitable for this purpose is found in Herb. Sonder (MEL). Two syntypes or probable syntypes were found in MEL as indicated by annotations with this species name in Schuchardt's putative handwriting. They belong to *S. aspericocca* Schuch., as defined herein, and resemble young unbranched plants of the variant with cylindrical inflorescences and branching well above ground level. Although Schuchardt cited no specific locality for his species, the syntype collected by Stuart (*MEL503704*) comes from the Mt. Lofty Ranges in South Australia, and not from Tasmania ("Van Diemen's Land") as presumed by Schuchardt (l.c.: see discussion of typification of *S. aspericocca*). I delay selection of a lectotype until all syntypes have been located and studied and the infraspecific affinities of the plants have been determined.

Representative and cited specimens

Race 1

SOUTH AUSTRALIA (Ca. 140 specimens seen): *Alcock 2555*, 12.ix.1968, Eyre Peninsula, road between Sections 13 & 16; Hundred of Cummins, AD. — *Anon. s.n.*, xi.1889, S.Y.P. [Southern Yorke Peninsula], AD96916033 (Herb. Tate). — *Barker 553, 555*, 29.ix.1968, Southern Lofty, National Park, Belair, ca. 300 yards east of Pines Oval, AD. — *Barker 665, 667-672, 674-678, 680-682, 684-686*, 27.x.1968, Southern Lofty, Cleland Wildlife Reserve, transect from Mt Lofty Obelisk to ca. 2½ km west-north-west of it in Waterfall Gully, AD. — *Menzel s.n.*, x.1897, Mt. Lofty Ranges, AD96916031 (Herb. Tate). — *Tepper s.n.*, xi.1897, Yorke Peninsula, Ardrossan, AD96916035 (Herb. Tate). — *Wilson 813*, 8.xi.1958, Kangaroo Island, 8 km east of Rocky River homestead on South Coast Road, c. 84 km south-west of Kingscote, AD.

WESTERN VICTORIA (10 specimens seen): *Barker 1418*, 25.x.1971, ca. 23 km SSW of Casterton, ca. 4 km E of Casterton-Dartmoor road, AD.

Race 2

SOUTH AUSTRALIA (Ca. 135 specimens seen): *Alcock s.n.*, x.1963, Eyre Peninsula, Hundred of Mortlock, County Flinders, abutting section 20, AD96524036. — *Anon[? Behr]s.n.*, 28.x.-, Southern Lofty, Pf. inter P. et L. [Between Pfeiffers Section and Lyndoch Valley — see spec. leg. Behr], MEL503695 (probable syntype of *S. aspericocca*). — *Anon. s.n., s. dat.*, South-eastern, Mount Gambier, MEL503706 (lectotypus of *S. aspericocca*). — *Barker 534*, 22.ix.1968, Southern Lofty, 1½ miles west from Mt. Lofty Obelisk, AD. —

Barker 647, 14.x.1968, Yorke Peninsula, off Curramulka-Port Vincent road, Hundred of Ramsay, Section 141, AD. — *Barker 658-660, 664*, 20.x.1968, Southern Lofty, Morialta Falls Reserve, ca. ¼ mile east-north-east of kiosk, southern slopes and summit of Rocky Hill, AD. — *Barker 697-699*, 3.xi.1968, Murray, ca. 3½ miles south of Monarto South, AD. — *Barker 1454*, 27.x.1971, South-eastern, ca. 12 km by road from Keith on main Bordertown road, AD. — *Behr s.n.*, Nov., Southern Lofty, Tanunda, MEL503707 (probable syntype of *S. aspericocca*). — *Behr s.n.*, Nov., Southern Lofty, inter Pfeiffer's Section et Lyndocvalley, MEL503696 (possible isosyntype of *S. aspericocca*). — *Wheeler 1110*, 13.x.1968, Eyre Peninsula, north-east track through Hincks National Park, ca. 6 km from eastern boundary, AD. — *Wheeler 1274*, 19.x.1968, Kangaroo Island, Flinders Chase, south-west corner, ca. 6 km along road to Cape du Couedic, south of Rocky River Homestead, AD. WESTERN VICTORIA (4 specimens seen): *Anon. s.n.*, s. dat., Nhill, AD96916024 (Herb. Tate). — *Barker 1427*, 25.x.1971, ca. 23 km SSW of Casterton, ca. 4 km E of Casterton-Dartmoor road, AD.

Race 3

SOUTH AUSTRALIA (15 specimens seen): *Barker 632, 637, 643*, 13/14.x.1968, Yorke Peninsula, ca. 6-7½ km south-south-west of the Corny Point Lighthouse, AD. — *Cleland s.n.*, 18.xi.1924, Kangaroo Island, Cape du Couedic, AD966090192 (p.p.), AD96905033 (p.p.), AD966090249. — *Cleland s.n.*, 18.xi.1924, Kangaroo Island, Rocky River, AD966090192 (p.p.). — *Eichler 15403*, 11.xi.1958, Kangaroo Island, Cape du Couedic (near the light house), AD.

Specimens of doubtful infraspecific affinities

SOUTH AUSTRALIA: *Anon. [? Oswald]*, s. dat., South-eastern, Guichenbay, MEL503705 (material det. by Schuchardt as *S. muelleri*, but not cited in protologue). — *Stuart s.n.*, s. dat., Lofty-range, Nov Holl austral., MEL503704 (probable syntype of *S. muelleri*).

3. *Stackhousia annua* Barker, species nova

Species nova Sectionis *Stackhousiae* Subsectionis *Racemosarum* a omnibus speciebus notis subsectionis duratione annua differt; prope *S. aspericoccam* et *S. monogynam* sed altitudine minore, cotyledonibus persistentibus et floribus coccisque minoribus etiam differt.

Herba annua glabra erecta, (5.5-)12(-19) cm alta, plerumque caule solitario, raro in partibus inferis ramosa. *Cotyledones* duo oppositae, obovato-spathulatae usque anguste obovato-spathulatae, (5-)6-9(-10.5) mm longae crassae, plerumque persistentes. *Caulis* irregulariter obtuso-angulus. *Folia* alternata simplicia sessilia crassiuscula, (7-)13-18(-27) mm longa, basi articulata, costa impressa; folia infima anguste spathulata, media anguste obovata, suprema linearia. *Stipulae* tereto-subulatae, (0.3-)0.4(-0.45) mm longae, persistentes. *Inflorescentia* spica cylindrica densiflora, usque 3(-4) cm longa, floribus secus rhachim singulariter dispositis, subsessilibus tribracteatis, pedunculo 1-3(-4) cm longo, *bracteae mediae* una ad basim pedicelli, exstipulatae vel bistipulatae, sessiles concavae ovatae eroso-serrulatae, acuminatae acutaeve, (1.4-)1.8(-2.5) mm longae, (0.6-)0.7(-1.2) mm latae, herbaceae marginibus hyalescentibus, *bracteolae* duo inaequales exstipulatae sessiles ovatae acuminatae, (0.7-)0.8-1.3(-1.4) mm longae, (0.4-)0.6-0.8(-0.9) mm latae, herbaceae marginibus hyalescentibus, ad calycem adpressae. *Calyx* campanulatus, tubo 0.7-0.9 mm longo, herbaceo, lobis quinque subaequalibus concavis lanceolatis, acutis eroso-serrulatis, 1.1-1.9 mm longis, 0.7-1.0 mm latis, herbaceis margine hyalescenti. *Corolla* parum zygomorpha eborina, tubo in lato adaxiali 4.0-5.2 mm longo, in lato abaxiali 3.5-4.5 mm longo, ad basim in unguis quinque diviso, lobis quinque inaequalibus, patentibus lanceolatis obtusis, (3.1-)3.4-4.0(-4.5) mm longis, (1.1-)1.3-1.6 mm latis. *Stamina* tres longa et duo brevia alternantia, antheris oblongis. *Gynoecium* 3-5-partitum, etiam in spica singulari quoad numerum partium varians, ovario inermi. *Cocci* immaturi rugulosi, minute colliculato-pusticulati. (Figs 3 & 4).

Holotypus (fig. 3): *W.R. Barker 633*, 13.x.1968. Ca. 6 km south-south-west of the Corny Point lighthouse. *Casuarina stricta-Alyxia buxifolia* association. Dark brown sand. Open flat terrain. Growing among grasses. From within same population, 634 (*W.R. Barker*) representing the 3 largest plants with longer and less fleshy leaves. AD97645535. *Isotypi*: CANB, K, PERTH, atque *W.R. Barker 634* (AD96905061). *Topotypus*: *Blaylock 1066*. (See also Typification on p. 77.)

Slender erect glabrous annual *herb.* (5.5-)12(-19) cm high. *Cotyledons* two, opposite, simple, entire, obovate-spathulate to narrow obovate-spathulate, obtuse, (5-)6-9(-10.5) mm long, thick, usually persistent, rarely caducous before flowering. *Stem* longitudinally ribbed, usually simple, rarely with branches developing singly and non-synchronously in axils of cotyledons, and then sometimes also in axils of lower leaves. *Leaves* alternate simple entire sessile, slightly tapered towards the articulated base, somewhat thick, with sunken midrib; lower leaves narrow spathulate, obtuse, (8-)13-17(-25) mm long, with or without a daedaleous opaque tip; middle leaves narrow obovate,

AD97645535



Fig. 3. *S. annua*. Holotype (Barker 633, AD).

obtuse, (10-)13-18(-26)mm long, with a longer daedaleous opaque tip; uppermost leaves linear, acute to acuminate, (7-)13-18(-25)mm long, with a opaque daedaleous tip. *Stipules* two equal terete-subulate, (0.3-)0.4(-0.45)mm long, persistent. *Inflorescence* a dense-flowered cylindrical spike, with peduncle 1-3(-4)cm long; flowers tribracteate arranged singly along flowering rachis which is up to 3(-4)cm long; *middle bract* at base of pedicel, exstipulate or bistipulate, sessile concave ovate, acuminate to acute, (1.4-)1.8(-2.5)mm long, (0.6-)0.7(-1.2)mm wide, herbaceous with a hyalescent erose-serrulate margin; *lateral bracteoles* two, on opposite sides of pedicel, unequal exstipulate sessile, appressed to calyx tube, ovate, (0.7-)0.8-1.3(-1.4)mm long, (0.4-)0.6-0.8(-0.9)mm wide, acuminate, herbaceous with erose-serrulate hyalescent margin; *pedicel* 0-0.1(-0.15)mm long. *Calyx* campanulate, with tube 0.7-0.9mm long, herbaceous, with the five lobes concave, inflexed at apex, lanceolate \pm equal, 1.1-1.9mm long, 0.7-1.0mm wide, acute herbaceous, with erose-serrulate hyalescent margin. *Corolla* slightly zygomorphic, cream-white; tube divided into five free basal claws inserted upon torus alternate with calyx lobes, 4.0-5.2mm long along adaxial side, 3.5-4.5mm long along abaxial side; lobes five spreading concave lanceolate obtuse (3.1-)3.4-4.0(-4.5)mm long, (1.1-)1.3-1.6mm wide. *Stamens* five; filaments 3 long alternating with 2 short, inserted on rim of torus opposite the calyx lobes; anthers oblong. *Gynoecium* 3-5-partite, the number of carpels varying even in a single spike; carpels uni-ovulate with surface free of excrescences; ovules anatropous bitegmic tenuinucellate. Immature *cocci* obovoid, to 1.4mm long and 1mm wide, shiny rugulose, minutely colliculate-pusticulate, often showing different stages of development in a single flower, sometimes aborting. (Figs 3 & 4.)

S. annua is endemic to the near-coastal regions of south-western Yorke Peninsula and south-eastern Eyre Peninsula (fig. 4G). It may yet be found in the western part of Kangaroo Island where the flora is closely related to that found on the two peninsulas (Wood, 1930). The species occupies grey sandy soil in open grassy areas of *Melaleuca lanceolata* or *Casuarina stricta* scrub, with or without a prominent shrub understory. Its known distribution is restricted to a few populations and it may be an endangered species. The Corny Point and Daly Head populations are certainly threatened by human activity and grazing, respectively.

As an annual *S. annua* differs from all known species of Sect. *Stackhousia* Subsect. *Racemosae*.

The type population of *S. annua* (*Barker 633, 634*) in *Casuarina stricta* woodland lies adjacent to a population of the coastal cliff-top variant of *S. aspericocca* (*Barker 632*) in low heath. The two species were flowering simultaneously but no intermediates were found.

The Eyre Peninsula collection differs from the Yorke Peninsula material by the presence of prominent stipules at either side of the base of each bract (fig. 4 B,F). Further study is required to determine whether this is of taxonomic significance.

Typification of S. annua

The specimens *Barker 633 & 634* and *Blaylock 1066* were collected from the one population at the one time (the discrepancy between the descriptions of the locality given by the two collectors is erroneous). *Barker 634* is considered an isotype on the following basis. The separation of the Barker collection under two numbers in the field was a means by which the character differences of thick versus membranous leaves could be associated with the plants after the loss of the distinction in the drying process. There was also the thought at the time that the three plants in *Barker 634*, among the largest in the population, may, however unlikely, have been hybrids between *S. annua* and a neighbouring undiscovered population of *S. aspericocca* with membranous leaves, but this consideration was not confined to the three plants nor could any evidence be found for this subsequently. The exclusion of *Barker 634* from the type collection would give a biased sample of the range of variation in both the type population and the species overall (e.g. *Barker 639* contains a majority of plants much larger than in the type population).

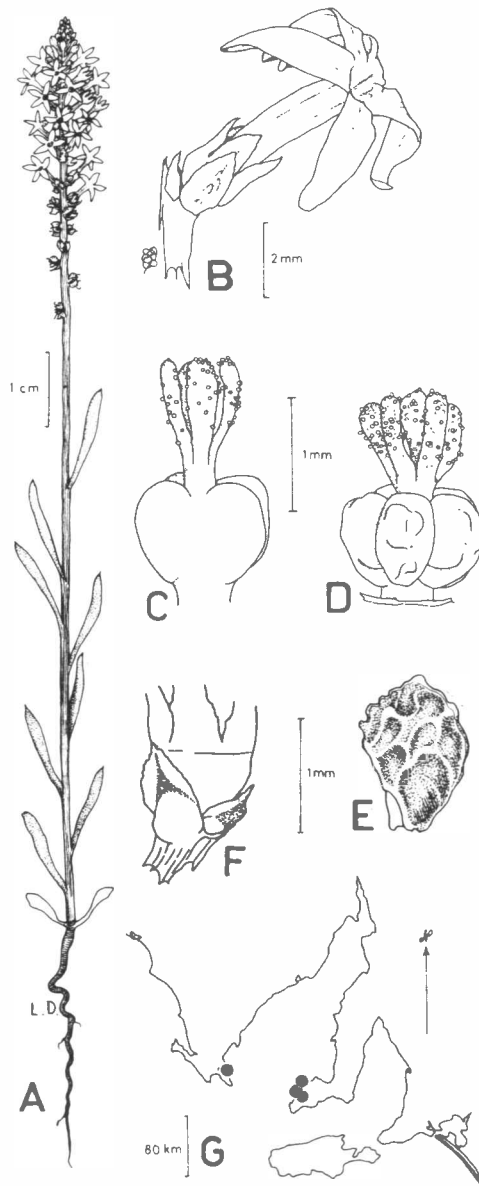


Fig. 4. *S. annua*. A, habit (Barker 633); B, flower, with estipulate bract and prominent bracteole (Barker 639); C & D, gynoecia from single inflorescence (Barker 633, 634 or 639); E, immature coccus (Barker 639); F, base of flower, showing stipulate bract (Eyre Peninsula collection: Wilson 324); G, distribution of *S. annua*.

Specimens examined

SOUTH AUSTRALIA. EYRE PENINSULA: *Wilson 324*, 8.x.1958, Flinders Hundred, 8 km south-east of Port Lincoln, Stamford Hill, AD. — YORKE PENINSULA: *Barker 633, 634*, 13.x.1968, ca. 6 km south-south-west of the Corny Point lighthouse, AD (holo- and isotype of *S. annua*). — *Barker 639*, 13.x.1968, Daly Head, AD (topotype of *S. annua*). — *Eichler 13974*, 26.ix.1957, between Corny Point and Cape Spencer, ca 17½ km south of Corny Point and ¼ km east of road to Stenhouse Bay, AD. — *Gordon & Woelkerling 3*, 22.ix. 1968, ca. 1.6 km east of Daly Head, AD.

4. *Stackhousia spathulata* Sieb. ex Spreng., Linn. Syst. Veg. (ed. 16) 4(2)(1827)124; Tate, Hdbk. Fl. Extratrop. S. Austral. (1890)29, 211; Black, Fl. S. Austral. (1926) 359, p. maj. p.; Black, Fl. S. Austral. (ed.2)(1952)537, p. maj. p. TYPE: *Sieber 246*, s. dat. Fl. Novae Holl. MEL 503697 (isotype).

This species, which is also known from coastal regions of the eastern states, is distinctive by its broadly 3-winged coccus (fig. 5), fleshy broad spatulate leaves, broad bracts and broad herbaceous bracteoles. It has a cylindrical inflorescence of cream-white flowers. It is clearly closely related to *S. aspericocca* and possibly comes closest to the coastal clifftop variant of southern Yorke and Eyre Peninsulas and Kangaroo Island. In South Australia these taxa can be distinguished on habit and floral characters in addition to the leaf and fruit differences which separate *S. spathulata* and *S. aspericocca* as a whole. *S. spathulata* branches well above the root stock, while the coastal variant (*Race 3*) of *S. aspericocca* branches only at the base of the plant. The former also tends to have a shorter corolla and stigmatic lobes. These, however, are only characteristics of South Australian specimens and the one western Victorian collection seen, for the few collections seen from New South Wales and Queensland differ by their branches arising from near ground level and their longer corollas and longer linear stigmatic lobes.

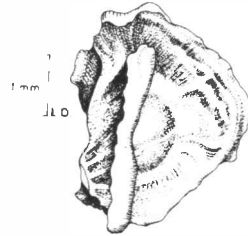


Fig. 5. *S. spathulata*. Coccus, lateral view (Copley 3334).

In South Australia *S. spathulata* occurs in coastal or near-coastal sand dunes or sand flats. It has rarely been collected west of the River Murray mouth. Fruiting material is required to verify the occurrence at the tip of Eyre Peninsula.

Specimens examined

SOUTH AUSTRALIA. YORKE PENINSULA: *Donner 611*, 30.ix.1962, sandhills above the beach ca. 12 km south of Yorketown, AD. — *Donner 628*, 25.xi.1962, ca. 10 km south of Yorketown, AD. — *Wollaston s.n.*, 17.xi.1968, Troubridge Point, AD. — KANGAROO ISLAND: *Cashmore s.n.*, 21.xi.1933, limestone E. of Vivonne Bay, AD96905033(p.p.). — *Cleland s.n.*, 1.ii.1940, near Rocky River on south coast, AD966090267. — SOUTH-EASTERN: *Anon. (Mt. Gambier School Wildflower Show) s.n.*, x.1937, without locality, AD966020389. — *C.D. Black s.n.*, x.1910 & ix.1913, Robe, AD96905033 (p.p.). — *Cleland s.n.*, 2.xi.1941, Port MacDonnell, AD966090266. — *Cleland s.n.*, 14.ii.1948, Cape Northumberland, AD97013082. AD966090286. — *Cleland s.n.*, 13.xi.1957, Younghusband Peninsula, AD966090287. — *Copley 3334*, 13.i.1971, Nora Creina Bay, AD. — *Fagg 206*, 24.i.1966, Lake Bonney, AD. — *Hunt 1892*, 14.ii.1964, Port MacDonnell, AD. — *E.N.S. Jackson 194*, 12.xi.1959, sandhills between Lake George and the sea near Beachport, AD. — *Robertson 1*, 26.viii.1976, beside Coorong Lagoon, 2 km S of Noonameena Camp, AD. — *Robertson 2*, 27.viii.1976, on Younghusband Peninsula opposite Noonameena Camp, AD. — *Symon 6881*, 11.iv.1971, Younghusband Peninsula, on Coorong near Meningie, AD. — *Wilson 1351*, 19.xi.1959, Cape Northumberland, ca. 3 km west of Port Macdonnell, AD.

VICTORIA. SOUTH-WEST COAST: *Whibley 72*, 22.x.1957, Cape Otway, AD.

NEW SOUTH WALES: *Brown s.n.*, 1900, Port Macquarie, AD96916012. — *Sieber 246*, s.dat., Fl. Novae Holl., MEL 503697 (isotype of *S. spathulata*).

QUEENSLAND: *Davis s.n.*, 26.viii.1955, Mooloolaba, AD95808226.

Specimens with affinities to S. spathulata

SOUTH AUSTRALIA. EYRE PENINSULA: *Rohrlach* 873, 8.x.1961, West Point area, ca. 32km south-south-east of Port Lincoln, AD. – KANGAROO ISLAND: *G. Jackson* 687, 11.x.1970, "Little Sahara sandhills", AD.

5. Sect. *Stackhousia* Subsect. *Cincinniferae* Mattf. in Engl. & Prantl, Nat. Pfl.-fam. (ed.2)20b(1942)252. Fig. 6.

There are clearly several distinct taxa belonging to this subsection in South Australia. From annotations on collections in the Tate and Black Herbaria in AD, "*S. viminea* Sm." and "*S. muricata* Lindl." of Tate (1890) and Black (1926, 1952) belong in this subsection.

The present taxonomy of Subsect. *Cincinniferae*, as summarized by Mattfeld (1942), is clearly inadequate as it does not cover the existing extensive variation in this subsection which is centred in the arid and tropical areas but extends into the temperate regions of Australia. Until the subsection is revised, it is possible neither to apply rank to the South Australian taxa nor to attribute names with any certainty. In fact, it is probable that all South Australian taxa, except the following species, are undescribed. It is important that more collections of this subsection are made throughout its range.

Although Tate (1890) recorded *S. megaloptera* FvM. from central Australia north of Lake Eyre, a study of material in the Tate Herbarium (AD) shows that he applied this name only to specimens from the Northern Territory and Western Australia. Similarly Mueller (1882, 1889) cited *S. megaloptera* from "South Australia", but this region as defined included Northern Territory south of the Tropic of Capricorn in addition to South Australia. This record was probably based only on the type location of the species in the MacDonnell Ranges of Northern Territory, although this must be verified by a research of the collections available to Mueller. Accordingly, in the absence of any further reference to the species in works covering the South Australian flora (e.g. Black, 1926, 1952; Eichler, 1965), the collection of the species *Whibley* 968 (6.ix.1963, North-Western Region, Musgrave Range, ca. 65 km west of Musgrave Park, AD) represents a new addition to the state's flora.

S. megaloptera can be readily distinguished from other members of Subsect. *Cincinniferae* by its prominently winged cocci.



Fig. 6. Sect. *Stackhousia* Subsect. *Cincinniferae*. Inflorescence (*Stackhousia* sp.: *Copley* 2756, 1.viii.1969, Eyre Peninsula, Gawler Ranges, ca. 10 km north of Peterby Tank, Thurlga Station, AD).