

A REVISION OF THE GENUS MENKEA

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There are approximately fifty endemic species of *Cruciferae* in Australia. Many were first described as species in genera otherwise extra-Australian. They have since had a varied nomenclatural history, being transferred from one genus to another, until O. E. Schulz (1924, 1933) described several new genera to accommodate them. Some, however, have always been placed in genera entirely Australian, one of which is *Menkea* Lehmann, now including six species of small winter- and spring-flowering ephemerals of central and southern Australia.

Most of the early Australian botanical collections were made by English and French explorers, but in 1838 a German collector, Johann Ludwig Preiss, went to Western Australia, returning three years later with extensive collections of plants and animals from the southwestern part of the then Swan River Colony. The plants, finally listed under 2718 numbers, were turned over to various European specialists for study with the results edited by J. G. C. Lehmann of Hamburg and published from 1844 to 1848 as *Plantae Preissianae*.

The treatment of the *Cruciferae* (Vol. 1:257–262) was prepared by Alexander von Bunge and published in December, 1844 or January, 1845, but Lehmann, who was director of the botanic garden at Hamburg, grew some plants from seed brought back by Preiss and published a description of a new genus, *Menkea*, and one species, *M. australis*, in the Index Seminum of the garden for 1843. Lehmann offered no suggestions concerning the affinities of the genus except to remark “nov. genus Cruciferarum e Comelinearum tribu,” a slip corrected by Bunge in his treatment to “e Camelinearum tribu.” Their concept of the *Camelineae* was probably that of de Candolle and included genera in which the siliques are completely dehiscent and not compressed contrary to the septum, and the embryos notorrhizal. Bunge remarked that *Menkea* is a very clearly defined genus, “affine ex characteribus Orobio et Eudemati, ex habitu Stenopetalo. . .” and went on to point out that it differed from the first two genera by the “quadriseriate” seeds and the habit, and from *Stenopetalum* by the unilocular siliques and petals that are not elongated. *Orobium* Reichenb., now generally included in *Aphragmus*, and *Eudema* resemble *Menkea* only superficially in that the siliques may be eseptate.

The first two species described in *Menkea*, *M. australis* and *M. draboides* (Hook.) Benth., have small oblong or obovate siliques which are strongly compressed in the plane of the replum so that the valves are nearly flat; the septum is much reduced or absent and the ovules are biseriate and very numerous. *Menkea draboides* was described in 1844 as a species of *Stenopetalum* by Hooker, who apparently did not then know of Lehmann's publication of *Menkea*. He stated that in spite of the esepstate siliques he was reluctant to separate the species from *Stenopetalum*, that is, from *S. lineare* R. Br. ex DC., which is, however, very different in habit and has nearly cylindric, few-seeded siliques and greatly elongated petals, and from his own *Stenopetalum procumbens* which is *Menkea australis*. In 1874 Mueller described *M. sphaerocarpa* and remarked, "Speciem . . . a genere remove noli propter valvas fructuum turgentes, quia enim Cochlearia species siliculis tum planis tum turgidissimis includerit"; since then it has been accepted that *Menkea* includes plants both with compressed and inflated siliques. The genus, as now delimited, consists of a group of species characterized by small compressed or inflated siliques in which the septum is reduced to a very narrow rim or completely gone and the ovules are biseriate and numerous.

Schulz (1936) placed *Menkea*, including only *M. australis*, *M. draboides* and *M. sphaerocarpa*, in subtribe *Brayineae* of the *Sisymbrieae* which is distinguished from subtribe *Camelinineae* [sensu Schulz] by the leaves being not amplexicaul and the seeds not mucose. He put *Stenopetalum* into the monogeneric tribe *Stenopetaleae* which essentially differs from the *Sisymbrieae* only by the erect calyx and elongated petals. I am reluctant to offer any opinions about the relationships of *Menkea* to extra-Australian genera, but I think that among the endemic genera, *Menkea* is perhaps closer to *Stenopetalum* than to any of those in the *Arabidopsidineae* (Shaw, 1965) or to those which have obcompressed siliques. Although Schulz, in 1933, transferred *M. villosula* to his newly described genus *Phlegmatospermum*, this was a result of his having relied on the original description of the species which contains some inaccuracies, and the two genera are, I think, not closely related; the three or four species of *Phlegmatospermum* all have strongly obcompressed, few-seeded siliques and are pubescent with malpighiaceae trichomes.

All six species of *Menkea* are ephemerals of arid and semi-arid parts of central and southern Australia. Often they are found in

places such as creek beds and clay pans or in any shallow depression which might receive runoff water. There are various notes on herbarium labels indicating that the plants were growing on soils derived from limestone and calciphily is not uncommon in the family. The center of distribution would seem to be in northern South Australia where five species have been found. The known range of each species is shown by the maps and the cited specimens; in each case the species may be more widely spread, but the plants are short-lived and, in part, grow in an area which is not well-known botanically.

The genus is named for C. T. Menke (1791–1861), a physician and amateur malacologist of Bad Pyrmont.

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SYSTEMATIC TREATMENT

Menkea Lehmann, Ind. Sem. Hort. Hamburg. 8. 1843

TYPE SPECIES: *Menkea australis* Lehmann, Ind. Sem. Hort. Hamburg. 8. 1843.

Plants small glabrous or villous annuals; stems several, prostrate or erect from a rosette of basal leaves; basal leaves linear to oblanceolate, the blades entire, dentate or pinnatisect and narrowing to a slender petiole; cauline leaves few and remote, obovate or spathulate, entire or coarsely dentate; inflorescences ebracteate, buds subglobose or ovoid; sepals spreading and sometimes persistent, sometimes saccate or cucullate; petals white, yellow, or pink to mauve, as long as to twice as long as the sepals, oblong to obovate or clearly differentiated into blade and claw, the claw often rather broad; stamens erect or spreading; glandular tissue semi-circular to square or several-angled around the single stamens and subtending the paired stamens; ovules 10–130 per ovary; siliques completely dehiscent, unilocular by more or less complete reduction of the septum, subglobose to obovoid or ellipsoid, or strongly compressed and elliptic or oblong; styles very short or obsolete; stigmas depressed-capitate, slightly expanded; seeds biseriate and numerous, oblong or ellipsoid to ovoid; embryo notorrhizal.

KEY TO THE SPECIES OF MENKEA

- A. Plants usually prostrate and spreading; siliques strongly compressed, the valves nearly flat.
 - B. Ovaries and siliques glabrous.
 - C. Petals usually white; septum completely reduced; ovules 40–80 per ovary 1. *M. australis*.
 - C. Petals bright yellow; septum present as a narrow rim; ovules 10–40 per ovary 2. *M. lutea*.
 - B. Ovaries and siliques papillose and often twisted. 3. *M. draboides*.
- A. Plants often erect; siliques subterete in section, the valves concave.
 - D. Plants villous with simple trichomes 4. *M. villosula*.
 - D. Plants completely glabrous.
 - E. Petals white or cream-colored, 2–3.7 mm. long; leaves subsucculent and entire 5. *M. crassa*.
 - E. Petals usually mauve or pink, 3–5.2 mm. long; basal leaves not conspicuously succulent, usually lobed or dentate 6. *M. sphaerocarpa*.

1. *Menkea australis* Lehm., Ind. Sem. Hort. Hamburg. 8. 1843

MAP 1

HOLOTYPE: Western Australia: without exact locality; *Preiss* 1937 (LU); probable isotype (MEL 7669).

Stenopetalum procumbens Hook., Icon. Pl. t. 610. 1844. HOLOTYPE: Western Australia: Swan River; *Drummond* 3 (K).

Menkea procumbens (Hook.) F. Muell., Fragm. 2:142. 1861.

Menkea coolgardiensis Sp. Moore, Journ. Bot. 35:162. 1897. HOLOTYPE: Western Australia: near Coolgardie; *Spencer Moore*, 1895 (BM); photo (AD).

Plant a glabrous prostrate annual; stems 5–15 (–25) cm. long, several, usually branched, frequently showing red-purple or red-brown pigmentation; basal leaves to 5 cm. long and 4 mm. wide, spatulate, entire to pinnatisect with several lobes per side and narrowing to a short petiole, marcescent; cauline leaves to 2 cm. long and 7 mm. wide (usually ca. 1 cm. × 4 mm.), narrowly obovate to elliptic, entire or shallowly lobed, sessile or shortly petiolate; inflorescences initially lax and soon elongating, the pedicels often 1 cm. distant, buds subglobose to ovoid; sepals 1–2 (2.5) mm. long, 0.5–1.2 mm. wide, oblong to elliptic or (ob-)ovate, sometimes cucullate, green to pink or lavender; petals 1.3–2.5 mm. long, 0.4–0.9 mm. wide, white or pink to mauve, rather coarsely veined, cuneate or obovate or oblong, usually subacute, the margins entire or sinuate; stamens 1.2–2.2 mm. long, the filaments slender and little expanded; lateral glands square around the single stamens and subtending the paired stamens, but absent between the latter; ovules ca. 20–40 per locule; infructescences loose, the pedicels to 15 mm. long and usually divaricate, but sometimes horizontal or recurved; siliques 3.5–7 mm. long, 1.5–3.5 mm. wide, elliptic or ± obovate and markedly compressed, sessile; styles very short or absent, the stigmas small and depressed-capitate; septum obsolete; seeds ca. 0.3–0.4 mm. long, oblong or square or sometimes ellipsoid, orange-brown to dark red-brown; cotyledons as long as or slightly longer than the radicle.

REPRESENTATIVE SPECIMENS: South Australia. Evelyn Downs, *Ising*, 1952 (AD); Mt. Lynhurst, *Koch* 326 (AD, BM, K, NSW 77564); Warren's Gorge,

near Quorn, *anon.*, 1916 (AD); Koonamore, *Osborn*, 1928 (SYD); Wynarka, *Ising*, 1960 (AD); Whyalla-Kimba, *Higginson*, 1955 (AD); Ooldea, *Cleland*, 1935 (AD); Maralinga, *Hill* 749 (BM). **New South Wales.** Nyngan, *Boorman*, 1903 (GH, NSW 77559); Cobar, *Abrahams*, 1911 (NSW 77560); Broken Hill, *Morris* 393 (NSW 77563); "Zara," Wanganella via Hay, *Officer*, 1917 (AD); Murray and Darling River, *Mueller & Beckler* s.n. (MEL 7665, MELU). **Victoria.** Swan Hill, *McAdams* 89 (MEL 11005); Hattah, *Carr*, 1955 (MELU); northwest of Lake Albacutya, *French*, 1887 (MEL 7664); Nhill, *St. Eloy D'Alton* 4 (MEL 7663). **Western Australia.** 4 miles south of Sandstone, *George* 5663 (PERTH); near Laverton, *George* 3743 (PERTH); Northam, *Fitzgerald*, 1898 (NSW 77565); Swan River, *Drummond* 2nd series no. 48 (BM, K, LU, P, W).

This species is probably more widely spread than the cited collections indicate, and might be looked for in the southern part of the Northern Territory and in southwestern Queensland. Although not uncommon, the plants are prostrate and short-lived and are easily overlooked by collectors. In habit, *Menkea australis* somewhat resembles *Hymenolobus procumbens* (L.) Nutt. ex Schinz & Thell., but the latter is distinguished by the siliques which are completely septate.

In the protologue, Lehmann neither cited specimens nor mentioned a locality but remarked "Semina in Australia occidentali ex herbario Preissiano accepimus.", indicating that the descriptions are based on material collected in Western Australia by Ludwig Preiss during his stay there in 1838–1841. Bunge, who prepared the treatment of the *Cruciferae* for *Plantae Preissianae*, cited *Preiss* 1937 under *Menkea australis*, so it is likely that the material under that number in Lehmann's own herbarium is the holotype. On Lehmann's death in 1860, the Preiss collections in his herbarium were purchased by Agardh (*Bot. Zeit.* 20:255. 1862) and are still housed at Lund.

Menkea coolgardiensis is known only from Spencer Moore's original collection. Mr. A. S. George, Australian Liaison Officer during 1968, kindly examined this specimen at the British Museum (Natural History) and reported that, in his opinion, it is *M. australis*. Moore described his material as "sparsim puberula" and remarked that this species differed from *M. australis* "chiefly in the much larger flowers with their persistent reflexed sepals, as well as in the differently shaped silicules." However, Mr. George found the plants to be quite glabrous; the size of the floral organs falls well within the range of those of *M. australis*; and the descriptions "siliculis oblongis compressis" and "Siliculae basi

breviter angustatae, 0.4 cm. long., vix 0.2 cm. lat." apply perfectly well to the siliques of *M. australis*.

For several years Mueller confused *Stenopetalum procumbens* Hook. (Icon. Pl. t. 610. 1844) with *S. draboides* Hook. (Icon. Pl. t. 617. 1844), both names based on collections made in the Swan River Colony by James Drummond. Hooker apparently did not know of the descriptions of *Menkea* and *M. australis* published by Lehmann, and published *S. procumbens* before the second fascicle (pp. 161–320) of the first volume of *Plantae Preissianae* (in which Bunge gave amplified descriptions) appeared in December, 1844 or January, 1845 (Stearn, Jour. Soc. Bibl. Nat. Hist. 1:203–205. 1939).

In 1862, Mueller made the combination *Menkea procumbens*, based on *Stenopetalum procumbens* Hook.; on the same page he gave a brief description of *M. australis*, correctly citing Lehmann's original description and the fuller one provided by Bunge, but he cited as a synonym *S. draboides* Hook., and remarked "Hujus speciei diagnosin juxta tabulam supra citatam [Icon. Pl. t. 617] extruxi, quum plantam ipsam nondum viderim." Having seen no authentic material of *S. draboides*, Mueller assumed it to be the same as Lehmann's *M. australis*. It is surprising that he did not realize that Hooker's diagnosis and description of *S. procumbens* agree much better with the description given by Lehmann and Bunge of *M. australis* than do those of *S. draboides*. In particular, Hooker said of *S. draboides*, ". . . siliculis oblongo-obovatis compresso-planis subtortuosis unilocularibus (dissepimento nullo) minutissime puberuli-granulatis. . . ." The siliques of *M. australis* are never twisted and completely lack trichomes or papillae, while those of *M. draboides* are usually twisted and are always papillose. The taxonomy of these two species was clarified by Bentham (1863).

The German-Australian collector, Max Koch, whose collections were widely distributed to Australian, European and American herbaria, in listing the plants he had found at Mt. Lyndhurst in the Flinders Ranges of South Australia (Trans. Roy. Soc. S. Austral. 22:102. 1898), said of *Menkea australis*, "My No. 326 is a variety differing from the typical form by the paucity of foliage. It is quite prostrate, racemes are filiform, flowers white, more minute than with *M. australis*, and the fruits somewhat narrower at the apex, and slightly wrinkled." Koch here confused *M. australis* with a hitherto undescribed species. On one sheet of

Koch 326 (AD) he noted "prostrate var: very different from typical form 270." However, the prostrate form (*Koch* 326) is true *M. australis* while *Koch* 270, also distributed as that species, is *M. crassa* E. Shaw, a species seldom found outside the Lake Eyre basin and the northern Flinders Ranges in South Australia.

2. *Menkea lutea* E. Shaw, sp. nov.

MAP 1

Herba annua glabra caulibus gracilibus plerumque prostratis; folia basalia rosulata, spatulata vel obovata, plerumque pinnatisecta lobis 2-4 utroque latere, in petiolum longiorem angustata; folia caulina remota, \pm obovata dentibus grossis 1-3 utroque latere, in petiolum angustum contracta, raro folia sessilia; racemi conferti plerumque floribus 20-40; sepala caduca, mediana quam lateralibus parum maiora; petala lutea, plerumque anguste obovata sine ungue distincto autem nonnumquam lamina obovata, elliptica vel rhombea in unguem \pm aequilongum vel breviorum attenuata; ovulae 5-20 in loculo; siliquae obovatae vel ellipticae valde latiseptales; semina \pm ellipsoidea.

HOLOTYPE: Western Australia: Wingelena airstrip, Tomkinson Range (\pm 128° 48' E., 26° 3' S.), *Symon* 2165 (AD); isotype (ADW).

Plant an erect or prostrate glabrous annual; stems to 4 dm. long, slender and flexuous and usually branched, often with some purple pigmentation, basal leaves to 6 cm. long and 10 mm. wide, spatulate to obovate, usually pinnatisect with 2-4 segments on a side, narrowing into a slender petiole nearly as long as the blade, often with much purple pigmentation; cauline leaves few, to 3 cm. long and 8 mm. wide, \pm obovate with 1-3 coarse teeth per side, narrowing to a short petiole or sessile; inflorescences initially dense but rapidly elongating after anthesis, buds subglobose; sepals 1.7-2.3 mm. long, elliptic or oblong to ovate, sometimes cucullate; petals 1.8-2.8 mm. long, 0.8-1.2 mm. wide, bright yellow and coarsely veined, oblong to elongatedly obovate or sometimes with a distinct obovate or rhombic blade narrowing to a claw about as long; stamens 1.8-2.7 mm. long, filaments linear and slightly expanded at the base; glandular tissue square or pentagonal around the single stamens and subtending the paired stamens but not developed between these; ovules 5-20 per locule; infructescences loose, to 20 cm. long; pedicels 5-9 mm. long, divaricately spreading or erect; siliques 4-6.8 mm. long, 1.9-2.7 mm. wide, obovate to elliptic and much compressed, sessile or sub-stipitate; styles 0.3-0.5 mm. long, stigmas small and depressed-capitate; septum reduced to a narrow rim, this present sometimes only at the proximal end of the silique; seeds 0.7-0.9 mm. long, oblong to ellipsoid, orange to yellow-brown cotyledons slightly shorter than the radicle.

SPECIMENS SEEN: Western Australia. Wingellina near Mt. Hinchley, *Cleland*, 1960 (AD); Blackstone Range Mining Camp, *George* 4820 (PERTH). South Australia. Mt. Davies, *Cleland*, 1960 (AD); 10 miles northwest of Mt. Davies airstrip by road to Giles, *Wilson* 2466 (AD). Western Australia or South Australia. Tompkinson Range, *Cleland*, 1954 (AD).

The Tomkinson and Blackstone Ranges were crossed on horseback by Ernest Giles in 1873. Richard Helms, botanical collector with the Elder Exploring Expedition (which relied on camels for

transport), spent several days in the western part of the Blackstone Range in 1891, but it is only in recent years, with the development of the weather station at Giles and the construction of airstrips, that this very remote area has been at all accessible to field biologists.

Menkea sphaerocarpa and *M. villosula* have also been found in the ranges of northwestern South Australia, but both species differ from *M. lutea* in that the siliques are subglobose; furthermore, *M. sphaerocarpa* has much larger mauve or pink petals and *M. villosula* is hirsute.

3. *Menkea draboides* (Hook.) Benth., Fl. Austral. 1:80. 1863

MAP 2

Stenopetalum draboides Hook., Icon. Pl. t. 617. 1844. HOLOTYPE: Western Australia. Swan River: Drummond ("Crucif. n. 3.") (K); possible isotype (NSW 77566).

Plant a glabrous prostrate annual; stems to 0.6 dm. long, generally branched, often with reddish or purplish pigmentation; basal leaves to 3 cm. long and about 10 mm. wide, the blade \pm obovate, entire or remotely lobed or dentate, narrowing to the slender petiole often as long as the blade; cauline leaves few, to 1.5 cm. long and 5 mm. wide, obovate or oblanceolate (sometimes falcate) entire or shallowly and remotely dentate or lobed, sessile or (the lowermost) shortly petiolate; inflorescences dense and few-flowered, buds ellipsoid or obovoid; sepals 1.8–2.3 mm. long, oblong, usually persistent; petals 2.5–3.0 mm. long, 1.0–1.4 mm. wide, apparently white or cream-colored, obovate or with an obovate to oblong blade narrowed to a \pm linear claw; stamens 2.0–2.5 mm. long, filaments expanded at the base; glandular tissue horseshoe-shaped around the single stamens and subtending the paired stamens but absent between these; ovules 30–40 per locule; infructescences loose and quite short, pedicels to about 4 mm. long, usually spreading divaricately but sometimes erect; siliques 8–10 mm. long, 2–3 mm. wide, oblong to obovate, much compressed and frequently twisted, the valves densely papillose; styles short, the stigmas small, depressed and capitate; septum reduced to a very narrow rim; seeds oblong to ovoid, dark red-brown, but none fully developed seen.

SPECIMENS SEEN: Western Australia. Swan River: Drummond, 1843 (K); Swan River: Drummond 2nd series #49 (BM, K, LU, MEL 7670, W); Watheroo: Koch 1758 (AD, NSW 77567); Watheroo: Staer, 1905 (E); Yilgarn: Sayer, 1889 (MEL 7687).

This, the least known species of *Menkea*, differs from the others in the usually twisted, papillose siliques. The fact that it seems not to have been collected since 1905 suggests that its habitats may have been destroyed although it is possible that the plants merely have gone unnoticed by collectors. There is also some confusion

about the provenance of Koch's collection; the labels are clearly marked "Watheroo" and "1758" and the date given is August, 1905. However, in the library of the National Herbarium of Victoria there is an manuscript résumé, written by Koch, of his collecting activities up to 1925. According to this, his collections of 1905 (numbers 1293 to 1385) were made near the inner rabbit-proof fence, "50 miles east of Watheroo Rwy. St.," with the following note: "but a considerable number of plants labelled later on among the Wooroloo plants." The material from Wooroloo was collected from 1906 to 1908 and includes Koch's numbers 1386 to 1851; the collection in question might have come from either place.

4. *Menkea villosula* (F. Muell. & Tate) Black, Trans. Roy.

Soc. S. Austral. 40:62. 1916

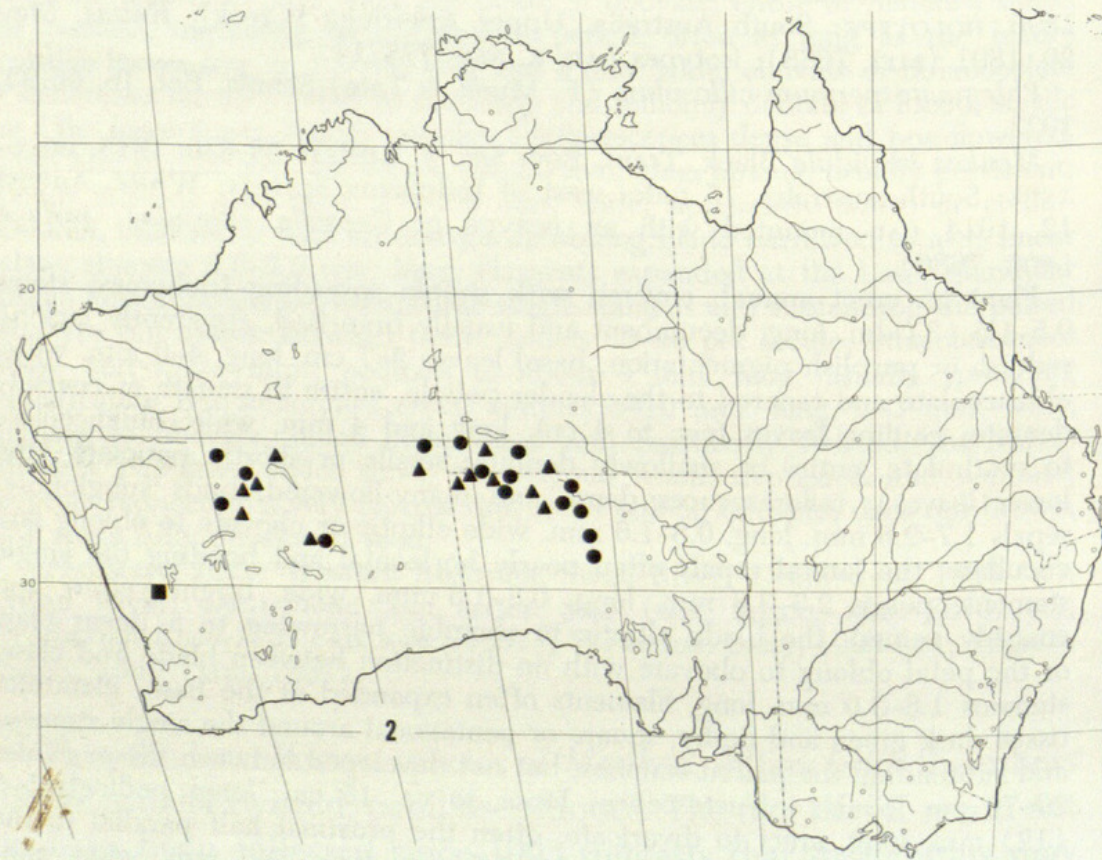
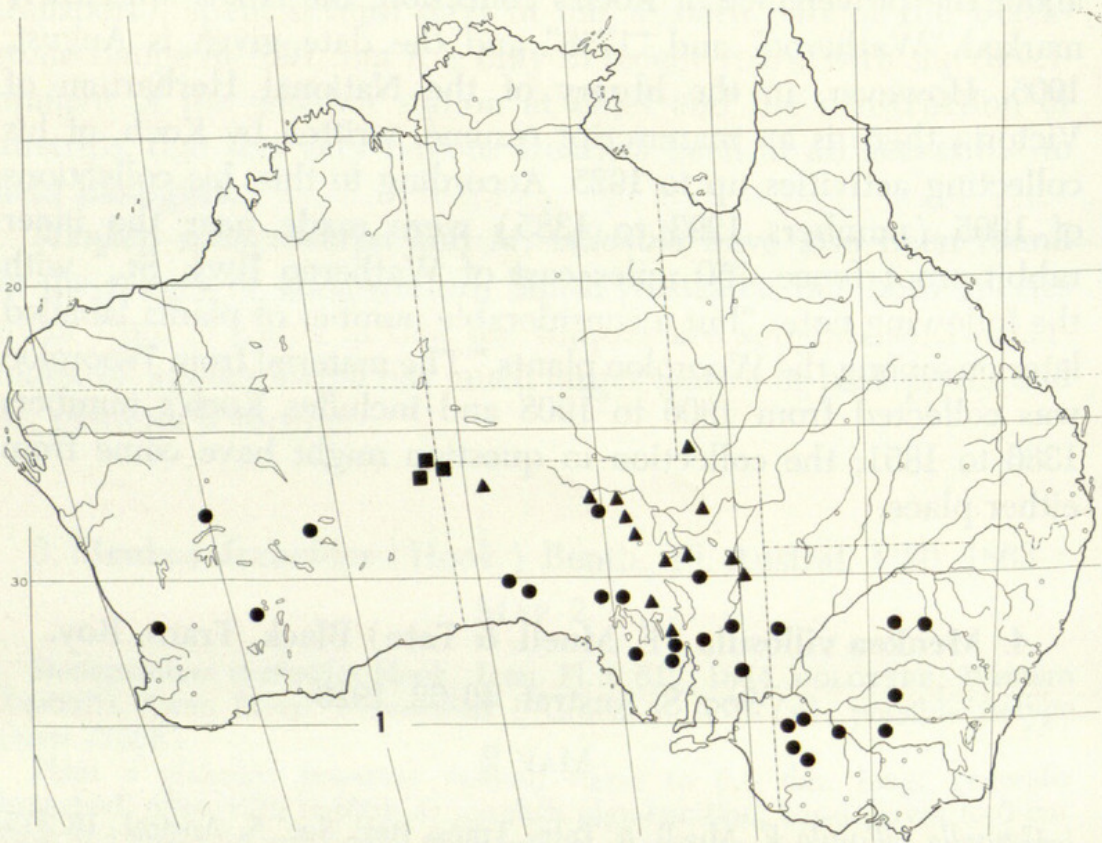
MAP 2

Capsella villosula F. Muell. & Tate, Trans. Roy. Soc. S. Austral. 16:335. 1896. HOLOTYPE: South Australia. Upper Arkaringa [Creek]; Helms, May 20, 1891 (MEL 7688); isotypes (AD, K, NSW 77571).

Phlegmatospermum villosulum (F. Muell. & Tate) Schulz, Bot. Jb. 66:93. 1933.

Menkea hispidula Black, Trans. Roy. Soc. S. Austral. 39:830. 1915. HOLOTYPE: South Australia. 15 miles west of Indulkana Springs: White, August 12, 1914 (AD—mounted with an isotype of *Capsella villosula*); isotype (MEL 7686).

Plant an erect annual, covered with simple spreading trichomes; stems 0.5–1.5 (3) dm. long, decumbent and usually branched, apparently lacking reddish or purplish pigmentation; basal leaves 2–7 cm. long, 4–9 mm. wide, oblanceolate and tapered to the slender petiole, entire to sinuate or coarsely dentate; cauline leaves few, to 4 cm. long and 4 mm. wide, oblanceolate to spatulate, entire or shallowly dentate, sessile or shortly petiolate (the lower leaves); inflorescences dense and many-flowered, buds subglobose; sepals 1.7–2.6 mm. long, 0.8–1.6 mm. wide elliptic or obovate to oblong and cucullate, the lateral sepals often nearly horizontal and hooding the single stamens; petals 2.3–3.8 mm. long, 0.8–1.6 mm. wide, bright yellow and coarsely veined, the blade elliptic to rhombic narrowing to a linear claw or the petal oblong to obovate with no distinction between blade and claw; stamens 1.8–3.0 mm. long, filaments often expanded at the base; glandular tissue dark green and fleshy, square or pentagonal around the single stamens and subtending the paired stamens, but not developed between these; ovules 20–70 per locule; infructescences loose, to ca. 15 cm. long; pedicels 5–8 (12) mm. long, erect to divaricate, often the proximal half parallel to the axis and then spreading; siliques 3.0–5.5 mm. long, 2–3 mm. wide, subglobose or ellipsoid, sometimes slightly compressed, sessile or on a short stipe, villous; styles 0.5–0.8 mm. long, stigmas fleshy and depressed and



Map 1. *M. Australis* (dots); *M. crassa* (triangles); *M. lutea* (squares)
Map 2. *M. villosula* (dots); *M. sphaerocarpa* (triangles); *M. draboides* (squares)

capitate; septum reduced to a rim 0.1–0.2 mm. wide or obsolete; seeds 0.4–0.5 mm. long, subglobose or shortly oblong, brown to dark red- or orange-brown; cotyledons a little shorter than the radicle.

REPRESENTATIVE SPECIMENS: **Northern Territory.** 3.6 miles west of Curtin Springs Homestead, *Chippendale* (BRI, CANB, MEL 7685, NSW 77568, NT 2862); Docker River near Petermann Range, *George* 4959 (PERTH). **Western Australia.** 2 miles northwest of Giles Weather Station, *George* 4925 (PERTH); Gunbarrel Highway, 3 miles east of Mungilli claypan, *George* 5433 (PERTH); 14 miles east of Meekatharra, *Aplin* 2460(d) (PERTH); Upper Gascoyne, *Hoey*, 1963 (PERTH); Terin rockhole, Laverton-Warburton road, *George* 4700 (PERTH); 16 miles south of Wiluna on Sandstone road, *George* 5624 (PERTH). **South Australia.** 22 miles south of De Rose Hill station, *Perry* 5520 (CANB, NSW 77569, NT); 48 miles east of Mt. Davies, *Wilson* 2357 (AD); Musgrave Ranges, western slope to summit of Mt. Morris, *Eichler* 17353 (AD); Piltardi, in Mann Ranges, *Cleland*, 1954 (AD); 22 km. south of Mt. Willoughby Homestead, *Shaw* 515 (AD); ca. 30 km. north of the turnoff to Mable Creek Homestead, *Eichler* 17238 (AD).

As pointed out by J. M. Black (Trans. Roy. Soc. S. Austral. 61:245. 1937) the plants in Helms' collection, on which Mueller and Tate based the name *Capsella villosula*, lack mature siliques and this is the apparent cause of some surprising inaccuracies, such as "two or three seeds in each cell," in the protologue. Black himself examined the holotype and found 50–60 ovules in each ovary. But before Black had seen this material, he described *Menkea hispidula* from plants collected near Indulkana Springs, about 12 miles west of Granite Downs Homestead, by S. A. White. In the protologue Black remarked that Captain White's specimens agreed well, "apart from the number of seeds," with the description of *C. villosula*; but not having seen the plants on which the latter name is based, he proceeded to describe the species as new, only to find in the following year, after Professor Ewart of Melbourne compared the collections of Helms and of White, that *M. hispidula* and *C. villosula* were conspecific and best placed in *Menkea*.

As a result of having seen only these plants with immature fruit, Mueller and Tate described the siliques as "... ellipsoid-oval, ...; the valves boat-shaped; the replum in the narrow diameter"; this, and the statement that there are two or three seeds in each fruit led O. E. Schulz, who knew the species only from the description, to transfer *Menkea villosula* to *Phlegmatospermum*, described as having "Ovarium ovoideum, 4–14-ovulatum; ... Silicula a lateribus compressa, ovoidea, ...; valvulae naviculiformes, carinatae, desilientes. Semina prorata magna, ... , recte

vel suboblique pleurorrhiza, . . .” *Menkea villosula* does resemble *Phlegmatospermum* in that it is the only species of *Menkea* in which the seeds are truly mucose, and the plants are pubescent, although with spreading simple trichomes rather than with appressed branched ones, as are all species of *Phlegmatospermum*. However, the siliques of this species are never strongly obcompressed with keeled valves, as are those of *Phlegmatospermum*, the septum is obsolete or much reduced, and the seeds are numerous and very small. The inclusion of this species in *Menkea* makes incorrect that part of Schulz’s key to the genera of *Sisymbrieae-Brayinae* (Nat. Pflanzenfam. ed. 2, 17b:290. 1936) in which *Menkea* follows the lead “Pflanze völlig kahl.”

Menkea villosula is distinguished by the erect habit, bright yellow petals and dense covering of simple trichomes; the flowers are sweetly scented, the odor described by Helms in his field notes as “like hawthorn, mixed with heliotrope.” In Australia, the only other species of this family having similar trichomes is *Lepidium oxytrichum* Sprague; however, the plants are much larger than those of *M. villosula*, the petals are white and the siliques are septate, two-seeded and strongly obcompressed.

5. *Menkea crassa* E. Shaw, sp. nov.

MAP 1

Herba annua glabra caulibus prostratis vel decumbentibus. Folia subsucculenta integra; basalia rosulata linearia vel spatulata in petiolum gracilem sensim angustata vel (superiora praecipue) cuneatim sessilia. Racemi conferti pauciflori. Sepala caduca, mediana quam lateralia parum maiora. Petala alba vel eburnea (raro lutea), lamina orbiculari vel obovata vel elliptica in unguem linearem attenuata; interdum petala anguste obovata sine unguo distincto. Ovulae ca. 25–55 in loculo. Silicula ellipsoidea vel sphaerica vel (ob-)ovoidea, teres vel parum latiseptalis. Semina \pm ellipsoidea.

HOLOTYPE: South Australia. Sand dune immediately in front (west) of Mungerani Homestead; *Lothian 310* (AD).

Plant a glabrous prostrate or decumbent annual; stems to 1.5 (-2.5) dm. long, stout and usually branched, apparently lacking reddish or purplish pigmentation; basal leaves about 3 cm. long and 5 mm. wide, the blades entire and linear to spatulate tapering to the slender petiole, glaucous and rather fleshy; cauline leaves 1–4 cm. long, 0.3–0.6 cm. wide, obovate to spatulate, entire or sinuate, sessile (the upper leaves) or shortly petiolate, glaucous and subsucculent; inflorescences initially dense, buds subglobose; sepals 1.5–2.5 mm. long, ovate to elliptic or oblong, often cucullate; petals 2.0–3.7 mm. long, 1.0–2.3 mm. wide, white or cream-colored (rarely, yellow), coarsely veined, obovate or with an orbicular to obovate blade narrowing to a distinct claw; stamens 1.5–2.5 mm. long, the filaments expanded at the

base; glandular tissue square to pentagonal around the single stamens and subtending the paired stamens with a deltoid lobe between the bases of each pair of the latter; ovules ca. 25–55 per locule; infructescences loose, to ca. 8 cm. long; pedicels about 15 (–25) mm. long and usually divaricate but occasionally horizontal or erect; siliques ca. 3.5–6.5 mm. long, 1.8–3.6 mm. wide, ellipsoid to (ob-)ovoid, sometimes slightly compressed, sessile; styles 0.4–0.8 mm. long, stigmas small and depressed and capitate; septum reduced to a rim 0.2–0.3 mm. wide, broadest at the proximal end of the silique; seeds 0.5–0.6 mm. long, oblong to ellipsoid, dark orange-brown to red-brown; cotyledons shorter than the radicle.

REPRESENTATIVE SPECIMENS: **South Australia.** Sand hills around Lake Wittakilla, 40 miles from N. S. W. border (near junction of Boolkaree and Yandama Creeks, south of Lake Callabonna), *Béchervaise*, 1950 (AD, MEL 7677); Frome River bed, ca. 1½ miles north of Marree, *Shaw* 189 (AD); Muloorina Station, in wet beds of claypan between Muloorina Station and Lake Eyre, *Hill* 202 (AD); Mt. Lyndhurst, *Koch* 270 (AD, B, BRI, K, MEL 7681, NSW 77553, 77554, 77555, p, w); north of Bopeechee, *Lothian* 1301 (AD); Gidjee flood plain, 4 miles north of Oodnadatta, *Lothian* 2053 (AD); Arkaringa Creek, *Helms*, 1891 (AD, MEL 7676, NSW 77557); between Musgrave Ranges and Birks Gate Range, *Helms*, 1891 (AD); near lake Hart, *Whibley* 1258 (AD). **Queensland.** Mulligan River, *Clarke*, 1904 (NSW 77551).

The specimens cited indicate the range of *Menkea crassa* as presently known, most of the forty collections seen having come from the Lake Eyre basin and the northern part of the Flinders Ranges. However, it is likely that more material will be obtained from the Lake Torrens basin as is suggested by *Whibley* 1258 (AD) and a collection from Yudnapinna, northwest of Port Augusta, *Hilton* 781 (ADW). A plant of this species is mounted with a probable isotype of *M. sphaerocarpa* from Mt. Olga in the Northern Territory (κ) but there is no evidence that the plant was collected there.

The range of *Menkea crassa* overlaps, in part, that of *M. australis*, *M. sphaerocarpa* and *M. villosula*, but this species can be recognized by the combination of stout stems and subsucculent foliage with white or cream-colored petals and glabrous inflated siliques. In South Australia, *M. lutea* is so far known only from the far northwestern part of the state, slightly beyond the known range of *M. crassa*; the former species is distinguished by bright yellow petals and compressed siliques. As mentioned in the discussion of *M. australis*, Max Koch confused that species and this one, and his number 270, widely distributed as the "typical form" of *M. australis*, is *M. crassa*. *Menkea crassa* seems most closely related to *M. villosula* which it resembles in that the stems are frequently erect, the siliques are inflated and the septum is not entirely absent.

6. *Menkea sphaerocarpa* F. Muell., Fragm. 8:223. 1874

MAP 2

HOLOTYPE: Northern Territory. Mt. Olga: *E. Giles*, 1873 (MEL 7674). The following sheets include material which may be isotypes or parts of the type: AD (ex Herb. Ralph Tate), K (these two sheets both labelled "Mt. Olga," but lacking date and collector's name), MEL 7682, MEL 7683 (both sheets unlabelled, but on the latter is an annotation made by Mr. J. H. Willis of the National Herbarium of Victoria suggesting that the material might be part of the type).

Plant an erect or prostrate glabrous annual; stems 1.5–3 dm. long, usually branched, often with much reddish or purplish pigmentation; basal leaves to 7 cm. long and 12 mm. wide, the blades obovate to spatulate, usually coarsely lobed or dentate, tapering to a slender petiole often as long as the blade; cauline leaves few, 1.5–4 cm. long, 5–12 mm. wide, obovate to spatulate, sometimes falcate, entire or shallowly dentate, sessile or (the lowermost) on a short petiole; inflorescences initially dense, but soon elongating, buds subglobose; sepals 2.1–3.1 mm. long, elliptic to oblong or ovate, sometimes cucullate; petals 3.0–5.2 mm. long, 2.0–4.5 mm. wide, pink to mauve, or white (but often drying yellow), the blades orbicular to (ob-)ovate and narrowing suddenly to the broad claw; stamens 2.1–3.1 mm. long, the filaments dilated at the base; glandular tissue pentagonal or hexagonal around the single stamens and subtending the paired ones, sometimes developed between the latter; ovules 25–70 per locule; infructescences loose, to 10 cm. long; pedicels 5–15(–20) mm. long, usually spreading but sometimes erect or horizontal; siliques 3–7 mm. long, 1.0–3.5 mm. wide, subglobose to ellipsoid or obovoid and slightly compressed, sessile or on a short stipe; styles 0.6–1.0 mm. long and slender, the stigmas depressed-capitate; septum obsolete; seeds 0.3–0.5 mm. long, ellipsoid to oblong, dark brown to dark red-brown; cotyledons slightly shorter than the radicle.

REPRESENTATIVE SPECIMENS: **Northern Territory.** 22 miles west of Victory Downs Homestead, *George* 5103 (PERTH). **Western Australia.** Giles road, 4 miles south of Blackstone turnoff, *George* 5218 (PERTH); Brockman River, west of Carnegie, *George* 5574 (PERTH); 25 miles west of Wiluna, *Gardner* 2379 (PERTH); Lake Miranda, edge on sand, 21 miles north of Agnew, on road to Wiluna, *Aplin* 2370 (PERTH); East of Laverton, Geological Survey no. 49 (PERTH); Parker's Range, *Merrall* (MEL 7684). **South Australia.** 42 miles south of Mt. Davies camp, Tomkinson Range, *Symon* 2531 (AD, ADW); Ernabella Mission Station, Musgrave Ranges area, *Coombe*, 1955 (AD, MEL 7672, 7673, NSW 77556); between camps 10 and 11 [of the Elder Exploring Expedition, i.e., between the Birksgate and Everard Ranges], *Helms*, 1891 (AD, K, MEL 7675, 7679, NSW 77558); 9 miles east of Emu Clay Pans, *Forde* 350 (AD, CANB, MEL 7671).

The material on the holotype sheet consists only of silique valves and a few fragments of stem, but Mueller referred to *Menkea sphaerocarpa* as "*speciem pulchellam et eximiam*" and the protologue includes details of leaves and flowers which may have been drawn from material on MEL 7683, one plant on this sheet having a few flowers and leaves. However, MEL 7674 must

be regarded as the holotype for it is the only sheet of this species at the National Herbarium of Victoria which can be connected with certainty to Mt. Olga and Ernest Giles.

This sheet is labelled "1873-1874," referring to Giles' second expedition into central Australia and the collection was probably made during the third week of September, 1873, when Giles and his companions spent a few days near the base of Mt. Olga to rest their horses. In *Australia Twice Traversed* (vol. 1, p. 292), Giles remarked, "...just about Mt. Olga I fancied I had discovered several new species." and, in fascicle 69 of *Fragmenta Phytographiae Australiae*, published soon after Giles' return to the settled areas, Mueller described, among others, five species from Mt. Olga or nearby.

In South Australia *Menkea sphaerocarpa* occurs in the northwest and seems not to have been collected east of the Everard Ranges. Mueller and Tate (1896), in enumerating the collections of the Elder Expedition, refer to this species collections made on the Cootanoorina and Arkaringa Creeks, while J. M. Black (1917) cited Lake Blanche and Mt. Lyndhurst and, in 1918, "waterhole near Marree." With the exception of Arkaringa Creek, which is northwest of Oodnadatta, these are places in northeastern South Australia, and the collections all belong to *M. crassa*.

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