

An update to the taxonomy of some Western Australian genera of Myrtaceae tribe Chamelaucieae. 6. *Scholtzia*

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Abstract

Rye, B.L. An update to the taxonomy of the Western Australian genera of the Myrtaceae tribe Chamelaucieae. 6. *Scholtzia*. *Nuytsia* 30: 33–86 (2019). Twenty five new species and five new subspecies of *Scholtzia* are described: *S. bellairsiorum* Rye, *S. brevistylis* Rye, *S. brevistylis* subsp. *prowaka* Rye, *S. calcicola* Rye, *S. chapmanii* Trudgen ex Rye, *S. cordata* Trudgen ex Rye, *S. corrugata* Rye, *S. denticulata* Rye, *S. halophila* Rye, *S. halophila* subsp. *meridionalis* Rye, *S. halophila* subsp. *mortlockensis* Rye, *S. inaequalis* Rye, *S. laciniata* Rye, *S. longipedata* Rye, *S. longipedata* subsp. *procera* Rye, *S. multiflora* Rye, *S. oleosa* Rye, *S. peltigera* Rye, *S. pentamera* Rye, *S. pentamera* subsp. *collina* Rye, *S. prostrata* Rye, *S. quindecim* Rye, *S. recurva* Rye, *S. subsessilis* Rye, *S. tenuissima* Rye, *S. thinicola* Rye, *S. trilocularis* Rye, *S. truncata* Rye, *S. uniflora* Rye and *S. uniovulata* Rye. *Scholtzia* sp. Shark Bay (M.E. Trudgen 7429) is reduced to synonymy under *S. capitata* Benth. and most of the other phrase names in the genus are treated as synonyms of the above new taxa. A key is given to aid the identification of approximately 40 species and subspecies. Most taxa have conservation priority.

Introduction

This paper on *Scholtzia* Schauer is one of a series designed to reduce the large backlog of unnamed members of Myrtaceae tribe Chamelaucieae and draw attention to any problematic taxa. *Scholtzia* is endemic to Western Australia, extending from near Carnarvon south to near Harvey. It is the largest genus of a proposed new subtribe (Rye *et al.* in prep.) that includes *Babingtonia* Lindl., *Hysterobaeckea* (Nied.) Rye, *Malleostemon* J.W.Green and *Sannantha* Peter G.Wilson. Apart from a recent paper establishing lectotypes (Rye 2017), there has been very little published regarding the taxonomy of *Scholtzia* since Bentham's (1867) treatment of it in *Flora Australiensis*.

Background

When Schauer (1843, 1844) named *Scholtzia*, only two species, now known as *S. obovata* (DC.) Schauer and *S. involucrata* (Endl.) Druce, had been described. Schauer regarded *Scholtzia* as having axillary, dichotomously cymose inflorescences, anthers dehiscent by pores, and a 2-locular ovary with two ovules in each loculus, but was apparently unaware of the indehiscent fruit, which is one of the important characters that define the genus. He recorded 20 stamens, a common number in *S. involucrata* (see Figure 1A), although stamen numbers range from about 15 to 30 in this species.

A third species, now known as *S. spatulata* (Turcz.) Benth., was described by Turczaninow (1862), who treated it as a new genus, *Piptandra* Turcz. This species differed from the two previously named species in having a 3-locular ovary.

Ten more names were published by Mueller (1864) and Bentham (1867), although not all of them are still considered to represent distinct species. Based on this larger number of species, Bentham (1867: 66) described the genus as having a 2- or 3-locular ovary, usually with two superposed ovules per loculus, but rarely one or three ovules per loculus. Actually, there is sometimes only one loculus and the ovule number is either one or two per loculus. Bentham also described the genus as having three kinds of fruits, valvate, indehiscent and schizocarpic, when in fact the fruits are uniformly indehiscent.

Since 1867, only one species, *S. eatoniana* (Ewart & J.R.White) C.A.Gardner, has been named; altogether 12 of the named taxa in *Scholtzia* are considered here to be good species. A flora treatment for the Perth region (Rye 1987) treated only three species. Trudgen established manuscript names for two very distinctive new species during the 1990s, one of which was listed by Paczkowska and Chapman (2000), but both were later replaced by phrase names. A total of 44 phrase names have been applied to members of the genus (Table 1).

Rye (2017) selected lectotypes for the genus and several species, and relegated two phrase names and one published name to synonymy. This left about 40 phrase names still in use prior to the current paper.

Need for further work

One of the unnamed species, *S. sp.* Geraldton (F. Lullfitz L 3216), does not match *Scholtzia* as circumscribed here, but does not appear to match any of the other named genera either (see Rye 2016: 105), so is retained under *Scholtzia* pending molecular studies to help establish its affinities.

Four of the phrase names that remain unaltered by the current study are of taxa that are considered to be too poorly collected to adequately assess and describe. These are *S. sp.* Bickley (W.H. Loaring s.n. PERTH 06165184), *S. sp.* Nolba (E. Place s.n. Jan. 1964), *S. sp.* Walebing (S. McNee 4) and *S. sp.* Whelarra (M.E. Trudgen 12018). Several others belong to three complexes that need further study to determine how many taxa should be recognised:

1. *Scholtzia involucrata* complex. This has both low-growing plants and erect ones up to 3 m tall.
2. *Scholtzia laxiflora* Benth. complex. This is variable in characters such as leaf shape and peduncle length. Mike Hislop (pers. comm.) has observed two variants that sometimes co-occur but differ in habit, flowering time and microhabitat.
3. *Scholtzia obovata* complex. This complex has the longest geographic range and includes specimens currently identified as *S. umbellifera* F.Muell.

Methods

Measurements were taken from dried material using the largest leaves and bracts, and using fully mature floral parts that were well pressed. The stigma is recorded as peltate if it is more than twice as wide as its attachment point at maturity and as capitate if it is less than twice as wide.

Table 1. Phrase names and manuscript names for taxa in *Scholtzia*, with the year each was established and its new name or a comment.

Phrase name or manuscript name	Year	Published name or comment
<i>Scholtzia chapmanii</i> Trudgen ms	1993	<i>Scholtzia chapmanii</i> Trudgen ex Rye
<i>Scholtzia cordata</i> Trudgen ms	1994	<i>Scholtzia cordata</i> Trudgen ex Rye
<i>Scholtzia</i> sp. Ajana (TA. Halliday 137)	1994	<i>Scholtzia bellairsiorum</i> Rye
<i>Scholtzia</i> sp. Ajana East Road (M.E. Trudgen 21734 A)	2006	<i>Scholtzia truncata</i> Rye
<i>Scholtzia</i> sp. Bickley (W.H. Loaring s.n. PERTH 06165184)	2002	known from a single collection
<i>Scholtzia</i> sp. Billeranga Hills (B.J. Conn 2159)	2010	<i>Scholtzia subsessilis</i> Rye
<i>Scholtzia</i> sp. Binnu (M.E. Trudgen 2218)	1994	<i>Scholtzia uniflora</i> Rye
<i>Scholtzia</i> sp. Binnu East Road (M.E. Trudgen 12013)	1995	<i>Scholtzia thinicola</i> Rye
<i>Scholtzia</i> sp. Binnu-Yuna (M.E. Trudgen 12016)	2003	<i>Scholtzia longipedata</i> subsp. <i>procera</i> Rye
<i>Scholtzia</i> sp. Bungabandi Creek (M. Quick EURA 48)	2004	<i>Scholtzia peltigera</i> Rye
<i>Scholtzia</i> sp. Burma Road (A.C. Burns 138)	2002	<i>Scholtzia prostrata</i> Rye
<i>Scholtzia</i> sp. Coburn (N. Murdock NM 031)	2018	<i>Scholtzia corrugata</i> Rye
<i>Scholtzia</i> sp. Coomberdale (M.E. & M.E. Trudgen MET 1724)	2006	<i>Scholtzia halophila</i> Rye subsp. <i>halophila</i>
<i>Scholtzia</i> sp. Dongara (R. Hart 8401)	2003	<i>Scholtzia calcicola</i> Rye
<i>Scholtzia</i> sp. Duck Pool (M.E. Trudgen MET 5427)	2006	<i>Scholtzia halophila</i> subsp. <i>mortlockensis</i> Rye
<i>Scholtzia</i> sp. East Yuna (A.C. Burns 6)	1994	<i>Scholtzia inaequalis</i> Rye
<i>Scholtzia</i> sp. Eneabba (S. Maley 8)	1996	<i>Scholtzia trilocularis</i> Rye
<i>Scholtzia</i> sp. Eradu (R.D. Royce 8016)	1994	<i>Scholtzia longipedata</i> subsp. <i>procera</i> Rye
<i>Scholtzia</i> sp. Eurardy (J.S. Beard 6886)	1994	<i>Scholtzia oleosa</i> Rye
<i>Scholtzia</i> sp. Folly Hill (M.E. Trudgen 12097)	1995	belongs to <i>Scholtzia obovata</i> (DC.) Schauer complex
<i>Scholtzia</i> sp. Galena (W.E. Blackall 4728)	1994	<i>Scholtzia truncata</i> Rye
<i>Scholtzia</i> sp. Geraldton (F. Lullfitz L 3216)	1994	atypical of the genus in ovule number
<i>Scholtzia</i> sp. Guniyidi (J.D. Briggs 1721)	1994	<i>Scholtzia quindecim</i> Rye
<i>Scholtzia</i> sp. Jurien (R.J. Cranfield & P.J. Spencer RJC 8443)	2003	belongs to <i>Scholtzia involucrata</i> (Endl.) Druce complex
<i>Scholtzia</i> sp. Kalbarri (N. Hoyle 623)	1996	<i>Scholtzia oligandra</i> F.Muell. ex Benth.
<i>Scholtzia</i> sp. Kojarina (A.M. Ashby 1904)	1994	<i>Scholtzia multiflora</i> Rye
<i>Scholtzia</i> sp. Lancelin (M.E. Trudgen 1516)	2003	<i>Scholtzia laciniata</i> Rye
<i>Scholtzia</i> sp. Murchison (M.E. Trudgen 1685)	2002	belongs to <i>Scholtzia laxiflora</i> Benth. complex
<i>Scholtzia</i> sp. Murchison River (A.S. George 7908)	?1994	<i>Scholtzia denticulata</i> Rye
<i>Scholtzia</i> sp. Nolba (E. Place s.n. Jan. 1964)	1994	known from a single collection
<i>Scholtzia</i> sp. Northampton (A Strid 20714)	1995	<i>Scholtzia pentamera</i> Rye subsp. <i>pentamera</i>
<i>Scholtzia</i> sp. Overlander (M.E. Trudgen 12138)	2018	<i>Scholtzia recurva</i> Rye
<i>Scholtzia</i> sp. Prowaka Springs (R.J. Cranfield & P. Spencer 8083)	1995	<i>Scholtzia brevistylis</i> subsp. <i>prowaka</i> Rye
<i>Scholtzia</i> sp. Red Bluff (A. Guinness 2373)	1996	<i>Scholtzia longipedata</i> Rye subsp. <i>longipedata</i>
<i>Scholtzia</i> sp. Ross Graham Lookout (S Maley 6)	1994	<i>Scholtzia denticulata</i> Rye
<i>Scholtzia</i> sp. Shark Bay (M.E. Trudgen 7429)	1996	<i>Scholtzia capitata</i> F.Muell. ex Benth.

Phrase name or manuscript name	Year	Published name or comment
<i>Scholtzia</i> sp. Valentine Road (S. Patrick 2142)	1995	<i>Scholtzia thinicola</i> Rye
<i>Scholtzia</i> sp. Walebing (S. McNee 4)	2006	known from a single collection (see <i>S. halophila</i>)
<i>Scholtzia</i> sp. Whelarra (M.E. Trudgen 12018)	1994	known from a single collection (see <i>S. tenuissima</i>)
<i>Scholtzia</i> sp. Winchester (C. Chapman s.n. PERTH 05625386)	2010	<i>Scholtzia chapmanii</i> Trudgen ex Rye
<i>Scholtzia</i> sp. Wonganderrah (M.E. & M.R. Trudgen MET 12000)	2003	belongs to <i>Scholtzia involucrata</i> (Endl.) Druce complex
<i>Scholtzia</i> sp. Yandanooka (R. Soullier 646)	1999	<i>Scholtzia brevistylis</i> Rye
<i>Scholtzia</i> sp. Yenyening Lakes (A. Guinness 2824)	2003	<i>Scholtzia halophila</i> subsp. <i>meridionalis</i> Rye
<i>Scholtzia</i> sp. Yerina Springs (N. Hoyle 517)	2002	<i>Scholtzia capitata</i> F.Muell. ex Benth.
<i>Scholtzia</i> sp. Yuna (C.A. Gardner 14286)	2010	<i>Scholtzia cordata</i> Trudgen ex Rye
<i>Scholtzia</i> sp. Z-Bend (Bellairs-Kalflora 912a)	1994	<i>Scholtzia tenuissima</i> Rye

Fruit measurements were only taken from fertile fruits as far as possible. Fully mature fruits that are sterile contain hard structures formed from unfertilised ovules or inviable seeds; they tend to be somewhat larger than fertile fruits with a fully formed viable seed enclosed. A similar phenomenon was observed in *Thryptomene* Endl. (see Rye 2014: 274).

Taxonomy

Scholtzia Schauer, *Linnaea* 17: 241 (1843). *Baeckea* sect. *Scholtzia* (Schauer) Baill., *Hist. Pl.* 6: 358 (1876). *Type*: *Baeckea involucrata* Endl., *lecto, fide* B.L. Rye, *Nuytsia* 27: 160 (2017) [= *Scholtzia involucrata* (Endl.) Druce].

[*Pritzelia* Schauer ms, *Flora* 27: 407 (1843), *nom. inval. & nom. nud.*]

Piptandra Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 35: 323 (1862). *Type*: *Piptandra spatulata* Turcz. [= *Scholtzia spatulata* (Turcz.) Benth.].

Shrubs prostrate to tall, up to 3(–4) m high, mostly without a lignotuber, glabrous. *Young stems* developing a loose, whitish epidermis, which is smooth or fairly smooth in nearly all species. *Leaves* opposite. *Petioles* usually well defined, but sometimes very reduced or absent. *Leafblades* dorsiventrally compressed, obtuse. *Peduncles* up to 25 mm long, often many-flowered and with secondary axes, rarely consistently 1-flowered. *Sepals* often of varied shape within a flower, usually much shorter than, but up to about as long as, the petals, persistent in fruit, often with a longitudinal ridge on the base. *Petals* broadly ovate to circular, 1.0–4.5 mm long, white or pink, abruptly narrowed to a short claw at base, deciduous or (in some species) persistent (closed erect) in fruit. *Stamens* 3–30, antisepalous (often in irregular antisepalous groups) in most species, in a continuous circle in some species. *Anthers* (including basal connective gland) bent more or less at right angles to the filament to face the centre of the flower, somewhat 2-lobed, dehiscent by 2 terminal pores or short, ± vertical slits. *Ovary* 1–3-locular (rarely 4-locular in one taxon); ovules 1 or 2 per loculus, if 2 then superposed. *Style* 0.3–3.5 mm long; base inset in a cylindrical depression. *Fruits* indehiscent, inferior to *c.* 1/2 inferior, usually 1-seeded. *Seeds* unafaceted, usually ± obovoid, 0.8–1.9 mm long; testa thin, membranous.

Size and distribution. A Western Australian genus of more than 40 species, extending from near

Carnarvon south to near Harvey and inland to Anderson Rocks, north of Hyden, with a concentration of species in the northern sandplains of the South West Botanical Province. Kalbarri National Park is particularly rich, including more than a quarter of the species.

Etymology. The genus is dedicated to Johann Eduard Heinrich Scholtz (1812–1859), a physician and naturalist from Bratislava, who studied the flora and fauna of one of the provinces of Poland. Gender: feminine.

Chromosome numbers. Several species have been recorded with $n = 11$ and a single species, *S. drummondii* Benth., with the tetraploid number of $n = 22$ (Rye 1979).

Horticultural potential and fire tolerance. Several species are in cultivation as garden ornamentals. They have the advantage of being relatively drought-tolerant plants for Perth gardens, since most come from drier habitats. The local species *S. involucrata* is one of the best known species as it is widespread in the Perth metropolitan area. It is a small, single-stemmed shrub, often low-growing, and is readily killed by fires. Seedlings are commonly produced in the two years after fires, but rarely, if ever, during fire-free periods. Some single-stemmed species of *Scholtzia* are large, sturdy shrubs that may be able to survive low-intensity fires.

Species groups. Although *Scholtzia* is one of the largest genera in the tribe Chamelaucieae, no formal or informal infra-generic classification has been proposed for it. Stamen number and arrangement are of importance in distinguishing individual species or groups of species in the genus. When stamens are 15 or more, they are arranged in a complete circle (Figure 1A), and when of moderate number or fewer they are usually in obvious antisepalous groups (Figure 1B, C), although sometimes the stamens of an antisepalous group are quite widely separated. When there are very few stamens per flower, some of the antisepalous groups may be absent (see Figure 1D).

Scholtzia species can be divided into two groups based on whether they have two superposed ovules, or a solitary ovule, in each loculus of the ovary. Both situations are unknown in related genera, which have 3–25 radially arranged ovules per loculus or rarely two collateral ovules.

Most of the *Scholtzia* species with only one ovule per loculus have three ovary loculi, whereas species with two ovules per loculus are much more likely to have two loculi. However the number of loculi ranges from one to three in both categories, with just one member of each having a one-locular ovary. Past reliance on keys such as Blackall and Grieve (1980) has led to one-locular specimens often having been misidentified as members of consistently one-locular genera, such as *Thryptomene* and *Malleostemon* J.W.Green.

A much less complete difference between the two main groups is in stamen arrangement, but this is only evident when stamen numbers are low, as most members of the 2-ovulate group appear to always have at least one stamen opposite each sepal, so that the minimum number of stamens per flower is five, whereas members of the 1-ovulate group have up to two sepals without a stamen and a minimum number of three stamens per flower. However, *S. brevistylis* of the former group has antisepalous groups of 0–2 stamens, with a minimum of four stamens per flower. In this species, as in the 1-ovulate group, the most common arrangement of the stamens when there are five per flower is 2,0,1,2,0 around the circumference such that two sepals lack stamens but two others have two stamens and one has a single stamen.



Figure 1. Images of *Scholtzia* species showing varied stamen arrangements. A – numerous stamens in a continuous circle in *S. involucrata*; B – ten antisepalous stamens in the arrangement 3,1,3,1,2 in a flower of *S. drummondii*; C – nine or ten stamens per flower, arranged mostly in close pairs opposite each sepal, in *S. halophila*; D – three or four, widely spaced stamens per flower in *S. uniovulata*, showing one enlarged flower with four antisepalous stamens in the arrangement 2,0,1,1,0. Taken by Kevin Thiele at Inglewood, voucher *K.R. Thiele* 3159 (A) and near Kellerberrin, voucher *K.R. Thiele* 3859 (D); by Rob Davis from near Irwin River, voucher *R. Davis* 11272 (B); and by Jean Hort from near Cunderdin (C).

Key to species and subspecies of *Scholtzia*

*taxa that appear in more than one section of the key

1. Stamens (10–)13–30, in a continuous circle, with antipetalous stamens as well as antisepalous ones
 2. Ovary 3-locular; ovules 1 per loculus. Erect shrubs up to 2.5 m high, occurring north of Geraldton
 3. Peduncles absent or up to 0.5 mm long, 1-flowered. Sepals 0.7–1.3 mm long (Binnu area)..... **S. uniflora**
 - 3: Peduncles 7–13 mm long, 5–15-flowered. Sepals 0.4–0.8 mm long (Nolba area)..... **S. sp. Nolba**
 2. Ovary 2-locular; ovules 2 per loculus, superposed. Mostly prostrate or low-growing shrubs but one variant of *S. involucrata* up to 3 m high, occurring south of Geraldton
 4. Leaves markedly laciniate-ciliate; longest cilia 0.4–0.8 mm long (near Lancelin–N of Seabird–Moore River NP)..... **S. laciniata**
 - 4: Leaves entire to moderately laciniate-ciliate; longest cilia (when present) up to 0.4 mm long
 5. Peduncles 3–7-flowered. Outer (and inner) sepals scarious throughout, not ridged (Eneabba–near Harvey) **S. involucrata complex**
 - 5: Peduncles 1–3-flowered, all or mostly 1-flowered in most taxa. Outer sepals longitudinally ridged at the base
 6. Leaves about as thick as wide, with margins poorly defined (rounded) and entire except for a few apical teeth. Flowers borne usually at 2–7 consecutive nodes (Meckering–Youndegin area)..... **S. eatoniana**
 - 6: Leaves usually wider than thick, angled on each edge to form distinct margins, often denticulate along most or distal parts of the margins. Flowers borne at up to 35 consecutive nodes, rarely all at fewer than 10 nodes
 7. Leaves ovate to linear, 3.5–10 mm long. Peduncles 1–3-flowered
 8. Leaves flat, with the longest lacinia or cilia 0.2–0.4 mm long. Petals 3.5–4.5 mm long. Antipetalous stamens with a filament *c.* 3.3 mm long (Bickley area)..... **S. sp. Bickley**
 - 8: Leaves usually somewhat thickened on a fold, entire or denticulate-ciliolate. Petals 2.5–3 mm long. Antipetalous stamens with a filament 1.8–2.4 mm long (near Eneabba–near Moore River)..... **S. teretifolia**
 - 7: Leaves obovate to broadly elliptic or narrowly obovate to linear, 1.2–5 mm long. Peduncles all or nearly all 1-flowered
 9. Leaves ± entire. Peduncles 3–7 mm long. Mature style (including embedded part) commonly 2.5–3.4 mm long (Gunyidi–Dalwallinu)..... **S. quindecim**
 - 9: Leaves toothed along the margins, sometimes becoming entire with age. Peduncles 1.5–3 mm long. Mature style (including embedded part) 1.5–2.3 mm long
 10. Leaves narrowly obovate to linear, 1.2–3 mm long. Hypanthium distinctly 5-ribbed, each rib connecting to a marked ridge on the base of a sepal. Stamens 15–20 (W of Eneabba–near Winchester) **S. chapmanii**

- 10: Leaves obovate to broadly elliptic, 2.5–4.5 mm long. Hypanthium not appearing 5-ribbed, the sepals only moderately ridged at the base. Stamens 11–17 (E of Walkaway)..... **S. prostrata**
- 1: Stamens 3–12(–14), grouped opposite the sepals, with no antipetalous stamens
11. Ovules 1 per loculus
12. Leaves rather densely covered by fairly uniform oil glands on abaxial surface; foliar colleters up to 0.6 mm long on each side of the petiole of young leaves. Sepals fairly erect in flower and fruit
13. Leaves broadly to depressed obovate, 0.5–2.5 mm long, usually with midvein not noticeably raised or only at the apex. Hypanthium about as broad as long, commonly 1.5–1.6 mm long in fruit. Peduncles 3–14-flowered (Coburn Stn–near Binnu)..... **S. oleosa**
- 13: Leaves narrowly to broadly obovate, 2.5–5 mm long, usually with midvein ridged for about half or more of the lamina. Hypanthium longer than broad, commonly 2–2.5 mm long in fruit. Peduncles 9–23-flowered (Tamala Stn–Yerina Springs) **S. capitata**
- 12: Leaves with few or more scattered oil glands on abaxial surface, usually with central glands much larger than lateral ones; foliar colleters minute or apparently absent. Sepals somewhat to markedly incurved in flower and fruit in most species but spreading in fruit in *S. uniovulata*
14. Hypanthium wrinkled-rugose or reticulate, with lowered areas not very deep or not restricted to oil glands
15. Flowers borne at 5–42 consecutive nodes on most branchlets and with many or all of them occurring well below apex of flowering branchlets (i.e. not all in terminal clusters). Most flowers with 4–6 stamens and a 2-locular ovary, and all with sepals of fairly uniform length
16. Leaf blades 2.3–3 mm wide. Peduncles 5–7 mm long, 3–15-flowered (near Kojarena–E of Walkaway)..... **S. multiflora**
- 16: Leaf blades 1.8–2.3 mm wide. Peduncles 2–2.5 mm long, 1–3-flowered (near Winchester)..... **S. aff. multiflora**
- 15: Flowers borne at 1–5(–8) consecutive nodes on most branchlets, either all in ± terminal clusters or at very few nodes. Flowers not matching above choice in all characters, most commonly by having 6–11 stamens or a 3-locular ovary
17. Leaf blades 2–7 × 2–4 mm, scarcely thickened (Eurardy Stn area–Canning River) **S. laxiflora** complex
- 17: Leaf blades 1.0–2.5 × 0.8–2.1 mm, usually distinctly thickened towards the centre
18. Peduncles 3–5 mm long, 3–7-flowered. Flowers most commonly with a 3-locular ovary and 5 stamens
19. Leaf blades obovate, 0.8–1.4 mm wide. Hypanthium 0.7–0.9 mm long. Petals 1.0–1.2 mm long (Dongara–Drovers Cave NP)..... **S. calcicola**
- 19: Leaf blades broadly obovate, 1.3–2.1 mm wide. Hypanthium 1.2–1.4 mm long. Petals 1.3–1.6 mm long (Coburn–southern Zuytdorp Cliffs) **S. corrugata**
- 18: Peduncles 0.4–2.3 mm long, 1–3-flowered. Flowers either with a 2-locular ovary or mostly with more than 5 stamens

20. Inner sepals much larger than outer ones. Stamens 3–6
(East Yuna NR–Wicherina area)..... **S. inaequalis**
- 20: Inner sepals not markedly different from outer ones. Stamens
mostly 6–11 (N of Eurardy Stn–Indarra)..... **S. truncata***
- 14: Hypanthium rugose-pitted, the shallow to very deep pits containing
a sunken oil gland
21. Peduncles 3.5–14 mm long, 3–12-flowered
22. Petioles absent or up to 0.25 mm long. Occurring in non-saline
habitats (Morawa area) **S. subsessilis***
- 22: Petioles 0.3–0.7 mm long. Occurring in subsaline habitats
23. Stamens 5–8. Ovary 2-locular in all or most flowers
(Yenyening Lakes NR) **S. halophila** subsp. **meridionalis**
- 23: Stamens 7–12. Ovary 2- or 3(4)-locular, most specimens
with about half or more of the ovaries 3-locular
24. Inner sepals 1.0–1.4 mm long (Mortlock River branches) ..**S. halophila** subsp. **mortlockensis**
- 24: Inner sepals 0.5–0.8 mm long
(near Coorow–Tammin area).....**S. halophila** subsp. **halophila**
21. Peduncles 0.4–2.5(–3.5) mm long, 1–6-flowered
25. Ovary 3-locular. Peduncles at least 2.5 mm long and 3–6-
flowered (Morawa area)..... **S. subsessilis***
- 25: Ovary 1- or 2-locular (possibly rarely 3-locular in *S. truncata*).
Peduncles 0.5–2.5 mm long and/or 1–3-flowered
26. Stamens (5–)7–12, always more than 6 in some flowers.
Mature style (including embedded part) 0.9–1.6 mm long
(N of Eurardy Stn–Indarra) **S. truncata***
- 26: Stamens 3–6, always 5 or fewer in most flowers. Mature
style (including embedded part) 0.45–0.8 mm long
27. Sepals mostly spreading in fruit; innermost one
0.8–1.2 mm long. Hypanthium pitted but usually not as
deeply as in *S. parviflora*. Ovary 1-locular or much less
commonly 2-locular (Northampton–Corrigin–
Anderson Rocks) **S. uniovulata**
- 27: Sepals more erect or incurved in fruit; innermost one
0.3–0.6 mm long. Hypanthium deeply rugose-pitted. Ovary
2-locular (Hill River area–Moore River–Watheroo NP)**S. parviflora**
- 11: Ovules 2 per loculus, superposed
28. Ovary 3-locular in all or most flowers or (in *S. oligandra*) sometimes
2-locular in up to half of the flowers
29. Stamens 5–8, commonly 5 with 1 opposite each sepal. Ovary
2-locular in up to half of the flowers. Mature style (including
embedded part) 0.6–1 mm long (Kalbarri–near Lucky Bay)..... **S. oligandra**

- 29: Stamens usually 8–14, rarely 6 or 7 (but then with mature style 1–1.6 mm long), with 0–4 opposite each sepal. Ovary 3-locular in all or nearly all of the flowers. Mature style (including embedded part) 0.7–1.6 mm long
30. Peduncles 0.4–6(–10) mm long, 1–3-flowered
31. Leaves ciliate to laciniate; longest cilia 0.2–0.4 mm long. Peduncles 0.4–2.1 mm long. Stamens 6–10 (Howatharra Hills area–N of Irwin River)..... **S. ciliata**
- 31: Leaves entire, denticulate or ciliate; longest cilia less than 0.2 mm long. Peduncles 2–6(–10) mm long. Stamens 10–14 (Maya–Tammin area)..... **S. drummondii**
- 30: Peduncles 4–25 mm long, mostly 3–15-flowered
32. Bracts 2–5 mm long. Petals 2.5–3.5 mm long. Largest stamens usually with a filament 1–1.3 mm long (Kalbarri NP–Binnu area –Howatharra) **S. spatulata**
- 32: Bracts 0.9–1.8 mm long. Petals 1.5–2.5 mm long. Largest stamens with a filament 0.4–0.7 mm long (E of Geraldton–Watheroo NP) **S. trilocularis**
- 28: Ovary 1- or 2-locular in all or most flowers
33. Leaves broadly to depressed orbicular-cordate or broadly ovate to depressed obovate, consistently broader than long
34. Leaves sessile, somewhat stem-clasping at base, 1.3–1.8 mm long, 1.5–2.5 mm wide, 0.5–1.1 mm thick (Eurardy Stn)..... **S. peltigera**
- 34: Leaves distinctly petiolate at base, 2.2–7 mm long, 2.5–9 mm wide, not very thick
35. Flowers borne at 1–4 consecutive nodes. Mature style 0.8–1.4 mm long (Kalbarri NP–N of Yuna)..... **S. cordata**
- 35: Flowers mostly borne at 8–23 consecutive nodes. Mature style 0.3–1.0 mm long
36. Stamens always or mostly 6–10 per flower, 1–3 opposite each sepal. Bracts 0.6–1.6 mm long. Mature style 0.45–1.0 mm long
37. Leaf blades broadly or very broadly obovate, with lateral veins usually obscure. Peduncles 2–4 mm long. Petals persistent in fruit (Kalbarri NP area)..... **S. bellairsiorum**
- 37: Leaf blades broadly to depressed orbicular-cordate, with lateral veins clearly visible. Peduncles 5–15 mm long. Petals deciduous in fruit (Murchison River–near Balline Homestead)..... **S. uberiflora**
- 36: Stamens always or mostly 5 per flower, 1 opposite each sepal. Bracts 1.3–3 mm long. Mature style 0.3–0.4 mm long
38. Bracts 1.3–1.8 mm long. Ovary 1-locular (Ajana–Greenough) **S. pentamera** subsp. **pentamera**
- 38: Bracts 2–3 mm long. Ovary 2-locular (Moresby Range) **S. pentamera** subsp. **collina**
- 33: Leaves of varied shape, all or mostly longer than broad
39. Petioles 0.1–0.35 mm long

40. Leaves with a recurved apex produced into a minute point
(Meadow Stn area)..... **S. recurva**
- 40: Leaves with a straight apex and no point (except sometimes on
the youngest leaves of *S. thinicola*)
- 41: Peduncles 0.7–4 mm long, 0.4–0.7 mm wide. Sepals with a
herbaceous base that is longitudinally ridged (near Yandi Stn
–W of Mullewa)**S. thinicola**
41. Peduncles 5.5–13 mm long 0.15–0.35 mm wide. Sepals scarious
throughout, not ridged
42. Leaves ± obovate, 0.6–1.0 mm wide. Secondary axes up to
2.5 mm long (Kalbarri NP)..... **S. tenuissima**
- 42: Leaves obovate to broadly elliptic, 1.0–1.5 mm wide.
Secondary axes up to 0.7 mm long (E of Binnu)..... **S. sp. Whelarra**
- 39: Petioles 0.4–1.1 mm long
43. Stamens 4–6, usually 5, with no stamens opposite one or two
sepals of each flower
44. Leaves 1.3–1.6 mm wide, with fairly flat margins. Inflorescences
extending for 3–8 nodes, tending to be concentrated into a small
zone towards the ends of the branchlets; peduncles of the lowest
node 2–4 mm long (Carnamah–Coorow area)**S. brevistylis** subsp. **prowaka**
- 44: Leaves either wider than 1.6 mm or with recurved margins
(at least towards the base). Inflorescences extending for 5–14
nodes but usually spike-like, usually well below the apex of
each branchlet; peduncles of the lowest node 1–2(–3) mm long
45. Leaves with margins recurved, at least at base, the largest
ones 1.0–1.5 mm wide. (Mingenew area–Yandanooka area)**S. brevistylis** subsp. **brevistylis**
- 45: Leaves with margins fairly flat, the largest ones 2.0–2.4
mm wide. (Nebroo Hill area)..... **S. brevistylis** unnamed variant
- 43: Stamens 5–11, mostly more than 5, with at least one stamen
opposite each sepal
- 46: Leaves entire. Flowers with a hypanthium 1.0–1.6 mm long
and sepals up to 0.75 mm long
47. Outer sepals 0.3–0.5 mm long, smooth or shortly ridged.
Stigma peltate or capitate (Kalbarri NP–E of Balline) **S. longipedata** subsp. **longipedata**
- 47: Outer sepals (0.4–)0.5–0.75 mm long, with base ridged
for most of length. Stigma capitate (East Yuna NR –
Eradu) **S. longipedata** subsp. **procera**
46. Leaves initially denticulate-ciliolate, sometimes becoming
entire as they age. Flowers either with a long hypanthium
(more than 1.6 mm long) or long sepals (more than 1 mm
long)
48. Hypanthium 1.0–1.6 mm long, rugose, not ribbed. Inner
sepals 1.3–2.5 mm long (Kalbarri NP)**S. denticulata**
- 48: Hypanthium 1.8–2.5 mm long, 5-ribbed at least in distal part.
Inner sepals 0.3–0.6 mm long (N of Carnarvon–Lancelin) **S. obovata** complex

Scholtzia bellairsiorum Rye, *sp. nov.*

Typus: Kalbarri National Park, Western Australia [precise locality withheld for conservation reasons], 24 October 1995, *M.N. Lyons* 2411 (*holo*: PERTH 05002257; *iso*: K, MEL).

Scholtzia sp. Ajana (T.A. Halliday 137), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 401 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub 0.9–3 m high, width not recorded; flowering branchlets with peduncles borne at up to 20 consecutive nodes in a raceme-like arrangement, but usually at 5–10 nodes and more clustered, in both cases usually well below apex of branchlet. *Leaves* antrorse to patent. *Petioles* 0.5–1.1 mm long. *Leaf blades* broadly or very broadly obovate, 3.5–5.5 mm long, 3–5 mm wide, with a translucent margin up to *c.* 0.1 mm deep, entire; abaxial surface flat except for a slight narrow furrow or ridge along midvein, with lateral veins usually obscure, the oil glands in more than 3 rows on each side of midvein but inconspicuous. *Peduncles* 2–4 mm long, 0.4–0.6 mm wide, mostly 7–12-flowered; secondary axes up to 1 mm long. *Bracts* 0.6–1.6 mm long, caducous. *Pedicels* 0–1.2 mm long. *Flowers* 4–5.3 mm diam. *Hypanthium* 1.5–1.8 mm long, rugose. *Sepals* mostly broadly to depressed ovate, 0.5–1.0 mm long, the outer ones with base somewhat ridged; petaline margin 0.4–0.6 mm deep, entire. *Petals* 1.5–2.0 mm long, white or pale pink. *Stamens* 7–10, with 1–3 opposite each sepal. *Longest filaments* 0.2–0.4 mm long. *Anthers* 0.35–0.4 mm long. *Ovary* inferior, 2-locular; ovules 2 per loculus. *Style* 0.5–1.0 mm long; stigma capitate. *Fruits* largely inferior, 2.0–2.5 mm long, 1.6–1.8 mm wide; sepals erect; petals persistent. *Seeds* 1.3–1.8 mm long, 0.6–0.8 mm wide.

Diagnostic features. Among species that have a 2-locular ovary with 2 ovules per loculus, *S. bellairsiorum* is distinguished by the following combination of characters: leaves broadly or very broadly obovate, with lateral veins usually obscure; peduncles 2–4 mm long; stamens 7–10; petals persistent in fruit.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 21 Oct. 1974, *J.S. Beard* 7137 (PERTH); 10 Oct. 1995, *D.R. Bellairs s.n.* (PERTH); 12 Jan. 2005, *A. Crawford* 867 (PERTH); 19 Dec. 1968, *H. Demarz* 925 (PERTH)

Distribution and habitat. Occurs in the eastern part of Kalbarri National Park (Figure 2A), on sandplain, often dominated by *Banksia*.

Phenology. Flowers from September to December. Mature fruits recorded from November to January.

Etymology. Named in honour of Don and Barbara Bellairs, who collected extensively in the Kalbarri area over their many years of residence there, and kept a local herbarium. They were the first to collect a number of rare species from Kalbarri National Park and nearby, including *S. tenuissima* Rye, and are the only collectors of *Thryptomene pinifolia* Rye & Trudgen.

Conservation status. Priority Three under Conservation Codes for Western Australian Flora. Listed with this conservation status by Smith and Jones (2018) under the name *S. sp. Ajana* (T.A. Halliday 137).

Affinities. *Scholtzia bellairsiorum* is closest in morphology to *S. uberiflora* F.Muell. and *S. pentamera* Rye, but those species have more obviously veined leaves, longer peduncles (4–15 mm long) and less persistent petals, and *S. pentamera* also differs in having only five stamens.

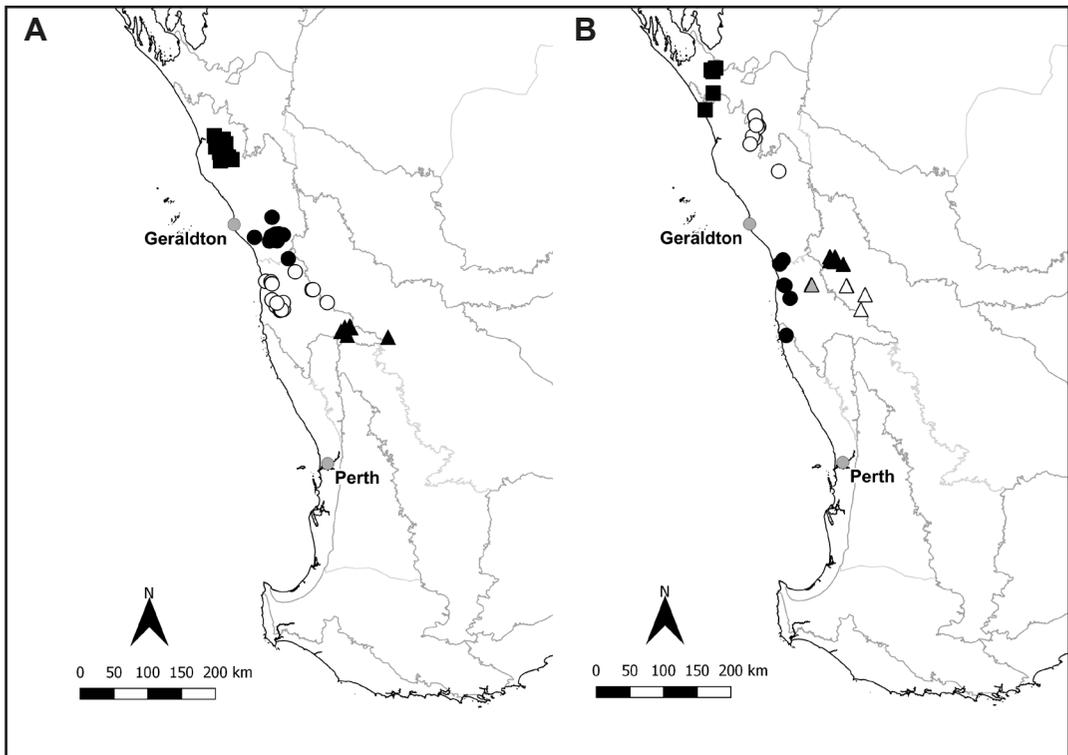


Figure 2. Distribution of *Scholtzia* species and subspecies. A – *S. bellairsiorum* (■), *S. chapmanii* (○), *S. prostrata* (●) and *S. quindecim* (▲); B – *S. brevistylis* subsp. *brevistylis* (▲), *S. brevistylis* subsp. *prowaka* (△), unnamed variant of *S. brevistylis* (●), *S. calcicola* (●), *S. cordata* (○) and *S. corrugata* (■).

Scholtzia brevistylis Rye, *sp. nov.*

Typus: Yandanooka, Western Australia [precise locality withheld for conservation reasons], November 1998, R. Soullier 646 (*holo*: PERTH 05447860; *iso*: K, MEL).

Shrub 0.6–2.5 m high, commonly 0.9–2 m wide, rather spindly; flowering branchlets commonly with peduncles borne at 4–15 consecutive nodes in a raceme-like arrangement. *Leaves* antrorse to patent. *Petioles* 0.4–0.8 mm long. *Leaf blades* obovate, 2–4.5 mm long, 1.0–2.4 mm wide, with a clear-translucent margin up to *c.* 0.1 mm deep, entire; abaxial surface gradually raised towards centre, sometimes grooved along midvein, with lateral veins obscure, the oil glands usually in 2 main rows on each side of midvein, with 4–7 glands in innermost rows. *Peduncles* 1–4 mm long, 0.25–0.3 mm wide, 3–7-flowered; secondary axes up to 0.5 mm long. *Bracts* 0.7–2.0 mm long, deciduous or caducous. *Pedicels* 0.2–0.6 mm long. *Flowers* 3–3.5 mm diam. *Hypanthium* 0.6–1.0 mm long, smooth to somewhat glandular-rugose. *Sepals* almost deltate to depressed ovate, 0.3–0.5 mm long, the outer ones often with a green ridge; petaline margin 0.25–0.4 mm deep, entire. *Petals* 1.2–1.5 mm long, white or pale pink. *Stamens* 4–6, usually 5, with 0–2 opposite each sepal. *Longest filaments* 0.2–0.4 mm long. *Anthers* 0.2–0.25 mm long. *Ovary* inferior, 2-locular; ovules 2 per loculus. *Style* 0.3–0.6 mm long; stigma capitate. *Fruits* 2/3–3/4 inferior, 1.3–1.5 mm long, 1.0–1.2 mm wide; sepals erect or incurved; petals deciduous. *Seeds* 1.0–1.3 mm long, 0.5–0.6 mm wide.

Diagnostic features. Distinguished from all other named species of *Scholtzia* by the combination of a short style (0.3–0.6 mm long) and 4–6 stamens with 0–2 opposite each sepal. Other important characters:

3–7-flowered peduncles, the smooth to somewhat glandular-rugose (i.e. not pitted) hypanthium and 2 ovules per loculus.

Distribution and habitat. Occurs from the Mingenew area south to the Nebroo Hill area and south-east to the Coorow area (Figure 2B).

Etymology. From the Latin *brevis* (short) and *-stylis* (styled), as this species has a shorter style than any other member of the genus except for *S. pentamera*.

Affinities. *Scholtzia brevistylis* is very distinctive, its affinities uncertain. It is readily distinguished from the other particularly short-styled species, *S. pentamera*, for example in its narrower leaves, which are longer than broad, shorter peduncles and smaller flowers. Although *S. brevistylis* has two ovules per loculus, it is similar to a number of species with a single ovule per loculus in having one or two sepals with no stamen opposite them. Most flowers have five stamens in the sequence 2,0,1,2,0 around the circumference of the flower, i.e. with a maximum of two stamens opposite each sepal.

Notes. Three groups of specimens are included here, from the northern, southern and western parts of the range respectively. The poorly known western variant is described informally below, while the other two variants are treated as subspecies *brevistyla* and *prowaka*.

a. *Scholtzia brevistylis* Rye subsp. *brevistylis*

Scholtzia sp. Yandanooka (R. Soullier 646), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Leaf blades 1–1.5 mm wide, with margins usually markedly recurved, at least at base. *Flowering branchlets* with peduncles borne at 5–11 consecutive nodes in a raceme-like arrangement 10–60 mm long, always with some over 20 mm long, usually well below the end of the branchlet; peduncles of the lowest node 1–2(–3) mm long.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 16 Nov. 1996, *A. Carr* 383 (PERTH); 10 Dec. 2015, *A. Crawford* ADC 2646 (PERTH); 2 Dec. 1999, *S.J. Patrick* 3358A (NSW, PERTH); Oct. 1997, *R. Soullier* 431 (PERTH).

Distribution and habitat. Occurs in the Mingenew to Yandanooka area (Figure 2B), often on sandplain, sometimes on the margins of granite outcrops or associated with damp depressions.

Phenology. Flowers from October to early December. Mature fruits recorded in November and December.

Conservation status. Priority One under Conservation Codes for Western Australian Flora. Listed with this conservation status by Smith and Jones (2018) under the name *S. sp.* Yandanooka (R. Soullier 646).

b. *Scholtzia brevistylis* subsp. *prowaka* Rye

Typus: east of Carnamah, Western Australia [precise locality withheld for conservation reasons], 7 September 2006, *M. Hislop, P. Aynsley & J. Borger* MH 3650 (*holo:* PERTH 07403267; *iso:* K, MEL).

Scholtzia sp. Prowaka Springs (R.J. Cranfield & P. Spencer 8083), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Leaf blades 1.3–1.6 mm wide, with margins fairly flat. *Flowering branchlets* with peduncles borne at 3–8 consecutive nodes in a short raceme-like arrangement up to 15 mm long, tending to be concentrated into a small zone towards the end of the branchlet; peduncles of the lowest node 2–4 mm long.

Diagnostic characters. Differs from subsp. *brevistylis* in usually having longer peduncles and leaves with fairly flat margins.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 16 Oct. 2006, *J. Borger* AK 1610–12 (CANB, NSW, PERTH); 24 June 2008, *J. Borger* IB 246–08 (CANB, NSW, PERTH); 19 Sep. 1991, *R.J. Cranfield* 8083 & *P.J. Spencer* (PERTH).

Phenology. Flowers from late June to September, with mature fruits recorded in October.

Distribution and habitat. Extends from north of Carnamah to south-east of Coorow (Figure 2B), on granite outcrops, also recorded on laterite.

Etymology. Named after Prowaka Springs, as this subspecies was first collected near there.

Conservation status. Priority Two under Conservation Codes for Western Australian Flora. Previously listed (Smith & Jones 2018) as Priority One under the name *S.* sp. Prowaka Springs (R.J. Cranfield 8083 & P.J. Spencer). Only four collections have been made of this taxon, but it is known from a nature reserve.

Notes. Flowering branchlets often have peduncles borne at, or fairly close to, the apex of the branchlet, whereas in subsp. *brevistylis* and the unnamed eastern variant, the uppermost peduncles are usually well below the apex of each branchlet.

c. *Scholtzia brevistylis* unnamed eastern variant

Leaf blades 2.0–2.4 mm wide, with margins fairly flat. *Flowering branchlets* with peduncles borne at 5–14 consecutive nodes in a raceme-like arrangement 15–70 mm long, always with some over 20 mm long, usually well below the end of the branchlet; peduncles of the lowest node 1–2 mm long.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 17 Oct. 2007, *J. Borger* BR 1710–14 (PERTH); 17 Nov. 2009, *J. Borger* NR21 5 (PERTH); 10 Oct. 2002, *S. Patrick* 4498 (CANB, PERTH).

Phenology. Flowers from October to December.

Distribution and habitat. Restricted to a small area near Nebroo Nature Reserve (Figure 2B), apparently associated with damp habitats or on hillsides, recorded in sandstone, siltstone or ironstone gravel.

Notes. The three specimens placed here have broader leaves than either of the named subspecies. They

match subsp. *brevistylis* in their inflorescences but have fairly flat leaf margins as in subsp. *prowaka*. More collections are needed to assess the taxonomic status of this variant.

Scholtzia calcicola Rye, *sp. nov.*

Typus: south-west of Dongara, Western Australia [precise locality withheld for conservation reasons], 9 December 2002, *R.P. Hart* 8401 (*holo*: PERTH 06256449; *iso*: CANB, K, MEL, NSW).

Scholtzia sp. Dongara (R. Hart 8401), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub erect, dense, 0.2–2 m high, 0.3–1.2 m wide; flowering branchlets mostly with peduncles borne at 2–8 consecutive nodes, in a raceme-like arrangement or sometimes with flowers in a globular cluster. *Leaves* appressed or antrorse. *Petioles* 0.2–0.4 mm long. *Leaf blades* obovate, 1.8–2.5 mm long, (0.8–)1.2–1.4 mm wide, entire, obtuse, not apiculate; abaxial surface flattened at the centre in basal 1/2–3/4 of its length and often with midrib ridged distally, with lateral veins obscure, the oil glands in 1 or 2 main rows on each side of midvein, with 3–6 glands in innermost rows. *Peduncles* 3–5 mm long, 0.2–0.35 mm wide, mostly 3–7-flowered; secondary axes up to 0.6 mm long. *Bracts* 0.6–0.8 mm long, deciduous. *Pedicels* absent or up to 0.3 mm long. *Flowers* 2.5–3.5 mm diam. *Hypanthium* 0.7–0.9 mm long, wrinkled or reticulate-rugose. *Sepals* broadly to depressed ovate, 0.35–0.5 mm long, the base ridged; petaline margin 0.15–0.3 mm deep, entire. *Petals* 1.0–1.2 mm long, usually pale pink. *Stamens* commonly 5, with 0–2 opposite each sepal. *Longest filaments* 0.25–0.35 mm long. *Anthers* 0.25–0.3 mm long. *Ovary* inferior, 3-locular; ovules 1 per loculus. *Style* c. 0.6 mm long; stigma capitate. *Fruits* globular, 2/3–3/4 inferior, 1.3–1.35 mm long, 1.1–1.2 mm wide; sepals strongly incurved; petals deciduous. *Seeds* 1.0–1.1 mm long, c. 0.8 mm wide.

Diagnostic features. Among species that have 1 ovule per loculus, *S. calcicola* is distinguished by the following combination of characters: leaves 0.8–1.4 mm wide; hypanthium wrinkled or reticulate-rugose, 0.7–0.9 mm long; petals 1.0–1.2 mm long.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 11 Nov. 2014, *S. Ruoss* SBR 020 (PERTH); 16 Oct. 2014, *T. Stehbens & D. Panickar* TS 003 (PERTH); 16 Oct. 2014, *T. Stehbens & D. Panickar* TS 005 (PERTH); 26 Sep. 1984, *R.T. Wills s.n.* (PERTH); 14 Oct. 2011, *G. Zemunik* 25 (PERTH).

Distribution and habitat. Recorded from near Dongara south to Drovers Cave National Park (Figure 2B), in heath on shallow sand over limestone.

Phenology. Flowers from October to December.

Etymology. From the Latin *calcis* (lime) and *-cola* (inhabitant), as the species is found in limestone habitats.

Vernacular name. Tiny-flowered Scholtzia.

Conservation status. Priority Two under Conservation Codes for Western Australian Flora. Previously listed (Smith & Jones 2018) as Priority One under the name *S. sp.* Dongara (R. Hart 8401), this species has recently been collected from a National Park and its known range extended to about 100 km.

Affinities. This belongs to a species group that has the sepals strongly incurved, both in flower and fruit. It shows greatest similarity to *S. corrugata* but that species occurs much further north and differs in having broader leaves and larger flowers with a longer hypanthium (see key). *Scholtzia multiflora* is closer in distribution to *S. calcicola* but has more numerous flowers and a 2-locular ovary.

Co-occurring species. Recorded growing with a member of the *S. obovata* complex (*G. Zemunik* 24).

Notes. *Scholtzia calcicola* has the smallest flowers in the genus. Its fruits are particularly delicate and dotted with somewhat glittering oil glands.

Scholtzia capitata F.Muell ex Benth., *Fl. Austral.* 3: 69 (1867). *Baeckea capitata* (F.Muell. ex Benth.) F.Muell., *Syst. Census Austral. Pl.* 54 (1883). *Type:* Murchison River, Western Australia, 1859–1863, *A.F. Oldfield s.n.* (*lecto:* MEL 2278625, *fide* B.L. Rye, *Nuytsia* 28: 161 (2017); *isolecto:* K 000357124, MEL 2278624).

Scholtzia sp. Shark Bay (M.E. Trudgen 7429), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Scholtzia sp. Yerina Springs (N. Hoyle 517), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub 0.4–3 m high, 0.5–4 m wide; flowering branchlets with peduncles mostly borne at 1–3 consecutive nodes, often in an umbel-like arrangement. *Leaves* widely antrorse or patent; foliar colleters (one on each side of the petiole of young leaves) filiform, 0.35–0.6 mm long, white. *Petioles* 0.5–1 mm long. *Leaf blades* narrowly to broadly obovate, 2.5–5 mm long, 1.3–3.5 mm wide, usually not very thick; abaxial surface usually ridged along midvein for at least half the blade length, sometimes deep bluish green, entire; abaxial surface with lateral veins obscure, the oil glands densely covering the surface rather than in rows. *Peduncles* 8–18 mm long, 0.5–0.8 mm wide, usually 9–23-flowered; secondary axes up to 1.3 mm long. *Basal bracts* 1.8–2.3 mm long. *Pedicels* 0.5–1.0 mm long. *Flowers* 4.3–4.8 mm diam. *Hypanthium* 1.1–1.4 mm long, densely glandular and pitted, each gland depressed below the surface and forming the full area of the pit. *Sepals* ovate to oblong or semicircular, commonly broadly ovate, (0.5–)0.8–1.3 mm long, thickened or ribbed and reddish at base; petaline margin 0.4–0.8 mm deep, entire. *Petals* 1.5–1.8 mm long, pale to medium pink. *Stamens* 6–10, with 0–3 opposite each sepal. *Longest filaments* 0.2–0.35 mm long. *Anthers* c. 0.35 mm long. *Ovary* inferior, 2-locular; ovules 1 per loculus. *Style* usually 0.6–1 mm long; stigma capitate or peltate. *Fruits* 1/2–2/3 inferior, 2–2.5 mm long, c. 1.6 mm wide; sepals erect; petals deciduous or persistent. *Seeds* 1.2–1.4 mm long, c. 0.6 mm wide.

Diagnostic features. Among species that have 1 ovule per loculus, *S. capitata* is distinguished by the following combination of characters: leaves densely glandular; peduncles 8–18 mm long, usually 9–23-flowered; hypanthium densely glandular and pitted, longer than wide; stigma capitate.

Selected specimens examined. WESTERNAUSTRALIA: between Hamelin and Tamala, 16 Oct. 1974, *J.S. Beard* 7067 (PERTH); near the Murchison river on the River Rd track, 2.5 km N of Kalbarri, 5 Oct. 1990, *S. Maley* 3 (AD, CANB, PERTH); 6.7 km from Tamala–Useless Loop fork on road to Hamelin Pool, 18 Sep. 1974, *B.L. Powell* 74090 (PERTH); Meanarra Hill, Kalbarri National Park, 29 Oct. 1996, *R. Schuh & G. Cassis* 96-33 (PERTH).

Distribution and habitat. Extends from Tamala Station south-south-east to near Yerina Springs (Figure 3A), in yellowish to reddish sandy soils. See below for a discussion of an outlying collection (*F. Hort & J. Hort* 3797) from the Perth suburb of Stratton.

Conservation status. Not listed by Smith and Jones (2018); this species has most of its known populations protected within Kalbarri National Park.

Chromosome number. $n = 11$, *vide* B.L. Rye, *Austral. J. Bot.* 27: 572 (1979) [as *Scholtzia* sp.]. Voucher: B.L. Powell 74090.

Phenology. Flowers mainly from August to October. Fruits recorded from October and January.

Etymology. From the Latin *capitatus* (capitate, head-like), referring to the head-like arrangement of the flowers, which are actually in a condensed dichasial cyme.

Vernacular name. Pom-pom Scholtzia.

Affinities. This species and *S. oleosa* Rye are referred to here as the *S. capitata* complex. They have crowded oil glands on the leaves and also on the hypanthium, with the glands sunken into small pits on the hypanthium. See *S. oleosa* for the differences between the two species.

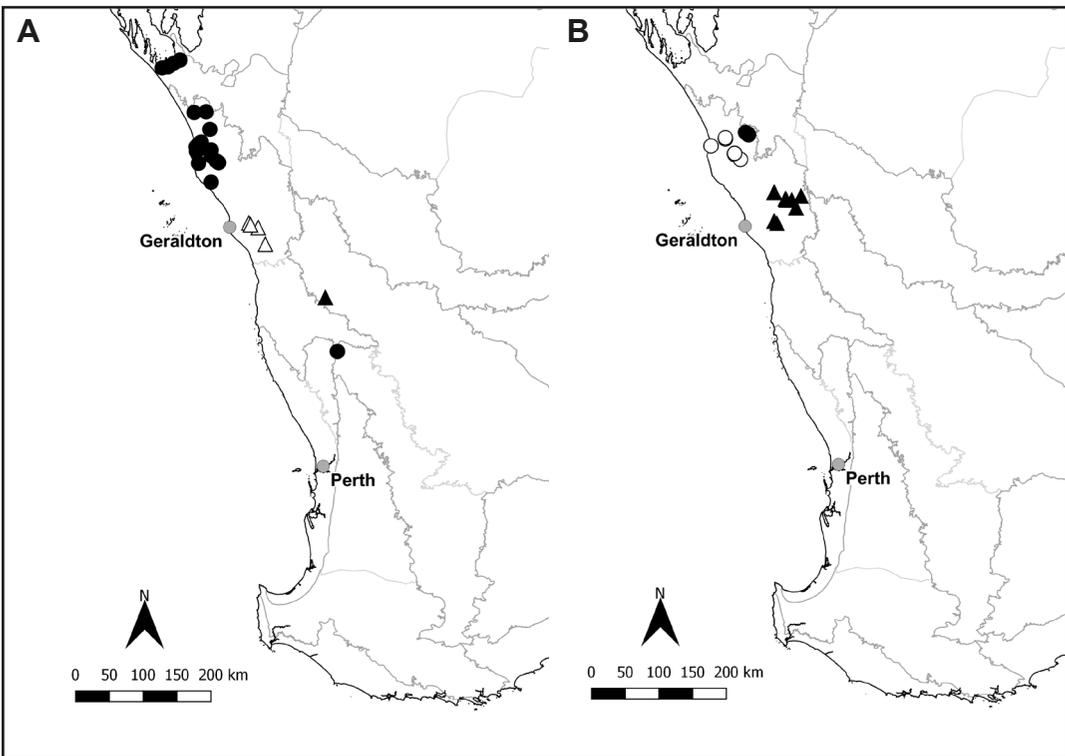


Figure 3. Distribution of *Scholtzia* species. A – *S. capitata*, with outlying southern collection (●), *S. multiflora* (△) and *S. aff. multiflora* (▲); B – *S. denticulata* (○), *S. inaequalis* (▲) and *S. peltigera* (●).

Notes. When this species was lectotypified in Rye (2017), it comprised only the specimens that had been housed under the phrase name *S. sp.* Yerina Springs (N. Hoyle 517). Now the circumscription of *S. capitata* is enlarged to include specimens previously identified as *S. sp.* Shark Bay (M.E. Trudgen 7429). *Scholtzia sp.* Shark Bay (M.E. Trudgen 7429) is a variant known from only a few, mostly poor specimens from the north-western part of the range of the complex. It tends to have narrower leaves than the other variants, often with the blade narrowly obovate, but broader leaves can be present on the same specimens. Leaf width varies considerably in the remainder of the complex, often with considerable variation on individual specimens that may occasionally include narrowly obovate leaves.

Foliar colleters are more conspicuous in this species than in most other species that have one ovule per loculus, but are usually shed before the leaves mature. Similar filiform colleters are associated with the bracts and bracteoles; these are commonly noticeable, especially if they are left protruding from the top of peduncles after the bracts and fruits have been shed.

The very isolated Stratton collection (*F. Hort & J. Hort 3797*: PERTH) occurs more than 350 km south of the known natural range of *S. capitata*. It also differs from the rest in having only 4–6 stamens per flower. It may represent a naturalised occurrence since over 500 plants have been recorded in a dense population, in which case it could be a cultivated hybrid. Alternatively the specimen could be the sole representative of a new taxon.

Scholtzia chapmanii Trudgen ex Rye, *sp. nov.*

Typus: 0.8 km E of Lake Indoon entrance along Leeman–Encabba road, Western Australia, 9 December 1992, *R.J. Cranfield & P.J. Spencer 8705* (*holo:* PERTH 02934256; *iso:* AD, CANB, K, MEL, NSW).

Scholtzia chapmanii Trudgen ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Scholtzia sp. Winchester (C. Chapman s.n. PERTH 05625386), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub ± prostrate, 0.1–0.3 m high, commonly 0.8–1.8 m wide, at least sometimes with multiple, close branches arising at ground level from a woody base; flowering branchlets with peduncles borne at up to 20 consecutive nodes but usually at 3–12 nodes, often in a one-sided raceme-like arrangement. *Leaves* appressed or antrorse. *Petioles* absent or up to 0.4 mm long. *Leaf blades* narrowly obovate or oblong to linear in outline, 1.2–3 mm long, 0.5–1.0 mm wide, 0.4–0.7 mm thick, ciliolate or denticulate at first, the cilia up to 0.2 mm long; abaxial surface raised and somewhat flattened at centre, with lateral veins obscure, the oil glands in 1 or sometimes 2 main rows on each side of midrib, with 3–6 glands in innermost rows. *Peduncles* 1–3.5 mm long, 0.2–0.35 mm wide, 1(2)-flowered; secondary axis (when present) *c.* 0.8 mm long. *Bracteoles* 0.7–2 mm long, deciduous. *Pedicels* 0.3–1.5 mm long. *Flowers* 5–8 mm diam. *Hypanthium* 1.0–1.3 mm long, 5-ribbed. *Sepals* broadly ovate to almost semicircular, usually very broadly ovate, 1.1–1.9 mm long, ridged on the herbaceous base, the ridge usually very prominent; scarious or petaline margin 0.5–0.7 mm deep, ± entire. *Petals* 2–3.5 mm long, white or pale pink, very erect in fruit. *Stamens* 15–20, in a continuous circle. *Longest filaments* 1.5–2 mm long. *Anthers* 0.3–0.5 mm long. *Ovary* *c.* 1/2 inferior, 2-locular; ovules 2 per loculus. *Style* 1.5–2.3 mm long; stigma capitate (possibly sometimes slightly peltate). *Fruits* *c.* 1/2 inferior, 1.6–2.3 mm long, 1.8–2.2 mm wide, 5-ribbed; sepals erect; petals persistent. *Seeds* mostly 1.1–1.4 mm long, 0.6–0.8 mm wide.

Diagnostic features. Among the species with two ovules per loculus and mostly to consistently 1-flowered peduncles, *S. chapmanii* is distinguished by its 5-ribbed hypanthium. Other important characters: stamens 15–19, in a continuous circle; style 1.5–2.3 mm long.

Selected specimens examined. WESTERN AUSTRALIA: cement crossing, 1 mile [1.6 km] second road towards N Eneabba, 8 Nov. 1970, *A.C. Burns* 63 (PERTH); 8 miles [13 km] SW of Winchester, Nov. 1975, *C. Chapman s.n.* (BRI, PERTH); N side of Brand Hwy, NW of Arrowsmith River, N of Eneabba, 29 Sep. 1992, *E.A. Griffin* 6834 (MEL, PERTH); S side of Dookanooka Rd, c. 800 m W of Wilton Well Rd, SW of Three Springs, 14 Nov. 2004, *M. Hislop & A. Tinker* MH 3361 (PERTH); 34 km N of Eneabba on Brand Hwy, 11 Oct. 1982, *K.H. Rechinger* 58630 (W); UCL c. 15 km S of Mt Adams Rd, 5 km E of Brand Hwy, c. 40 km S of Dongara, 6 Nov. 2007, *B. Taylor & K. Greenacre* 07-66-01(PERTH); Site 110, Beekeepers Reserve, 19 Oct. 1984, *R.T. Wills* 0294 (PERTH).

Distribution and habitat. Extends from near Lake Indoon east to near Winchester (Figure 2A), in a variety of sandy habitats, sometimes over limestone or associated with winter-wet depressions, often dominated by *Banksia*.

Phenology. Flowers mainly from late September to December. Mature fruits recorded from mid October to January.

Conservation status. Not listed by Smith and Jones (2018); this species is known from two reserves and is not currently considered to be at risk.

Etymology. Named after Charles Chapman (1904–1988), a farmer who lived near Winchester and collected extensively in the area between Green Head and Coorow, including making a collection of *S. chapmanii*.

Affinities. This species, *S. prostrata* Rye and *S. quindecim* Rye make up the *S. chapmanii* complex. *Scholtzia chapmanii* differs from the other two species in having more pronounced ridges on the calyx, and usually an obviously 5-ribbed hypanthium. All three taxa seem to be geographically separated from one another. The *S. chapmanii* complex is similar to *S. teretifolia* Benth., which has even more pronounced calyx ribs. See notes under *S. prostrata*, which shows the greatest similarities to *S. chapmanii*.

Notes. One specimen, *A.C. Burns* 63, has multiple, close branches arising at ground level from a woody base of about 15 mm diameter, but no other specimens have the base attached. Another specimen, *V. Westcott s.n.*, seems atypical as it does not have obvious ribs on the hypanthium, but it is mainly in bud.

Fertile fruits often appear to have four chambers (two per loculus) when mature, these corresponding with the four ovules, with a seed produced in either a top or basal chamber. The seed tends to be somewhat oblique if in the upper chamber but more erect and occupying closer to a full loculus if in the lower chamber.

Scholtzia cordata Trudgen ex Rye, *sp. nov.*

Typus: Kalbarri National Park, Western Australia [precise locality withheld for conservation reasons], 24 October 1995, *M.N. Lyons* 2413 (*holo:* PERTH 05002273; *iso:* CANB, MEL).

Scholtzia cordata Trudgen ms, in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 401 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Scholtzia sp. Yuna (C.A. Gardner 14286), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub low-growing, 0.2–0.8 m high, 1.8–3.0 m wide; flowering branchlets with peduncles borne at 1–4 consecutive nodes in a very loose, raceme-like arrangement or an umbel-like arrangement. *Leaves* ± patent (widely antrorse to widely retrorse). *Petioles* 0.2–0.6 mm long. *Leaf blades* very broadly orbicular or cordate, 2.2–4.0 mm long, 2.5–4.2 mm wide, usually with a pale or translucent margin less than 0.1 mm deep, entire; abaxial surface rather uniformly raised, often with a narrow ridge along the midvein, with lateral veins obscure, the oil glands in at least 3 main rows on each side of midvein but inconspicuous. *Peduncles* 7–18 mm long, 0.4–0.7 mm wide, 5–20-flowered; secondary axes up to 2 mm long. *Bracts* 1.4–2.0 mm long, deciduous. *Pedicels* 0.2–0.4 mm long. *Flowers* 4.5–5.5 mm diam. *Hypanthium* 1.5–1.6 mm long, somewhat rugose or smooth. *Sepals* mostly broadly to depressed ovate or semicircular, 0.4–0.6 mm long, sometimes shortly auriculate, the outer ones with a somewhat ridged herbaceous base; petaline margin 0.3–0.5 mm deep, entire. *Petals* 1.5–2.5 mm long, white. *Stamens* 9–12, with 1–3 opposite each sepal. *Longest filaments* 0.4–0.6 mm long. *Anthers* 0.35–0.5 mm long. *Ovary* inferior, 2-locular; ovules 2 per loculus. *Style* 0.8–1.4 mm long; stigma capitate. *Fruits* c. 2/3 inferior, 1.9–2.3 mm long, c. 1.5 mm wide; sepals erect; petals deciduous but often persistent on young fruits. *Seeds* (only 1 seen) c. 1.5 mm long, c. 0.5 mm wide.

Diagnostic features. Distinguished by the following combination of characters: leaf blades very broadly orbicular or cordate; peduncles 5–20-flowered, 7–18 mm long; stamens 9–12 with 1–3 opposite each sepal; ovules 2 per loculus; style 0.8–1.4 mm long.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 24 Oct. 2004, G. Cassis, M. Wall, C. Symonds & C. Weirauch 9-76 (PERTH); 20 Dec. 1962, C.A. Gardner 14286 (PERTH); 25–28 Nov. 1996, T.F. Houston 915-5 (PERTH); 4 Oct. 2003, *Wildflower Society of W.A.* EURA 13 (PERTH).

Distribution and habitat. Occurs from northern Kalbarri National Park south-east to north of Yuna (Figure 2B), recorded in yellow sand on dune ridges and in swales.

Phenology. Flowers mainly in October and November. Mature fruits recorded from October to December.

Conservation status. Priority Two under Conservation Codes for Western Australian Flora. Previously listed (Smith & Jones 2018) as Priority One under the name *S.* sp. Yuna (C.A. Gardner 14286), but now known from more localities including a national park.

Etymology. Derived from the Latin *cordatus* (cordate), in reference to the heart-shaped leaves.

Vernacular name. Heart-leaved Scholtzia.

Affinities. Similar to *S. uberiflora* in most of the diagnostic characters listed above, but that species has more numerous flowers per branchlet, and a shorter style, 0.45–0.8 mm long. *Scholtzia uberiflora* also has longer leaves and usually fewer stamens.

Notes. Seeds are probably up to 1.9 mm long but the single mature seed seen in the current study was only 1.5 mm long.

Scholtzia corrugata Rye, *sp. nov.*

Typus: Coburn Station, Western Australia [precise locality withheld for conservation reasons], 30 August 2012, *N. Murdock* NM 031 (*holo:* PERTH 08587221; *iso:* CANB, K, MEL).

Scholtzia sp. Coburn (N. Murdock NM 031), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 May 2018].

Shrub erect, commonly 1.5–1.7 m high, width not recorded; flowering branchlets with peduncles borne at 1–4 consecutive nodes, with flowers often in a terminal globular cluster. *Leaves* appressed or antrorse. *Petioles* 0.3–0.4 mm long. *Leaf blades* ± broadly obovate, 1.5–2.5 mm long, 1.3–2.1 mm wide, entire, usually not apiculate; abaxial surface flattened at the centre in basal half to 3/4 of its length and ridged distally, with lateral veins obscure, the oil glands in 1 or 2 main rows on each side of midvein, with 4–6 glands in innermost rows. *Flowers* c. 4 mm diam. *Peduncles* 3–4.5 mm long, 0.25–0.4 mm wide, mostly 3–7-flowered; secondary axes 0.3–0.7 mm long. *Bracts* 0.6–1.4 mm long, deciduous. *Pedicels* 0.2–0.5 mm long. *Flowers* c. 4 mm diam. *Hypanthium* 1.2–1.4 mm long, reticulate-rugose or wrinkled-rugose. *Sepals* very broadly or depressed ovate, 0.35–0.5 mm long, ridged on herbaceous base; petaline margin 0.2–0.3 mm deep, entire. *Petals* 1.3–1.6 mm long, pink or white. *Stamens* commonly 5, with 0–2 opposite each sepal. *Longest filaments* 0.3–0.4 mm long. *Anthers* 0.2–0.25 mm long. *Ovary* inferior, 3-locular; ovules 1 per loculus. *Style* 0.55–0.6 mm long; stigma capitate or peltate. *Fruits* c. 3/4 inferior, c. 1.6 mm long, c. 1.5 mm wide; sepals strongly incurved; petals deciduous. *Seeds* (not fully mature) c. 1.4 mm long, c. 0.9 mm wide.

Diagnostic features. Among the species that have a 3-locular ovary with 1 ovule per loculus, *S. corrugata* is distinguished by the following combination of characters: leaves broadly obovate; peduncles 3–4.5 mm long, mostly 3–7-flowered; hypanthium reticulate-rugose or wrinkled-rugose; petals 1.3–1.6 mm long; stamens c. 5.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 4 Aug. 2005, *S. Chalwell* SC 73 (PERTH); 4 Aug. 1996, *G.J. Keighery & N. Gibson* 1980 (AD, BRI, MEL, PERTH); 30 July 1996, *G.J. Keighery & N. Gibson* 2055 (CANB, NSW, PERTH); 28 Aug. 2012, *D. Panickar* DP 006 (PERTH).

Distribution and habitat. Occurs from Coburn south to southern Zuytdorp Cliffs (Figure 2B), one record from yellow sand over limestone, two records from red sand with *Acacia rostellifera*.

Phenology. Flowers from July to September, with fruits recorded in August and September.

Etymology. From the Latin *corrugatus* (wrinkled, irregularly crumpled, creased), in reference to the wrinkled hypanthium.

Conservation status. Recently listed as Priority Two under Conservation Codes for Western Australian Flora. Currently known from five locations, possibly including a nature reserve (Cooloomia Nature Reserve).

Affinities. *Scholtzia corrugata* is very similar to *S. calcicola*, which has narrower leaves and smaller flowers (with a shorter hypanthium and petals) and occurs further south.

Notes. Good fruiting material is still needed for this species. A few apparently full-sized fruits are present on the type collection, and the most mature seed seen was measured.

***Scholtzia denticulata* Rye, sp. nov.**

Typus: Murchison River Gorge, Kalbarri National Park [precise locality withheld for conservation reasons], Western Australia, 6 October 1990, *S. Maley* 6 (*holo:* PERTH 03627969; *iso:* CANB, K, MEL, NSW).

Scholtzia sp. Ross Graham Lookout (*S. Maley* 6), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Scholtzia sp. Murchison River (A.S. George 7098), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Scholtzia sp. Murchison River (A.S. George 7908), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018] – collection number wrong previously.

Shrub 0.8–2.0 m high, 1.0–2.5 m wide; flowering branchlets with peduncles borne at 1–5 consecutive nodes, commonly in a raceme-like arrangement well below the apex of branchlet but sometimes the flowers in more globular clusters. *Leaves* antrorse to patent. *Petioles* 0.5–1.1 mm long. *Leaf blades* linear or narrowly obovate to ± circular, 4–8.5 mm long, 0.7–3.3(–4.5) mm wide, uniformly unthickened, denticulate to ciliolate, with incurved or infolded margins; abaxial surface with lateral veins obscure, the oil glands crowded in (2)3 or more main rows on each side of midvein but inconspicuous. *Peduncles* 1.5–6 mm long, 0.4–0.6 mm wide, mostly 3–15-flowered; secondary axes 0.5–1.0 mm long. *Bracts* 1.3–3.1 mm long, persistent in flower but deciduous in late flower, broad, denticulate-laciniate. *Pedicels* up to 1.1 mm long. *Flowers* (5–)5.5–7.5 mm diam. *Hypanthium* 1.0–1.6 mm long, rugose. *Sepals* ovate or broadly ovate, (1.3–)1.5–2.5 mm long, scarious throughout, not or scarcely ridged at base, denticulate. *Petals* 2–3 mm long, white or pink. *Stamens* 8–11, with 1–3 opposite each sepal. *Longest filaments* 0.6–1.0 mm long. *Anthers* 0.35–0.45 mm long. *Ovary* inferior, 2-locular; ovules 2 per locus. *Style* commonly 0.8–1.1 mm long; stigma capitate. *Fruits* c. 3/4 inferior, probably c. 2 mm long; sepals erect to strongly recurved; petals apparently deciduous.

Diagnostic features. Among species that have a 2-locular ovary with 2 ovules per locus, *S. denticulata* is distinguished by the following combination of characters: leaf blades 4–8.5 mm long, denticulate to ciliolate; peduncles 1.5–6 mm long, mostly 3–15-flowered; persistent bracteoles; sepals (1.3–) 1.5–2.5 mm long.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 10 Oct. 1995, *D. & B. Bellairs* 3003 (PERTH); 8 Sep. 2001, *D. & B. Bellairs* 6202 (PERTH); 20 Aug. 1961, *C.A. Gardner* 13211 (PERTH); 7 Sep. 1966, *A.S. George* 7908 (PERTH); 22 Sep. 1994, *A.G. Gunness* 2379 (AD, BRI, NT, PERTH); 27 Sep. 1962, *M.E. Phillips* WA/62 1447 (CBG, PERTH).

Distribution and habitat. Recorded along the gorges of the Murchison River and in nearby areas within Kalbarri National Park (Figure 3B), in sand, mostly from sandstone well above the river, in sites described as rocky or sloping sandplain.

Phenology. Flowers from August to November.

Etymology. From the Latin *denticulatus* (bearing small teeth), referring to the minutely toothed margins to the leaves, bracts and sepals.

Conservation status. Priority Two under Conservation Codes for Western Australian Flora. Listed with this conservation status by Smith and Jones (2018) under the name *S. sp.* Ross Graham Lookout (S. Maley 6). All known populations occur in a large national park.

Co-occurring species. Recorded (*A.G. Gunness* AG 2379) growing downslope from, but apparently not intermixed with, *S. longipedata* (*A.G. Gunness* AG 2382).

Affinities. This species does not appear to be particularly close to any other named species. It differs from other species in the latter part of the key (lead 43 onwards), such as *S. oligandra* F.Muell. ex Benth., in having more persistent bracteoles and longer sepals.

Notes. *Scholtzia denticulata* usually has the longest sepals in relation to petals in the genus, typically about 3/4 the length of the petals but sometimes more or less as long as the petals. However, the name *S. sp.* Murchison River (A.S. George 7908) has been applied to a single collection that has somewhat shorter sepals than usual, the largest ones 1.3–1.5 mm long. It also appears a little different from other specimens because it is at a more advanced stage of flowering. A sterile fruit observed on *A.S. George* 7908 is c. 2 mm long and 1.8 mm wide. No other specimens have any mature fruits.

Scholtzia halophila* Rye, *sp. nov.

Typus: 3 miles [5 km] west of Coomberdale, Western Australia, 6 October 1976, *M.E. & M.E. Trudgen* MET 1724 (*holo:* PERTH 06171893; *iso:* CANB, K, MEL, NSW).

Shrub 0.5–3(–4) m high, 1.7–4(–5) m wide; flowering branchlets with peduncles borne at 2–6 consecutive nodes, often with flowers in a loose globular cluster. *Leaves* antrorse to somewhat retrorse, usually widely antrorse or patent. *Petioles* 0.3–0.7 mm long. *Leaf blades* broadly or very broadly obovate, 1.7–4.0 mm long, 1.7–3.8 mm wide, entire (occasionally some young leaves denticulate distally); abaxial surface not raised except sometimes narrowly along centre, sometimes grooved along midvein in lower part and ridged above, with lateral veins obscure or sometimes with 4–6 veins visible on each side of midvein, the oil glands in 1(–3) main rows on each side of midvein, with 3–5(–7) glands in innermost rows. *Peduncles* 3.5–14 mm long, 0.25–0.55 mm wide, 3–9(–12)-flowered; secondary axes ± absent or up to 0.8 mm long. *Bracts* 1.6–2.3 mm long. *Pedicels* 0.3–1.4 mm long. *Flowers* 4.0–5.5 mm diam. *Hypanthium* 1.4–1.5 mm long, rugose-pitted. *Sepals* broadly or very broadly ovate, 0.5–1.4 mm long, fully scarious or outermost ones ridged at base and with a deep petaline margin, entire. *Petals* 1.6–2.7 mm long, white or pink. *Stamens* 5–12, with 0–3 opposite each sepal. *Longest filaments* 0.3–0.6 mm long. *Anthers* 0.25–0.3 mm long. *Ovary* inferior, usually 2- or 3-locular (rarely 4-locular in one subspecies); ovules 1 per loculus. *Style* 0.7–1.4 mm long; stigma ± peltate. *Fruits* c. 1/2 inferior, 1.4–1.8 mm long, 1.8–2.3 mm wide; sepals incurved to spreading; petals deciduous. *Seeds* 1.0–1.2 mm long, 0.6–0.7 mm wide. (Figure 1C)

Diagnostic features. Among the species that have 1 ovule per loculus, *S. halophila* is distinguished by the following combination of characters: petioles 0.3–0.7 mm long; peduncles 3.5–14 mm long, 3–12-flowered; hypanthium rugose-pitted; stamens 5–12; ovary 2–4-locular; style 0.7–1.4 mm long.

Distribution and habitat. Extends from near Coorow south-east to near Tammin (Figure 4), associated with salt lakes and on saline margins of watercourses.

Phenology. Flowers mainly from September to November. Fruits recorded from October to February.

Etymology. From the Greek *halos* (salt) and *-philios* (loving), referring to the species' habitat surrounding salt lakes.

Vernacular name. Saltlands Scholtzia. This species occurs on the margins of salt lakes (or on raised areas within salt lakes) and on the somewhat saline margins of inland watercourses.

Co-occurring species. Since *S. halophila* occurs in more saline habitats than other species of *Scholtzia*, it does not appear to grow intermingled with them. However, it overlaps in range with *S. parviflora* F.Muell. and *S. uniovulata* Rye, both of which have sometimes been recorded not far from salt lakes.

Affinities. Similar to *S. parviflora* and *S. uniovulata* in many respects, such as having a pitted hypanthium, but differs in having more numerous flowers (3–12 *cf.* 1–3) on longer peduncles (3.5–14 mm *cf.* 0.7–3.5 mm), more numerous stamens (5–12 *cf.* usually 3–5) and a minimum of two loculi in the ovary (*cf.* 1- or 2-locular).

Notes. Stamens are often in very discrete groups in *S. halophila*, i.e. with the stamens of each antisepalous group very close (see Figure 1B), whereas some other species have the stamens often widely separated opposite each sepal.

Three geographically separated subspecies are recognised. These have previously been treated, informally, as separate species, but the morphological differences between them are only minor.

a. *Scholtzia halophila* Rye subsp. *halophila*

Scholtzia sp. Coomberdale (M.E. & M.E. Trudgen MET 1724), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Leafblades 1.7–3.5(–4) mm long, 1.7–3.3 mm wide. *Peduncles* 5–14 mm long. *Sepals* largely scarious or petal-like, 0.5–0.7 mm long. *Petals* 1.8–2.3 mm long. *Stamens* 7–12, with usually 1–3 opposite each sepal. *Longest filaments* c. 0.4 mm long. *Ovary* 2- or 3-locular. *Style* 0.8–1.4 mm long.

Diagnostic characters. Distinguished from subsp. *meridionalis* Rye by its more numerous stamens and longer peduncles. Distinguished from subsp. *mortlockensis* Rye primarily by its shorter sepals and in often having 2-locular ovaries.

Selected specimens examined. WESTERN AUSTRALIA: Stacy property, 14.5 km down Buntine–Marchagee Rd from the Midlands Rd intersection at Marchagee, adjacent Nature Reserve R28669, 1 Dec. 2009, *A. Chant* 1059 (PERTH); 15 km E of Marchagee on Buntine–Marchagee Rd, 2.5 km W

of Mamboobie Rd, 15 Nov. 1990, *S. Patrick* 501 (PERTH); Lake Eganu, c. 35 km S of Carnamah, 17 Sep. 2001, *A. Webb & B. Muir* 267 (PERTH).

Distribution. Extends from near Coorow south to the Wongan Hills area and apparently also in the Tammin area (Figure 4A). Two PERTH specimens from the Tammin area (*T.E.H. Aplin* 612; *A.M. Lyne* 956, *L. Craven & F. Zich*) are tentatively placed under this subspecies.

Conservation status. Not listed by Smith and Jones (2018); this taxon is known from a national park and a nature reserve and is not currently considered to be at risk.

Notes. The excluded syntype of *S. capitata*, *J. Drummond* 134 (MEL 2278623, K 000357122 & 000357123), appears to match this subspecies.

Of the three subspecies, *halophila* tends to have the longest peduncles, probably also the greatest tendency for its leaves to show veining, and is unusual in that some specimens have about equal numbers of 2- and 3-locular ovaries. See under the other subspecies for further differences.

b. *Scholtzia halophila* subsp. *meridionalis* Rye, *subsp. nov.*

Typus: Shire of Quairading, Western Australia [precise locality withheld for conservation reasons], 12 October 2002, *A.G. Gunness* 2828 (*holo:* PERTH 08245517; *iso:* CANB, MEL).

Scholtzia sp. Yenyening Lakes (A. Gunness 2824), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Leaf blades 1.8–2.5 mm long, 2.0–2.5 mm wide. *Peduncles* 3.5–6.5 mm long. *Sepals* mostly very broadly ovate, scarious or petal-like, 0.8–1.2 mm long. *Petals* 1.8–2.1 mm long. *Stamens* 5–8, with 0–2 opposite each sepal. *Longest filaments* 0.3–0.4 mm long. *Ovary* 2-locular. *Style* 0.7–1.1 mm long.

Diagnostic features. Subsp. *meridionalis* is distinguished from the other two subspecies by the following combination of characters: peduncles 3.5–6.5 mm long; stamens 5–8; ovary 2-locular.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 18 Sep. 2002, *A.G. Gunness* 2821 (AD, BRI, K, NSW, PERTH); 17 Sep. 2002, *T. Watson* 279 (PERTH).

Distribution and habitat. Associated with salt lakes in Yenyening Lakes Nature Reserve (Figure 4A), on white or yellow sand.

Phenology. Flowers mainly from September to November. Fruits recorded in November and July.

Etymology. From the Latin *meridionalis* (southern), as this subspecies occurs in the far south of the distribution of the genus.

Conservation status. Recently listed as Priority Two under Conservation Codes for Western Australian Flora. This species is known from a conservation reserve.

Notes. The sepals of this subspecies tend to be intermediate in length between those of subspecies *halophila* and *mortlockensis* but show some overlap with both of them. Subsp. *meridionalis* also

usually has fewer stamens (5–8 *cf.* 7–12), and its mature style tends to be shorter (0.7–1.1 *cf.* 0.8–1.4 mm long). However, good fruiting material is absent in subsp. *meridionalis* and this is needed to determine whether the mature style is sometimes close to the maximum length recorded for the other two subspecies.

c. *Scholtzia halophila* subsp. *mortlockensis* Rye, *subsp. nov.*

Typus: Mortlock River, Western Australia, 18 November 1986, *M.E. Trudgen* 5427 (*holo*: PERTH 06171877; *iso*: CANB, K, MEL, NSW).

Scholtzia sp. Duck Pool (M.E. Trudgen MET 5427), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Leaf blades 2.5–4.0 mm long, 2.0–3.6 mm wide. *Peduncles* 4–8 mm long. *Sepals* broadly or very broadly ovate, petal-like, 1.0–1.4 mm long. *Petals* 2.3–2.5 mm long, white to medium pink. *Stamens* (6–)8–11, with 0–3 opposite each sepal. *Longest filaments* 0.4–0.6 mm long. *Ovary* usually 3-locular (rarely with a proportion of them 4-locular). *Style* 1.1–1.3 mm long.

Diagnostic features. Subspecies *mortlockensis* is distinguished from the other two subspecies by the following combination of characters: sepals 1–1.4 mm long; stamens (6–)8–11; ovary 3-locular in most flowers.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 24 Jan. 1946, *C.A. Gardner s.n.* (BRI, CANB, NSW, PERTH); 26 Nov. 2003, *B. Oversby* BO 142 (PERTH); 23 Oct. 1967, *P.G. Wilson* 6394 (AD, PERTH).

Distribution. Occurs along the Mortlock River North, Mortlock River South and Mortlock River East, extending from north of Northam inland to near Cunderdin (Figure 4B).

Etymology. Refers to its occurrence along all three branches of the Mortlock River, combining Mortlock with the Latin *-ensis* (native of).

Conservation status. Recently listed as Priority Three under Conservation Codes for Western Australian Flora. Only known from 15 collections, some of which are historical records, in habitat that is susceptible to hydrological changes and salinity. Further survey is needed to check the conservation status of this taxon.

Notes. This subspecies is intermediate in its average latitude and peduncle length between the other two subspecies. While it is readily separated in both morphology and distribution from subsp. *meridionalis*, it shows a greater approach in both these aspects to subsp. *halophila*. The length of its largest sepal is the character that best separates it from subsp. *halophila* (1–1.4 mm *cf.* 0.5–0.8 mm long), but there may be some intermediate specimens occurring in the region where the ranges of the two taxa more or less meet.

Subsp. *mortlockensis* is distinguished from subsp. *meridionalis* in having the ovary 3-locular rather than 2-locular in a majority of the flowers, and is the only subspecies known to rarely have a 4-locular ovary. At least one PERTH specimen, *C. Howell* 494, has a number of 4-locular ovaries, a character state not recorded elsewhere in the genus.

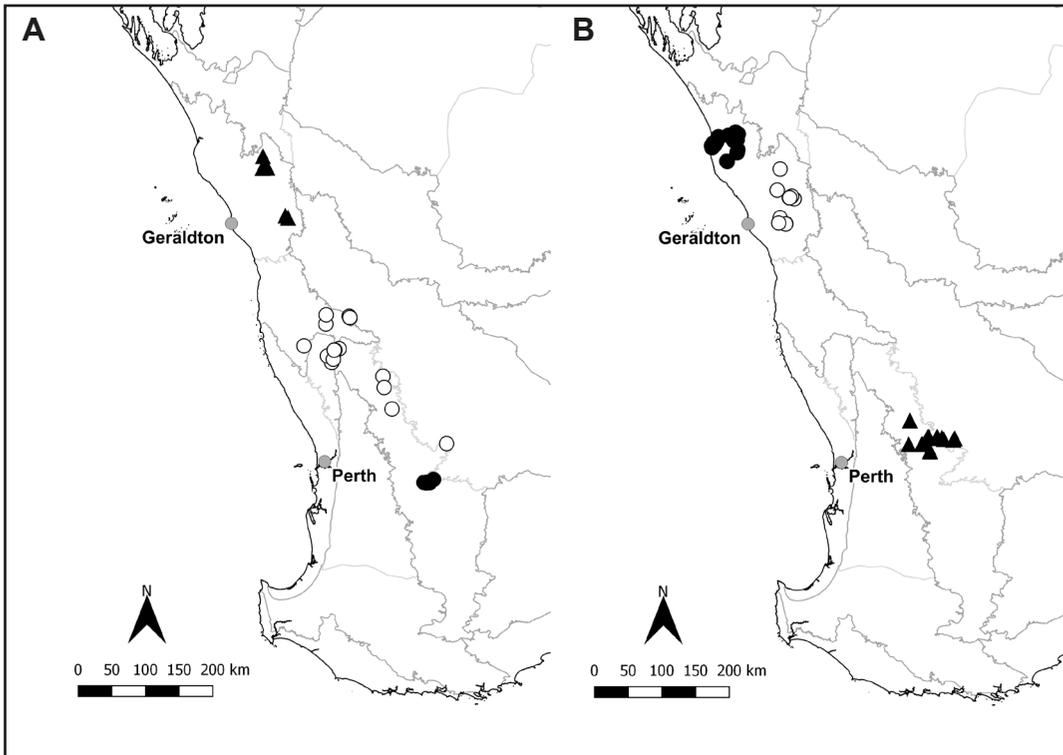


Figure 4. Distribution of *Scholtzia* species and subspecies. A – *S. halophila* subsp. *halophila* (○), *S. halophila* subsp. *meridionalis* (●) and *S. uniflora* (▲); B – *S. halophila* subsp. *mortlockensis* (▲), *S. longipedata* subsp. *longipedata* (●) and *S. longipedata* subsp. *procera* (○).

Scholtzia inaequalis Rye, *sp. nov.*

Typus: East Yuna Nature Reserve, Western Australia [precise locality withheld for conservation reasons], August 1985, *T.F. Houston* 617-2 (*holo*: PERTH 03627721; *iso*: CANB).

Scholtzia sp. East Yuna (A.C. Burns 6), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub 1–3 m high, 0.5–3 m wide; flowering branchlets with 1–4(–6) pairs of peduncles, often with flowers in a dense cluster or short raceme-like arrangement. *Leaves* appressed or antrorse. *Petioles* 0.2–0.5 mm long. *Leaf blades* obovate or broadly obovate, 1.0–2.5 mm long, 1.0–1.7 mm wide, entire, often apiculate; adaxial surface flattened at the centre in basal 1/2–3/4 of its length and ridged distally, with lateral veins obscure, the oil glands in 1 main row of 3 or 4 large glands and 1 or 2 rows of smaller glands on each side of midvein. *Peduncles* 0.4–1.2(–1.7) mm long, 0.3–0.5 mm wide, 1–3-flowered; secondary axes ± absent. *Bracts* 0.8–2.0 mm long. *Pedicels* 0.2–0.8 mm long. *Flowers* 4–5 mm diam. *Hypanthium* 0.7–1.2 mm long, wrinkled-rugose. *Sepals* greatly differing in size and sometimes orientation, the outermost one broadly or very broadly ovate and 0.35–0.5 mm long and the innermost one broadly to depressed ovate and 0.8–1.4 mm long, the base ridged; petaline margin up to 0.7 mm deep, but much smaller on outermost sepals, entire. *Petals* 1.5–2.5 mm long, pale pink. *Stamens* 3–6, 0–2 opposite each sepal. *Longest filaments* 0.5–0.7 mm long. *Anthers* 0.25–0.3 mm

long. *Ovary* inferior, 2-locular in all or most flowers, rarely 3-locular; ovules 1 per loculus. *Style* 0.8–1.5 mm long; stigma peltate or capitate. *Fruits* c. 2/3-inferior, c. 1.5 mm long, c. 1.6 mm wide; sepals fairly erect or (especially outer ones) tending to be incurved; petals deciduous. *Seeds* c. 1.3 mm long, c. 1.1 mm wide.

Diagnostic features. Among species that have 1 ovule per loculus, *S. inaequalis* is distinguished by the following combination of characters: 1–3-flowered peduncles 0.4–1.2 mm long; petals 1.5–2.5 mm long; stamens 3–6; outer sepals (incurved), usually much shorter than inner sepals (erect); hypanthium wrinkled-rugose.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons], 12–16 Oct. 19768, *B.G. Muir* 38 6.2 (PERTH); 15 Aug. 2006, *A. Guinness* AG 2988 (MEL, PERTH); 28 Aug. 2008, *A. Guinness* AG 3004 (CANB, NSW, PERTH); 31 July 2003, *M.E. Trudgen* MET 22021 (PERTH).

Distribution and habitat. Extends from East Yuna Nature Reserve south to the Wicherina area (Figure 3B), recorded from varied habitats including the base of a low granite breakaway, lateritic and yellow sandplain areas, sometimes in open *Eucalyptus* woodlands.

Phenology. Flowers mainly from June to October. Mature fruits recorded in August.

Etymology. From the Latin *inaequalis* (unequal), referring to the usually unequally sized sepals, with the innermost sepal tending to be more erect, as well as much larger than, the outermost sepal.

Conservation status. Priority Two under Conservation Codes for Western Australian Flora. Listed with this status by Smith and Jones (2018) under the name *S. sp. East Yuna* (A.C. Burns 6). This taxon occurs in a large nature reserve and one other reserve.

Affinities. This species is very similar to *S. truncata*, which differs in having less difference in size between the inner and outer sepals, more numerous stamens and possibly a shorter style. It is also very similar to *S. uniovulata*, which differs in having a pitted hypanthium and often only a 1-locular ovary. Both of those species overlap in distribution with *S. inaequalis*.

Scholtzia inaequalis could also be confused with *S. corrugata* but that species differs in having longer, mostly 3–7-flowered peduncles and occurs further north.

Notes. Two PERTH specimens that may belong to this species but which have more uniform-sized sepals than usual are *P. Fairall* 754 and *S. Patrick* SP 1760, both from the large East Yuna Flora Reserve (PERTH).

***Scholtzia laciniata* Rye, sp. nov.**

Typus: near Lancelin, Western Australia, 1975, *M.E. Trudgen* 1516 (*holo:* PERTH 06362168; *iso:* AD, CANB, K, MEL, NSW).

Scholtzia sp. Lancelin (M.E. Trudgen 1516), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Prostrate or widely spreading *shrub* up to 0.4 m high, width not recorded, with young stems often markedly tuberculate; flowering branchlets with peduncles borne at 3–15 consecutive nodes, in a raceme-like arrangement. *Leaves* widely antrorse to retrorse. *Petioles* 0.3–0.7 mm long. *Leaf blades* elliptic to broadly ovate or cordate, 2.5–4 mm long, 2–4 mm wide, markedly ciliate-laciniate, the longest cilia 0.4–0.8 mm long; abaxial surface raised only at the centre (near the midvein) and tending to be grooved along the midvein, with lateral veins obscure, the oil glands in several main rows on each side of midvein but inconspicuous. *Peduncles* 1.5–2.5 mm long, 0.4–0.7 mm wide, 3–7-flowered; secondary axes up to 0.6 mm long. *Bracts* 1.3–2 mm long, deciduous. *Longest pedicels* 0.4–0.8 mm long. *Flowers* 5–8 mm diam. *Hypanthium* 1.5–1.8 mm long, smooth or 5-ribbed. *Sepals* mostly very broadly to depressed ovate, 0.8–1.3 mm long, largely scarious, the herbaceous base somewhat ridged or almost smooth; petaline margin 0.5–0.8 mm deep, denticulate. *Petals* 2.5–3.5 mm long, pale pink. *Stamens* (10–)12–22, in a continuous circle. *Longest filaments* 1.7–2.5 mm long. *Anthers* 0.4–0.5 mm long. *Ovary* largely inferior, 2-locular; ovules 2 per loculus. *Style* 2.4–3.1 mm long; stigma capitate or peltate. *Fruits* 1/2–2/3 inferior, only sterile ones seen; sepals erect; petals deciduous.

Diagnostic features. Distinguished by the following combination of characters: young stems often markedly tuberculate; leaf blades elliptic to broadly ovate or cordate, markedly ciliate-laciniate; stamens up to 22, in a continuous circle.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 8 Dec. 1992, *E.A. Griffin* 8404 (PERTH); 25 Jan. 1966, *J.J. Havel* H 251 (PERTH); 5 Oct. 1999, *M.A. Langley & P.M. Smith* MAL 2173 (PERTH); 23 Nov. 2017, *B. Morgan* IOMH-12 (PERTH); 1 Dec. 1974, *A.E. Orchard* 4267 (PERTH).

Distribution and habitat. Extends from near Lancelin south to near Seabird and inland to Moore River National Park (Figure 5A), in shallow sand over limestone near the coast and in deep yellow sand further inland.

Phenology. Flowers from November to January. Fruits recorded from December to January.

Etymology. From the Latin *laciniatus* (laciniate), in reference to the irregularly incised leaf margins.

Vernacular name. Ragged-leaved Scholtzia.

Conservation status. Recently listed as Priority Two under Conservation Codes for Western Australian Flora, this species has a restricted range only *c.* 30 km long.

Affinities. Similar to *S. involocrata* in many respects, including having flat leaves and peduncles usually 3–7-flowered, but differing in having markedly laciniate-ciliate margins to the leaves and in having the base of the sepals somewhat ridged.

Notes. *Scholtzia laciniata* seems to be the only member of the genus to commonly have markedly tuberculate young stems. Judging from the most mature fruits examined, seeds probably tend to be 1.7–2 mm long. One PERTH specimen, *B. Morgan* IOMH-12, appeared to have most flowers with only 10–12 stamens. All other specimens examined had mostly 14–22 stamens per flower.

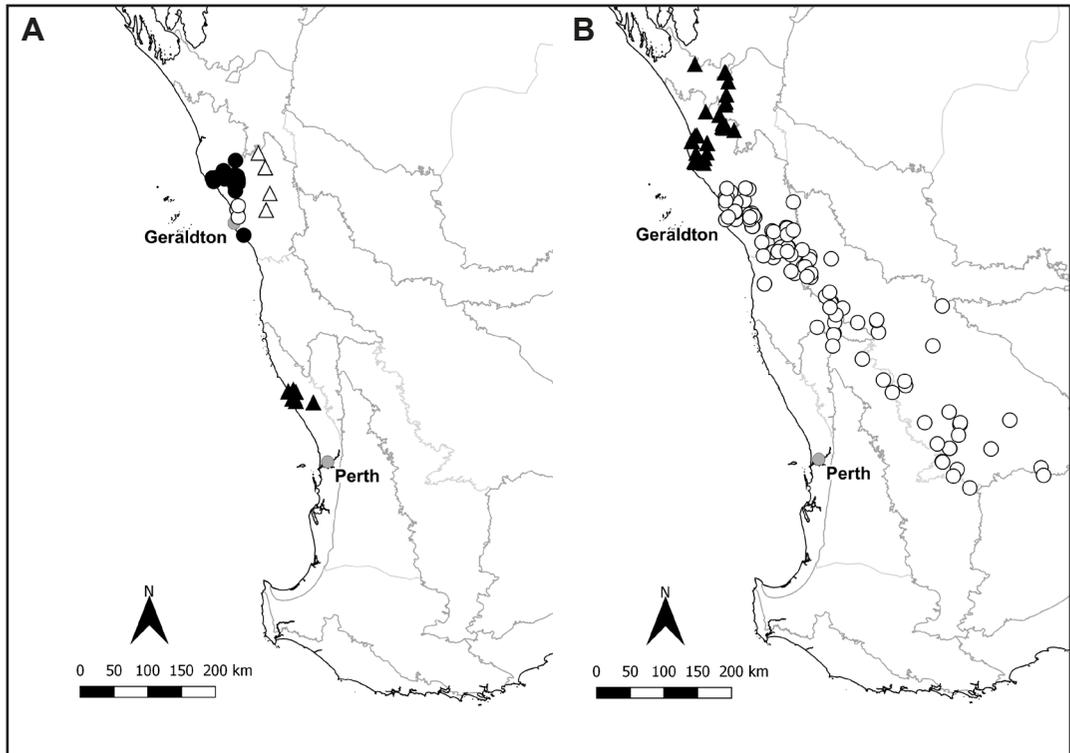


Figure 5. Distribution of *Scholtzia* species and subspecies. A – *S. laciniata* (▲), *S. pentamera* subsp. *pentamera* (●), *S. pentamera* subsp. *collina* (○) and *S. thincicola* (△); B – *S. oleosa* (▲) and *S. uniovalata* (○).

Scholtzia longipedata Rye, *sp. nov.*

Typus: 4.3 km along firebreak, *c.* 8.3 km E of Kalbarri along Ajana–Kalbarri road, Western Australia, 30 August 2001, *R. Davis* 10004 (*holo*: PERTH 05823854; *iso*: MEL).

Shrub 0.3–2.5 m high, 1–2.5 m wide; flowering branchlets with peduncles borne at 1–5 consecutive nodes, varying in arrangement, sometimes combined into an umbel-like or short raceme-like arrangement but often discrete or more densely arranged. *Leaves* antrorse to patent, usually widely antrorse. *Petioles* 0.4–1.0 mm long. *Leaf blades* obovate or broadly obovate, 2.5–4.5 mm long, 1.4–3.5 mm wide, entire, with incurved margins; abaxial surface gradually raised towards the centre, often indented or flattened along the midvein but narrowed to a ridge distally, with thin translucent margins less than 0.1 mm deep, with lateral veins obscure, the oil glands in more than 2 rows on each side of midvein but inconspicuous. *Peduncles* 6–16 mm long, 0.4–0.8 mm wide, mostly 7–21-flowered; secondary axes up to 1.5 mm long. *Basal bracts* 1.4–2.5 mm long, caducous or deciduous. *Pedicels* 0.3–1.0 mm long. *Flowers* 3.5–5.5 mm diam. *Hypanthium* 1.0–1.6 mm long, somewhat rugose. *Sepals* broadly to depressed ovate, 0.3–0.75 mm long, smooth or with a basal ridge; petaline margin 0.2–0.3 mm deep, entire. *Petals* 1.3–2 mm long, white or pink. *Stamens* 6–9, with 1–3 opposite each sepal (commonly 8 in the arrangement 2,1,2,2,1). *Longest filaments* 0.4–0.6 mm long. *Anthers* 0.25–0.35 mm long. *Ovary* inferior, 2-locular; ovules 2 per loculus. *Style* 0.7–1.4 mm long. *Fruits* *c.* 3/4 inferior, commonly 1.9–2.3 mm long, 1.6–1.7 mm wide; sepals erect; petals persistent or deciduous. *Seeds* 1.2–1.6 mm long, 0.5–0.7 mm wide.

Diagnostic features. Among species that have a 2-locular ovary with 2 ovules per loculus, *S. longipedata* is distinguished by the following combination of characters: leaf blades entire, obovate or broadly obovate; petioles 0.4–1 mm long; peduncles 7–16 mm long, mostly 7–21-flowered; sepals 0.3–0.75 mm long; stamens 6–9, with 1–3 opposite each sepal.

Distribution and habitat. Extends from the coast of the northern part of Kalbarri National Park south-east to East Yuna Reserve and Eradu (Figure 4B).

Phenology. Flowers mainly from July to November but with one record from December. Mature fruits have been recorded from September to November.

Etymology. From the Latin *longus* (long), *pes* (-*pedis*; foot) and *-atus* (indicating possession or likeness), referring to the long peduncles in this species. *Scholtzia spatulata* has the longest peduncles in the genus, but also tends to have longer leaves, so the two taxa are similar in the degree to which the flowers are separated from the foliage. Another particularly long-pedunculate species is *S. cordata*.

Co-occurring species. Recorded (*A.G. Gunness* AG 2382) growing upslope from, but apparently not intermixed with, *S. denticulata* (*A.G. Gunness* AG 2379).

Affinities. All other species of *Scholtzia* differ in several characters from this species, making it difficult to suggest which might be its closest relative.

Notes. This species was first collected in 1958 ‘near the Murchison River’ by Charles Gardner, who recorded the plant height as ‘30 cm’ and flowering in early December. These details, if accurate, give the lowest plant height and latest flowering time recorded for the species.

Two subspecies are recognised, occurring in the north and south of the range respectively.

a. *Scholtzia longipedata* subsp. *longipedata*

Scholtzia sp. Red Bluff (*A. Gunness* 2373), in *G. Paczkowska & A.R. Chapman, West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub 0.3–2.4 m high, 1.0–2.5 m wide. *Leaf blades* 2.5–4.5 mm long, 1.4–3.5 mm wide, not very thick. *Peduncles* 7–16 mm long. *Sepals* usually depressed ovate, 0.3–0.5 mm long, smooth or with a basal ridge; petaline margin 0.2–0.3 mm deep. *Style* 0.7–1.4 mm long; stigma peltate or capitate.

Selected specimens examined. WESTERN AUSTRALIA: Transect RB, Red Bluff, Kalbarri National Park, 9 Sep. 2003, *D. & B. Bellairs* 6336 (PERTH); Erriary Rd, 8.4 km N of the intersection with Binnu West Rd, 9 July 1997, *R. Davis* 3674 (PERTH); between Lookout and parking lot, Z Bend, Murchison River gorge, Kalbarri National Park, 2 Oct. 1991, *W. Greuter* 22482 (PERTH); Pot Alley Gorge, Kalbarri National Park, 26 Sep. 1974, *G. Perry* 322 (CANB, MEL, PERTH); 33.5 km E of the Meanarra Hill turnoff on the road to North West Coastal Hwy, Kalbarri National Park, 25 Sep. 2002, *M.E. Trudgen* 21708 (AD, BRI, CANB, DNA, NSW).

Distribution and habitat. Occurs in Kalbarri National Park and just south of the park (Figure 4B), on the coast in sand over sandstone and in near-coastal areas with sand.

Conservation status. Not listed by Smith and Jones (2018); most of the range of this species is within a large national park.

Notes. Specimens collected from along the coast are mostly 0.3–1.5 m high, apparently stunted from their exposed position, whereas those collected further inland are 1.2–2.5 m high. There is ample flowering material but better fruiting material is needed for this subspecies.

The stigma is often peltate in subsp. *longipedata* but is always capitate in subsp. *procera* Rye. See under the latter for other differences.

b. *Scholtzia longipedata* subsp. *procera* Rye, *subsp. nov.*

Typus: Binnu East Road, Western Australia [precise locality withheld for conservation reasons], 6 December 1993, *M.E. Trudgen & M.R. Trudgen* MET 12016 (*holo:* PERTH 06171869; *iso:* AD, BRI, CANB, K, NSW, MEL).

Scholtzia sp. Binnu-Yuna (M.E. Trudgen 12016), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Scholtzia sp. Eradu (R.D. Royce 8016), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub 1.2–3.5 m high, commonly 1–1.7 m wide. *Leaf blades* 2.0–3.3 mm long, 1.5–3.0 mm wide, up to *c.* 0.4 mm thick. *Peduncles* 6–11 mm long. *Sepals* broadly or very broadly ovate, (0.4–)0.5–0.75 mm long, with herbaceous base distinctly ridged; petaline margin 0.25–0.5 mm deep. *Style* 0.5–1.0 mm long; stigma capitate.

Diagnostic features. Differs from subsp. *longipedata* in its usually thicker leaves and usually longer sepals that are more markedly ridged, and tends to be a taller plant with more persistent petals and a shorter style.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 19 Nov. 1968, *A.C. Burns* 99A (PERTH); 24 Oct. 1992, *E.A. Griffin* 7516 (PERTH); 15 Aug. 2008, *A. Gunness* AG 2987 (PERTH); 24 Oct. 2001, *S.J. Patrick* 4082 (PERTH); 31 Oct. 1963, *R.D. Royce* 8016 (PERTH); 31 July 2003, *M. Trudgen* MET 22017 (PERTH); 28 Sep. 2007, *M.E. Trudgen & M. Guest* MET 22544 (PERTH).

Distribution and habitat. Extends from East Yuna Reserve south-west to Eradu (Figure 4B), in varied habitats that are usually sandy, often with mallees, *Melaleuca* or *Allocasuarina*. This subspecies may form a tall shrubland 2–3 m high.

Etymology. From the Latin *procerus* (tall, long), as this is one of the tallest members of the genus, up to 3.5 m high.

Conservation status. Priority Three under Conservation Codes for Western Australian Flora. Previously listed as Priority Two by Smith and Jones (2018) under the name *Scholtzia* sp. Eradu (R.D. Royce

8016) but not listed under the name *Scholtzia* sp. Binnu-Yuna (M.E. Trudgen 12016). This species is known from two nature reserves.

Notes. The phrase names *S.* sp. Eradu and *S.* sp. Binnu-Yuna have been applied to western and eastern specimens respectively, with all of the former in fruit and the latter mainly in bud or flower. Western specimens tend to have shorter sepals and styles than the eastern ones, but there is considerable overlap in the measurements of these characters.

***Scholtzia multiflora* Rye, sp. nov.**

Typus: Burma Road, Western Australia [precise locality withheld for conservation reasons], 1 August 2003, *M. Trudgen* MET 22022 (*holo:* PERTH 08209022; *iso:* CANB, K, MEL, NSW).

Scholtzia sp. Kojarena (A.M. Ashby 1904), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub commonly 1.6–2.0 m high, recorded as 1.5–2.7 m wide; flowering branchlets mostly with peduncles at 5–42 consecutive nodes in a raceme-like arrangement. *Leaves* widely antrorse or patent. *Petioles* 0.2–0.4 mm long. *Leaf blades* ± very broadly obovate, 1.7–3.3 mm long, 2.3–3.0 mm wide, entire, obtuse, not apiculate; abaxial surface flattened at the centre in basal 1/2–3/4 of its length and with midrib ridged distally, with lateral veins obscure, the oil glands usually in 3 or more main rows on each side of midvein, with 4 or 5 glands in innermost rows. *Peduncles* 5–7 mm long, 0.2–0.3 mm wide, 3–15-flowered; secondary axes 0.4–0.7 mm long. *Bracts* 0.4–1.5 mm long. *Pedicels* absent or up to 0.3 mm long. *Flowers* 3.5–4.5 mm diam. *Hypanthium* 0.7–1.1 mm long, reticulate-rugose. *Sepals* mostly broadly or very broadly ovate, 0.4–0.5 mm long, smooth or ridged at extreme base, largely petaline, entire. *Petals* 1.4–1.6 mm long, white or pale pink. *Stamens* 4–7, with 0–2 opposite each sepal. *Longest filaments* c. 0.5 mm long. *Anthers* c. 0.2 mm long. *Ovary* inferior, 2-locular; ovules 1 per loculus. *Style* 0.6–0.7 mm long; stigma capitate or peltate. *Fruits* c. 2/3 inferior, c. 1.3 mm long, c. 1.3 mm wide; sepals incurved; petals deciduous. *Seeds* 0.65–1.1 mm long, 0.6–0.7 mm wide.

Diagnostic features. Among species that have 1 ovule per loculus, *S. multiflora* is distinguished by the following combination of characters: leaves wider than long; peduncles many-flowered 5–7 mm long, borne at usually 5–42 consecutive nodes; hypanthium reticulate-rugose; stamens 4–7.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 14 Aug. 1966, *A.M. Ashby* 1904 (PERTH); 15 Aug. 2008, *A. Guinness* AG 2991 (PERTH); 8 Sep. 1998, *S. Patrick* 3007 (PERTH); Aug. 1924. *G.L. Sutton* s.n. (PERTH).

Distribution and habitat. Recorded from Kojarena south-east to east of Walkaway (Figure 3A), one record from a lateritic ridge but also recorded from a sandy swale. An outlying specimen from about 100 km to the south-east near Winchester, may also belong to this species (see *Notes* section below).

Phenology. Flowers recorded from July to September and mature fruits in August.

Etymology. From the Latin *multi-* (many-) and *-florus* (-flowered). This species is given the epithet *multiflora* because it has the largest number of consecutive nodes bearing flowers so far recorded in the genus, and often has numerous flowers on each peduncle.

Conservation status. Priority One under Conservation Codes for Western Australian Flora. Listed with this status by Smith and Jones (2018) under the name *S. sp.* Kojarena (A.M. Ashby 1904).

Affinities. Of the currently named species, *S. calcicola* and *S. corrugata* are perhaps the closest in their morphology, but *S. multiflora* differs from both in having widely spreading, depressed-obovate leaves with oil glands in 3 or more main rows on each side of midvein, more numerous peduncles on the flowering branchlets and a 2-locular ovary. Its fruit also appears to differ in being wider than broad and less glandular, but this requires confirmation with better fruiting material. All three species have sepals that are usually strongly incurved in flower as well as in fruit.

Notes. A single, atypical specimen (*E. Wittwer* 813: PERTH) from the Winchester area (see Figure 3A) is currently determined as *S. aff. multiflora*. This specimen might prove to be sufficiently distinctive to be treated as a subspecies of *S. multiflora* or a separate species but is too poorly known to assess its taxonomic status. The Winchester collection differs in having shorter peduncles (2.0–2.5 mm *cf.* 5–7 mm long) with only 1–3 flowers (*cf.* up to 15 flowers), but as it is in bud with only a few flowers opened, the possibility that some peduncles produce more than three flowers in more mature inflorescences cannot be completely ruled out. Flower colour is recorded as pink, but that may be because the inflorescences are still in bud. *E. Wittwer* 813 also differs in having smaller leaves, commonly only three stamens per flower and larger petals (*c.* 1.7 mm long *cf.* 1.4–1.6 mm long). More material is needed to determine whether these differences are sufficiently reliable to warrant formal recognition of more than one entity.

Scholtzia oleosa* Rye, *sp. nov.

Typus: north of Northampton, Western Australia [precise locality withheld for conservation reasons], 23 September 2002, *M.E. Trudgen* MET 21676 (*holo:* PERTH 06361005; *iso:* CANB, K, MEL, NSW).

Scholtzia sp. Eurardy (J.S. Beard 6886), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au> [accessed 2 March 2018].

Shrub 0.4–3 m high, 0.5–4 m wide; flowering branchlets with peduncles borne at 1–4 consecutive nodes, in umbel-like or other kinds of arrangements. *Leaves* widely antrorse or patent. *Petioles* 0.3–0.6 mm long. *Leafblades* obovate to depressed obovate (usually broadly or very broadly obovate), 0.5–2.5 long, 1.2–1.7 mm wide, often 0.5–0.7 mm thick at first, entire; abaxial surface commonly raised and rounded over the full surface, but sometimes distinctly thinner on each side of the midvein, which is often grooved in the basal half but may be ridged close to the apex, with lateral veins obscure, the oil glands densely covering the surface rather than in rows. *Peduncles* 4–14.5 mm long, 0.5–0.8 mm wide, usually 3–14-flowered; secondary axes up to 1.5 mm long. *Basal bracts* 1.5–1.8 mm long. *Pedicels* 0.3–0.8 mm long. *Flowers* 4.5–5.5 mm diam. *Hypanthium* 1.1–1.3 mm long, rugose-pitted (the numerous pits each corresponding to a sunken gland). *Sepals* ovate to oblong or semicircular, commonly broadly ovate, (0.5–)0.8–1.3 mm long, thickened or ribbed and reddish at base; petaline margin 0.4–0.8 mm deep, entire. *Petals* 1.6–2.3 mm long, pale to medium pink. *Stamens* 7–10, with 0–3 opposite each sepal. *Longest filaments* *c.* 0.2 mm long. *Anthers* 0.35–0.4 mm long. *Ovary* inferior, 2- or 3-locular; ovules 1 per loculus. *Style* 0.6–0.8 mm long; stigma capitate. *Fruits* 1/2–2/3 inferior, 1.5–1.6 mm long, 1.5–1.6 mm wide; sepals erect; petals deciduous or persistent. *Seeds* 1.0–1.4 mm long, *c.* 0.55 mm wide.

Diagnostic features. Among species that have 1 ovule per loculus, *S. oleosa* is distinguished by the following combination of characters: leaves densely glandular; hypanthium pitted, \pm as wide as long; stigma capitate.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 21 Oct. 1973, *J.S. Beard* 6886 (PERTH, AD, CANB); 3 Dec. 2004, *A. Crawford* ADC 809 (PERTH); 13 Sep. 2001, *R. Davis* 10044 (PERTH); 2 Oct. 1998, *N. Gibson* 4143 (PERTH); 26 Oct. 2006, *S. Robinson* SR 29 (PERTH); 25 Sep. 2002, *M.E. Trudgen* MET 21713 (PERTH); 29 Aug. 2003, *Wildflower Society of WA* EURA 39 (AD, BRI, PERTH); 3 Oct. 2003, *Wildflower Society of WA* EURA 38 (PERTH).

Distribution and habitat. Extends from Coburn Station south to near Binnu (Figure 5B), in yellowish to reddish sandy soils.

Phenology. Flowers from August to October. Fruits recorded from October and December.

Etymology. From the Latin *oleum* (oil) and *-osus* (abounding in), referring to the numerous oil glands on the leaves and hypanthium.

Conservation status. Listed by Smith and Jones (2018) as Priority Two under the name *S. sp.* Eurardy (*J.S. Beard* 6886). This species has many more collections than when it was previously assessed for conservation status so should probably be reduced in priority.

Co-occurring species. *Scholtzia oleosa* (*M.E. Trudgen* MET 22151) has been recorded growing with a member of the *S. obovata* complex (*M.E. Trudgen* MET 22153), with both species adjacent to a patch of vegetation where *S. tenuissima* (*M.E. Trudgen* MET 22154) occurred.

Affinities. This species belongs to the *S. capitata* complex, in which there are crowded oil glands on the leaves and also on the hypanthium, where the glands are sunken into pits. *Scholtzia oleosa* differs from *S. capitata* in its less elongated hypanthium, usually shorter leaves, and usually shorter (4–14.5 mm *cf.* 8–18 mm) and fewer-flowered peduncles (3–14-flowered *cf.* usually 9–23-flowered). It also differs in having the ovary commonly 3-locular (*cf.* consistently 2-locular). As the two taxa overlap in range and flowering time, they may well have the opportunity to hybridise, which could account for one or two specimens that are difficult to identify.

Notes. Specimens from north of Eurardy (e.g. *F. Lullfitz* L 3197) have a consistently 2-locular ovary and tend to have small sepals whereas most specimens from Eurardy southwards have a 3-locular ovary.

Scholtzia peltigera* Rye, *sp. nov.

Typus: Eurardy Station, Western Australia [precise locality withheld for conservation reasons], 1 November 2016, *B. Parkhurst* BP 1 (*holo:* PERTH 08986533; *iso:* CANB, K, MEL, NSW).

Scholtzia sp. Bungabandi (*M. Quicke* EURA 48), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub 0.5–2.0 m high, width not recorded, single-stemmed at base; flowering branchlets with peduncles borne at 1–5 consecutive nodes, sometimes with their flowers combined into a dense cluster. *Leaves*

widely antrorse to patent, sessile, with a broad, stem-clasping base. *Leaves* broadly to depressed ovate in outline, 1.3–1.8 mm long, 1.5–2.5 mm wide, 0.5–1.1 mm thick, with a clear-translucent margin up to 0.15 mm deep or rarely slightly deeper, entire; abaxial surface raised throughout, rounded, with lateral veins obscure, the oil glands in 3 or more rows on each side of midvein, usually with 3–5 large glands in innermost rows. *Peduncles* 2–8 mm long, 0.3–0.5 mm wide, mostly 3–12-flowered; secondary axes up to 0.4 mm long. *Basal bracts* caducous or deciduous, 1.2–1.5 mm long. *Pedicels* 0.2–0.7 mm long. *Flowers* 4.0–5.5 mm diam. *Hypanthium* 0.8–1.3 mm long, with prominent glands, becoming smooth in fruit. *Sepals* entire; outer ones almost triangular to depressed ovate, short, slightly ridged at base, with a scarious margin; inner ones mostly broadly ovate, 1.0–1.3 mm long, largely or fully scarious but with base tending to be glandular and reddish. *Petals* 1.7–2.0 mm long, white or pale pink. *Stamens* 7–10, with 1–3 opposite each sepal. *Longest filaments* 0.5–0.6 mm long. *Anthers* 0.25–0.3 mm long. *Ovary* inferior, 2-locular; ovules 2 per loculus. *Style* 0.5–0.7 mm long; stigma capitate. *Fruits* c. 1/2 inferior, 1.6–1.7 mm long, c. 1.4 mm wide; sepals spreading or recurved; petals persistent. *Seeds* c. 1.3 mm long, 0.5–0.6 mm wide.

Diagnostic features. Unique in having stem-clasping, sessile leaves. Other important characters: leaves broader than long; peduncles 2–8 mm long, mostly 3–12-flowered; ovary 2-locular, with 2 ovules per loculus.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 24 Nov. 2004, M. Quicke EURA 48 (BRI, NSW, PERTH); 8 Sep. 2016, B.L. Rye, J. Norman & B. Parkhurst BLR 290166 (PERTH); 23 Aug. 2015 *Wildflower Society of WA* CREEK NORTH 2/22 (PERTH).

Distribution and habitat. Known only from Eurardy Station (Figure 3B), mostly collected from a site on yellow sand, in a slight hollow well above a usually dry creek, in low open *Eucalyptus* woodland over *Acacia-Scholtzia* tall shrubs.

Phenology. Flowers recorded from September to November, and mature fruits in late November.

Etymology. From the Latin *pelta* (small, crescent-shaped shield) and *-ger* (bearing), referring to the presence of sessile, somewhat stem-clasping, leaves along the stems. Each leaf has three surfaces, the broad base that shallowly clasps the stem and is attached near its centre to the stem, the broadly crescent-shaped abaxial surface, and the smaller, incurved adaxial surface.

Vernacular name. Eurardy Scholtzia.

Conservation status. Priority One under Conservation Codes for Western Australian Flora. Listed with this priority by Smith and Jones (2018) under the name *S. sp.* Bungabandi (M. Quicke EURA 48), *S. peltigera* has a very restricted distribution.

Co-occurring species. There is one record (B.L. Rye, J. Norman & B. Parkhurst BLR 290166) of *S. peltigera* growing intermixed with *S. truncata* (B.L. Rye, J. Norman & B. Parkhurst BLR 290165), but only the latter was in flower.

Affinities. *Scholtzia peltigera* is readily distinguished from all other members of the genus by its sessile, stem-clasping leaves, and it is not clear from its morphology which of the other species is likely to be its closest relative.

Notes. Although narrow translucent margins are found on the leaves of a number of *Scholtzia* species, they tend to be more noticeable in *S. peltigera*, perhaps due to the contrast with the remainder of its very short, thick leaves.

Scholtzia pentamera Rye, *sp. nov.*

Typus: 7 km N along Yerina Springs Road from Port Gregory Road, Western Australia, 15 August 1996, E. Holland & K. Kershaw EH 1539 (*holo:* PERTH 04506111; *iso:* K, MEL, NSW).

Shrub 0.6–2.5(–3) m high, commonly 1–2.5 m wide; flowering branchlets mostly with peduncles borne at 8–23 consecutive nodes. *Leaves* widely antrorse to patent. *Petioles* 0.1–0.7 mm long. *Leaf blades* orbicular-cordate, 2.5–5 mm long, 3–6 mm wide, with a translucent margin less than 0.1 mm deep, entire; abaxial surface level except for a narrow raised midvein, usually with 4–6 lateral veins clearly visible on each side of midvein, the oil glands in 4 or more rows on each side of midvein, mostly with 5–7 glands in innermost rows. *Peduncles* 4–13 mm long, 0.4–0.6 mm wide, mostly 3–15-flowered; secondary axes up to 1.5 mm long. *Bracts* 1.3–3 mm long, deciduous. *Pedicels* 0–1.2 mm long. *Flowers* 3.5–5.0 mm diam. *Hypanthium* 1.5–2.0 mm long, wrinkled-ribbed or fairly smooth. *Sepals* usually broadly ovate to depressed elliptic, 0.5–0.9 mm long, almost fully scarious but outer ones often narrowly ridged or with a somewhat ridged green base; petaline margin 0.5–0.8 mm deep, entire. *Petals* 1.3–2 mm long, white or pink, deciduous in fruit. *Stamens* 5, with 1 opposite each sepal. *Longest filaments* 0.25–0.4 mm long. *Anthers* 0.25–0.35 mm long. *Ovary* inferior, 1- or 2-locular; ovules 2 per loculus. *Style* 0.3–0.4 mm long; stigma capitate. *Fruits* inferior, 1.5–1.8 mm long, *c.* 0.8 mm wide; sepals erect; petals deciduous. *Seeds* *c.* 1.2 mm long, *c.* 0.65 mm wide.

Diagnostic features. Differs from *S. bellairsiorum* and *S. uberiflora* in having smaller flowers, including a shorter style, and only five stamens.

Distribution and habitat. Extends from Ajana south to and near Greenough (Figure 5A).

Phenology. Flowers from July to November.

Etymology. From the Greek *penta-* (five-) and *-merus* (refers to parts or their numbers) as the constant stamen number of five per flower in this species matches the number of sepals and petals.

Vernacular name. Constant Scholtzia. This is the only species of *Scholtzia* known to have a constant stamen number, rather than having the number vary between flowers.

Affinities. Very similar to *S. uberiflora* overall, for example in having leaves often with multiple spreading veins visible, and both taxa are unusual in having long peduncles borne at many consecutive nodes along the stems, as other species with long peduncles (sometimes exceeding 10 mm) have them at a maximum of 6 nodes and mostly at 1–4 nodes. *Scholtzia uberiflora* differs in having smaller bracts but usually larger flowers, 6–10 stamens per flower, with 1–3 opposite each sepal, a style 0.45–0.8 mm long, and in always having a 2-locular ovary.

Notes. Two allopatric subspecies are recognised; these could be treated as separate species but are certainly more similar to one another than either is to *S. uberiflora*.

a. *Scholtzia pentamera* subsp. *collina* Rye, *subsp. nov.*

Typus: Howatharra, Western Australia [precise locality withheld for conservation reasons], 13 September 1977, A.S. George 14878 (*holo*: PERTH 04062647; *iso*: CANB, K).

Bracts 2–3 mm long. *Ovary* markedly expanded distally, 2-locular.

Diagnostic features. Distinguished from the other subspecies by its longer bracts and 2-locular ovary.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 3 July 1966, A.C. Burns 8 (PERTH); 3 July 1966, A.C. Burns 9 (PERTH); 26 Aug. 1983, R.J. Cranfield 2971 (PERTH).

Distribution and habitat. Occurs in Moresby Range (Figure 5A), the habitat recorded as ‘gravelly soil’ or ‘lateritic soil’.

Etymology. From the Latin *collinus* (pertaining to low hills), as this subspecies is restricted to a range of hills.

Conservation status. To be listed as Priority Two under Conservation Codes for Western Australian Flora (M. Smith, pers. comm.). Probably restricted to a small area within a nature reserve.

Notes. Subsp. *collina* is like the related species *S. uberiflora* in its ovary shape and loculus number, but is otherwise much more like *S. pentamera* subsp. *pentamera*. All three taxa differ in bract size.

b. *Scholtzia pentamera* Rye subsp. *pentamera*

Scholtzia sp. Northampton (A. Strid 20714), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Bracts 1.3–1.8 mm long. *Ovary* tubular, 1-locular.

Selected specimens examined. WESTERN AUSTRALIA: S of Ogilvie, 3 Sep. 1947, N.T. Burbidge 2158 (PERTH); Bishops Gully Rd, 4.3 km from Port Gregory Rd, 8 July 1997, R. Davis 3624 (PERTH); private property, Rob Rd, slope above Yarda Gully Creek, W of homestead, 30 May 2008, A. Guinness AG 3022 (PERTH); W side of Ogilvie Rd W, close to Hutt River crossing, W of Binnu, 25 July 2008, M. Hislop 3783 (PERTH); 7 km N along Yerina Springs Rd from Port Gregory Rd, 15 Aug. 1996, E. Holland 1539 & K. Kershaw (MEL, NSW, PERTH); North West Coastal Hwy, 8 km S of junction with Ogilvie East Rd and 9.5 km S of crossing of the Hutt River, 11 Sep. 1999, J.W. Horn 2400 (AD, PERTH); on dunes near Flat Rocks, SE of Greenough, 4 Oct. 1972, S. Paust 1222 (PERTH); 9.5 km N of Northampton along North West Coastal Hwy, 7 Oct. 1982, A. Strid 20714 (PERTH).

Diagnostic features. Distinguished from the other subspecies in having a 1-locular, tubular ovary.

Distribution and habitat. Mostly collected between Ajana and Northampton, but with one outlying specimen from Flat Rocks Beach, near Greenough (Figure 5A), in varied habitats including yellow sand, the outlier recorded from sand dunes.

Conservation status. Not listed by Smith and Jones (2018) but does not appear to be known from any nature reserves so may need to be surveyed.

Notes. The uni-locular ovary is a rarity in *Scholtzia*, otherwise being known only in *S. uniovulata*, *Scholtzia pentamera* subsp. *pentamera* is unique in having a tubular ovary.

***Scholtzia prostrata* Rye, sp. nov.**

Typus: Burma Rd, Western Australia [precise locality withheld for conservation reasons], 13 October 1969, A.C. Burns 138 (*holo:* PERTH 06165192; *iso:* CANB, MEL).

Scholtzia sp. Burma Road (A.C. Burns 138), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Prostrate *shrub* c. 0.1 m high, commonly 0.3–1.0 m wide, at least sometimes with multiple, close branches arising at ground level from a woody base; flowering branchlets with peduncles borne at up to 35 consecutive nodes, usually in a one-sided raceme-like arrangement. *Leaves* antrorse to patent. *Petioles* 0.3–0.5 mm long. *Leafblades* narrowly obovate to elliptic, 2.5–4.5 mm long, 0.8–2 mm wide, with a midrib commonly 0.3–0.5 mm thick but remainder thin, ciliolate or ciliate-laciniate, the longest cilia 0.2–0.3 mm long; abaxial surface raised along central part, often with a groove along midvein, with lateral veins obscure, the oil glands inconspicuous or in usually 2 or 3 main rows on each side of midvein, with 3–6 glands in main rows. *Peduncles* 1.5–3 mm long, 0.25–0.4 mm wide, 1-flowered. *Bracteoles* 1.1–1.5 mm long, deciduous or persistent. *Pedicels* 0.2–0.7 mm long. *Flowers* 5–8 mm diam. *Hypanthium* 0.8–1.0 mm long, finely rugose. *Sepals* broadly ovate to almost semicircular, usually very broadly ovate, 0.7–1.2 mm long, the herbaceous base ridged; petaline margin 0.6–0.8 mm deep, denticulate-ciliolate or dentate. *Petals* 2.5–3.5 mm long, white or pale pink. *Stamens* 11–17, in a continuous circle. *Longestfilaments* 1.5–2.0 mm long. *Anthers* 0.3–0.35 mm long. *Ovary* c. 1/2 inferior, 2-locular; ovules 2 per loculus. *Style* 1.5–2.3 mm long; stigma capitate. *Fruits* c. 1/2 inferior, probably 1.5–1.8 mm long, not seen at maturity; sepals erect; petals persistent.

Diagnostic features. Among the species that have 2 ovules per loculus and mostly to consistently 1-flowered peduncles, *S. prostrata* is distinguished by the following combination of characters: peduncles 1.5–3 mm long; hypanthium not ribbed; sepals ridged at base; stamens 11–17, in a continuous circle; style 1.5–2.3 mm long.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 21 Oct. 1963, A.C. Burns 3 (NSW, PERTH); 3 Oct. 2007, A. Crawford ADC 1392 (PERTH); 23 Oct. 1998, G.J. Keighery & N. Gibson 3011 (PERTH); 22 Mar. 2001, S.J. Patrick 3780 & A. Chant (PERTH); 24 Oct. 2001, S.J. Patrick 4077 (PERTH).

Distribution and habitat. Occurs between Ambania and Strawberry, east of Walkaway (Figure 2A), in sand, often over laterite, in heath, often with emergent banksias or mallees.

Phenology. Flowers from October to December.

Conservation status. Recently listed as Priority Three under Conservation Codes for Western Australian Flora. The species is known from at least one nature reserve.

Etymology. From the Latin *prostratus* (prostrate, lying flat along the ground), in reference to the habit of this species. Several apparently closely related species also tend to be prostrate but the habit is possibly most extreme in *S. prostrata*, with the species reported to be largely hidden (*S. Patrick* 4097) by other heath species.

Vernacular name. Creeping Scholtzia.

Co-occurring species. A possible hybrid (*S. Patrick* 4079 PERTH 08989702) was collected together with *S. prostrata* (*S. Patrick* 4079, PERTH 05947561). The putative hybrid is similar to *S. prostrata* but shows two significant differences, as it has up to three flowers per peduncle and fewer stamens arranged in antisepalous groups. These differences would be consistent with the other parent species being either *S. ciliata* or *S. obovata*, both of which are common in the general area and may well co-occur with *S. prostrata*.

Affinities. This is the northernmost member of the *S. chapmanii* complex and has the fewest stamens on average. *Scholtzia prostrata* is most similar to *S. chapmanii* but differs in that its usually shorter hypanthium lacks the antisepalous ribs that are usually obvious in *S. chapmanii*. Also, its leaves tend to be broader and more spreading, and its sepals tend to be less prominently ridged at the base.

Notes. Possibly this taxon should be treated as a subspecies of *S. chapmanii*, but since there are multiple minor differences between them it seems better to treat them as distinct species. The two taxa appear to be geographically separated by a distance of at least 50 km.

As in *S. chapmanii*, there is just one specimen of *S. prostrata* showing that the base of the plant may have multiple stems arising from it at about ground level. In this case, two plants mounted on *A.C. Burns* 138, are complete except for their roots. There are no specimens with mature fertile fruits.

Scholtzia quindecim* Rye, *sp. nov.

Typus: north of Watheroo, Western Australia [precise locality withheld for conservation reasons], 5 October 1984, *J.D. Briggs* 1721 (*holo:* PERTH 03628191; *iso:* AD, CANB).

Scholtzia sp. Gunyidi (*J.D. Briggs* 1721), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p.402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Prostrate *shrub* usually 0.05–0.15 m high, 0.6–2.5 m wide; flowering branchlets mostly with peduncles borne at 4–17 consecutive nodes, usually in a one-sided raceme-like arrangement. *Leaves* antrorse to patent. *Petioles* 0.3–0.5 mm long. *Leafblades* narrowly obovate to narrowly oblong, 3.5–5 mm long, 0.5–1.1 mm wide, up to 0.5 mm thick, entire or denticulate-ciliolate; abaxial surface raised along the midvein, the raised part rounded, with lateral veins obscure, the oil glands usually in 2 rows on each side of midvein, with 4–8 glands in innermost rows but not obvious. *Peduncles* 3–7 mm long, 0.25–0.5 mm wide, nearly always 1-flowered. *Bracteoles* 1.1–2.2 mm long, deciduous or persistent. *Pedicels* 0.4–0.8 mm long. *Flowers* 6–8 mm diam. *Hypanthium* 0.9–1.1 mm long, finely rugose. *Sepals* broadly ovate to almost semicircular, usually very broadly ovate, 1.1–1.9 mm long, the herbaceous base thickened or ridged; petaline margin 0.7–1.2 mm deep, entire. *Petals* 3–4 mm long, white or pale pink. *Stamens* 13–18, in a continuous circle. *Longest filaments* usually 2–2.5 mm long. *Anthers*

0.4–0.5 mm long. *Ovary* c. 1/2 inferior, 2-locular; ovules 2 per loculus. *Style* 2.5–3.4 mm long; stigma \pm capitate. *Fruits* c. 1/2 inferior, only sterile ones seen; sepals erect; petals probably persistent.

Diagnostic features. Among the species with two ovules per loculus and mostly to consistently 1-flowered peduncles, *S. quindecim* is distinguished by having peduncles 3–7 mm long, an unribbed hypanthium and a style 2.5–3.4 mm long.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 27 Oct. 1992, *E.A. Griffin* 7716 (PERTH); Reserve 21788, 20 Nov. 1992, *S.J. Patrick* 1450 (PERTH); 9 Nov. 1961, *Mrs Strickland s.n.* (PERTH).

Distribution and habitat. Occurs from Gunyidi to Dalwallinu (Figure 2A), in yellow or grey sand, recorded in sites with low woodlands or mallees.

Phenology. Flowers from September to November.

Etymology. From the Latin *quindecim* (fifteen), referring to the number of stamens, since this species has an average of about 15 stamens per flower.

Vernacular name. Gunyidi Scholtzia.

Conservation status. Priority Two under Conservation Codes for Western Australian Flora. Listed with this priority by Smith and Jones (2018) under the name *S. sp. Gunyidi* (J.D. Briggs 1721).

Affinities. This is the most inland member of the *S. chapmanii* complex and the only one with more or less entire leaves. It has the longest peduncles within the complex. It may also have longer styles than the other species, as measurements of 2.8 and 3.4 mm have been recorded for styles on the single fruiting specimen. No other reliable measurements of mature styles could be made, but specimens in the early stages of flowering have shorter styles to c. 2.5 mm long.

Notes. A single 2-flowered peduncle has been observed, indicating that the peduncles are not always 1-flowered. Material with mature fertile fruits is needed.

Scholtzia recurva Rye, *sp. nov.*

Typus: south of Overlander Roadhouse, Western Australia [precise locality withheld for conservation reasons], 26 September 2002, *M.E. Trudgen* 21720 (*holo:* PERTH 08986525; *iso:* CANB, K, MEL).

Scholtzia sp. Overlander (M.E. Trudgen 12138), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 20 July 2018].

Shrub 1–2 m high, 1.5–3.0 m wide, rather spindly; flowering branchlets commonly with peduncles borne at 1–4 consecutive nodes in a raceme-like arrangement. *Leaves* antrorse. *Petioles* 0.1–0.35 mm long. *Leafblades* broadly obovate, 1.3–1.7 mm long, 1.1–1.5 mm wide, with a clear-translucent margin less than 0.1 mm deep, denticulate/ciliolate, the apex recurved and with a point up to 0.15 mm long; abaxial surface gradually raised towards centre, sometimes grooved along midvein, with lateral veins obscure, the oil glands in 1 or 2 main rows on each side of midvein, with 3–5 glands in innermost rows.

Peduncles 4–6.5 mm long, 0.3–0.35 mm wide, mostly 6–9-flowered; secondary axes up to 1.3 mm long. *Bracts* 1.3–1.5 mm long, deciduous. *Pedicels* 0–0.5 mm long. *Flowers* c. 4 mm diam. *Hypanthium* 1.5–2 mm long, dotted with oil glands but otherwise rather smooth. *Sepals* ± deltate to very broadly ovate, 0.35–0.45 mm long, the outer ones with a green ridge; petaline margin c. 0.15 mm deep, entire. *Petals* 1.5–1.7 mm long, white or pale pink. *Stamens* commonly 10, with 1–3 opposite each sepal. *Longest filaments* c. 0.35 mm long. *Anthers* c. 0.3 mm long. *Ovary* inferior, 2-locular; ovules 2 per loculus. *Style* c. 0.5 mm long; stigma capitate. *Fruits* c. 3/4 inferior, sterile ones 1.6–1.75 mm long, 1.3–1.4 mm wide; sepals erect or incurved; petal persistence unknown. *Seeds* probably c. 1.2 mm long.

Diagnostic features. Among the species that have a 2-locular ovary with 2 ovules per loculus, *S. recurva* is distinguished by the following combination of characters: petioles mostly 0.1–0.3 mm long; leaf blades 1.3–1.7 mm long, longer than wide, with apex recurved and shortly pointed; peduncles 4–6.5 mm long, mostly 6–9-flowered; hypanthium smooth apart from its glands.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 22 Oct. 1994, *M.E. Trudgen* 12138 (NSW, PERTH); 26 Sep. 2002, *M.E. Trudgen* 21721 (PERTH).

Distribution and habitat. Occurs in the Meadow Station area (Figure 6A), in red or orange-brown soil on the slopes of dunes or in the swale, with *Acacia* high open shrubland.

Phenology. Flowers recorded in late October. A few old fruits were present on the specimens collected in late September.

Etymology. From the Latin *recurvus* (curved backwards), referring to the recurved apex of the leaves, which is of importance in distinguishing this species.

Conservation status. Recently listed as Priority One under Conservation Codes for Western Australian Flora. Known from three collections that were possibly all made from a single population.

Affinities. Closest in morphology to *S. thinicola* Rye but differing in having leaves with a recurved and shortly pointed apex. *Scholtzia recurva* also has shorter sepals with a narrower petaline margin, and tends to have longer peduncles but shorter pedicels. The two species occupy a similar habitat but with *S. recurva* occurring more than 100 km north of the range of *S. thinicola*.

Notes. *Scholtzia recurva* appears to have the smallest leaves of all the species with two ovules per loculus. The description of its flowers is based entirely on one specimen. Further collections of both flowering and fruiting material are needed. All fruits dissected were sterile, although one had a cavity that appeared to have contained an incompletely formed seed c. 1.2 mm long.

Scholtzia subsessilis Rye, *sp. nov.*

Typus: South-west of Morawa, Western Australia [precise locality withheld for conservation reasons], 15 September 1985, *B.J. Conn* 2159 (*holo:* PERTH 03414515; *iso:* B, CHR, MEL, MO, NSW all *n.v.*).

Scholtzia sp. Billeranga Hills (B.J. Conn 2159), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

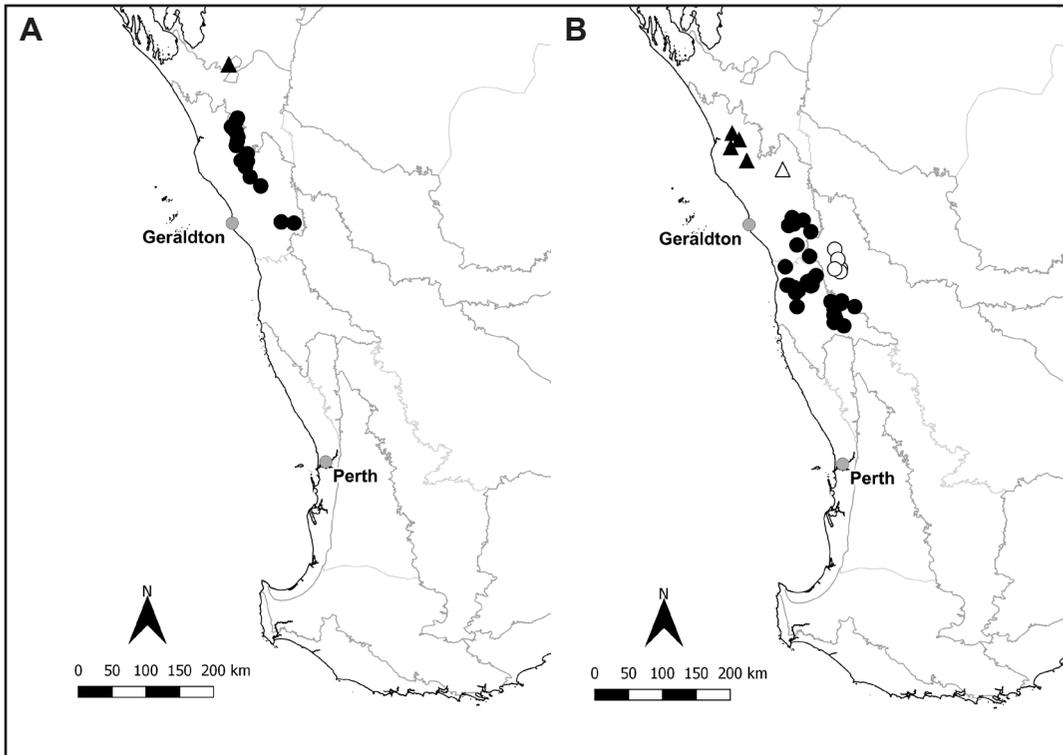


Figure 6. Distribution of *Scholtzia* species. A – *S. recurva* (▲) and *S. truncata* (●); B – *S. subsessilis* (○), *S. tenuissima* (▲), *S. trilocularis* (●) and *S. sp. Whelarra* (△).

Shrub 0.8–2.5 m high, erect, with one record of 1.5 m wide; flowering branchlets with peduncles borne at 1–5 consecutive nodes, often with the flowers combined into a dense cluster. *Leaves* antrorse or widely antrorse. *Petioles* absent or not exceeding 0.25 mm long. *Leaf blades* mostly broadly elliptic or broadly obovate, 1.5–2.3 mm long, 1.7–2.2 mm wide; abaxial surface often raised and grooved in basal 1/2–2/3 and ridged along midvein above, or ridged for full length, with lateral veins obscure, the oil glands in 2 or 3 main rows on each side of midvein, with 3–5 glands in innermost rows. *Peduncles* 2.5–5.5 mm long, 0.4–0.6 mm wide, 3–6-flowered; secondary axes absent or up to 0.3 mm long. *Bracts* 0.8–1.4 mm long, caducous or deciduous. *Pedicels* 0.2–0.8 mm long. *Flowers* 5–6 mm diam. *Hypanthium* 1.1–1.5 mm long, rugose-pitted. *Sepals* broadly to depressed ovate, 0.5–0.6 mm long, the outer sepals ridged and dark reddish at base; petaline margin *c.* 0.3 mm deep, entire. *Petals* 2.3–2.6 mm long, white or pink. *Stamens* usually 8–10, with 1–3 opposite each sepal. *Longest filaments* 0.7–0.8 mm long. *Anthers* *c.* 0.3 mm long. *Ovary* inferior, 3-locular; ovules 1 per locus. *Style* 1–1.2 mm long; stigma tending to be peltate. *Fruits* largely inferior, not seen at maturity; sepals incurved; petals deciduous.

Diagnostic features. Among species that have a 3-locular ovary with 1 ovule per locus, *S. subsessilis* is distinguished by having sessile or subsessile leaves. Other important characters: peduncles 2.5–5.5 mm long, 3–6-flowered; hypanthium pitted-rugose; stamens usually 8–10, with 1–3 opposite each sepal.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 12 Sep. 1996, A. Carr 368 (PERTH); 25 Sep. 1990, R.J. Cranfield 7847 & P.J. Spencer (CANB, PERTH); 19 Aug. 1997, F. Keast M6A 067 (PERTH).

Distribution and habitat. Occurs in the Billeranga Hills area, west of Morawa (Figure 6B), in sandy soils.

Phenology. Flowers from August to December. Fruits recorded from September to December.

Etymology. From the Latin *sub-* (somewhat, less than) and *sessilis* (sessile, unstalked), as the leaves are almost sessile.

Vernacular name. Billeranga Scholtzia.

Conservation status. Recently listed as Priority One under Conservation Codes for Western Australian Flora. *Scholtzia subsessilis* does not appear to have been collected from any nature reserves.

Affinities. The affinities of *S. subsessilis* are unclear, but it shows some similarities to *S. halophila*, which has longer petioles and peduncles.

Notes. Good fruiting material is needed for this species.

Scholtzia tenuissima* Rye, *sp. nov.

Typus: Kalbarri National Park, Western Australia [precise locality withheld for conservation reasons], 30 November 2003, *M.E. Trudgen* MET 22155 (*holo:* PERTH 08238162; *iso:* CANB, K, MEL).

Scholtzia sp. Z-Bend (Bellairs-Kalflora 912a), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub spindly, 0.4–1.0 m high, 0.3–1.0 m wide; flowering branchlets with peduncles borne at 1–4 (–7) consecutive nodes, in a very open raceme-like arrangement or with flowers more clustered. *Leaves* appressed or antrorse. *Petioles* 0.1–0.3 mm long. *Leaf blades* narrowly obovate or obovate, 1.4–2.7 mm long, 0.6–1 mm wide, 0.3–0.5 mm thick; abaxial surface highly raised throughout, rounded or flattened, with lateral veins obscure, the oil glands in 2 or 3 main rows on each side of midvein, with 4–6 glands in innermost rows. *Peduncles* 5.5–13 mm long, 0.15–0.25 mm wide, 1–3-flowered; secondary axes up to 2.5 mm long. *Bracts* 0.8–1.3 mm long, deciduous. *Pedicels* 0–0.5 mm long. *Flowers* 4–5.5 mm diam. *Hypanthium* 1.2–1.4 mm long, rugose. *Sepals* mostly ± broadly ovate, 1.0–1.4 mm long, scarious throughout, not ridged, tending to be recurved, entire. *Petals* 1.5–2.5 mm long, white. *Stamens* 12 or 13, with 1–3 opposite each sepal. *Longest filaments* 0.8–1.2 mm long. *Anthers* c. 0.35 mm long. *Ovary* inferior, 2-locular; ovules 2 per loculus. *Style* 0.8–1.0 mm long; stigma capitate. *Fruits* c. 1/2 inferior, 1.8–2.2 mm long, 1.3–1.4 mm wide; sepals reflexed; petals persistent. *Seeds* 1.3–1.4 mm long, 0.6–0.7 mm wide.

Diagnostic features. Among the species that have a 2-locular ovary with 2 ovules per loculus, *S. tenuissima* is distinguished by the following combination of characters: petioles 0.1–0.3 mm long; peduncles extremely slender (0.15–0.25 mm wide), 1–3-flowered, 5.5–13.0 mm long, with secondary axes up to 2.5 mm long; hypanthium rugose; sepals entirely scarious, reflexed in fruit.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 17 Nov. 1986, *Bellairs-Kalflora* 912A (PERTH); 6 Nov. 1995, *D. & B. Bellairs* 3008 (PERTH); 16 Sep. 1999, *D. & B. Bellairs* 6041 (PERTH).

Distribution and habitat. Occurs in Kalbarri National Park (Figure 6B), in sandy soil, sometimes over sandstone or laterite, one record from a winter-wet flat, where *S. tenuissima* formed a low shrubland over *Lepidobolus* open sedgeland.

Phenology. Flowers from September to December. Mature fruits recorded in November

Etymology. From the Latin *tenuis* (thin) and *-issimus* (very), i.e. the thinnest or most delicate, in reference to the peduncles, which are long (up to 13 mm) but extremely slender (0.15–0.25 mm wide).

Vernacular name. Delicate Scholtzia.

Conservation status Priority Two under Conservation Codes for Western Australian Flora. Listed with this priority Smith and Jones (2018) under the name *S. sp.* Z-Bend (*Bellairs-Kalflora* 912a). Known from an area c. 30 km long within a large national park.

Co-occurring species. *Scholtzia tenuissima* (M.E. Trudgen MET 22154) has been recorded adjacent to, and downhill from, an area where *S. oleosa* (M.E. Trudgen MET 22151) and a member of the *S. obovata* complex (M.E. Trudgen MET 22153) co-occurred.

Affinities. Very similar to *S. sp.* Whelarra (M.E. Trudgen 12018), both taxa having a somewhat spindly appearance and very slender peduncles. *Scholtzia sp.* Whelarra is very poorly known but occurs to the south-east (Figure 6B) and has broader, smoother, less thickened leaves, somewhat wider peduncles, much shorter secondary axes, and possibly fewer stamens. Good flowering material is needed to determine stamen numbers and other flowering characters for *S. sp.* Whelarra, but the differences in its leaves indicate that it should probably be treated as a distinct species rather than as a subspecies of *S. tenuissima*.

Notes. The sepals are about 2/3 the length of the petals. Only *S. denticulata* sometimes has a greater sepal/petal length ratio.

Scholtzia thinicola* Rye, *sp. nov.

Typus: Binu East Road, Western Australia [precise locality withheld for conservation reasons], 5 December 1993, M.E. & M.R. Trudgen MET 12013 (*holo:* PERTH 03979318; *iso:* AD, BRI, CANB, K, NSW, MEL).

Scholtzia sp. Binu East Road (M.E. Trudgen 12013), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 401 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Scholtzia sp. Valentine Road (S. Patrick 2142), G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub commonly 1.0–1.5 m high, with one record of 2 m wide; flowering branchlets with peduncles borne at 1–3 consecutive nodes with the flowers combined into a dense cluster. *Leaves* mostly widely antrorse. *Petioles* 0.1–0.3 mm long. *Leaf blades* obovate to almost circular in outline, 1.4–3.7 mm long, 1.0–1.6 mm wide, 0.35–0.6 mm thick, sometimes with a minute subterminal point at first, entire; abaxial surface somewhat angled, with the central part flattened and with sloping sides, with lateral veins obscure, the oil glands usually in 2 or 3 main rows on each side of midvein but inconspicuous. *Peduncles* 0.7–4 mm long, 0.5–0.7 mm wide, mostly 3–9-flowered; secondary axes scarcely developed or up to 0.6 long. *Bracts* 0.7–1.4 mm long, deciduous or persistent. *Pedicels* 0.3–2.0 mm long. *Flowers* c. 4 mm diam. *Hypanthium* 0.8–1.2 mm long, rugose. *Sepals* transversely oblong to depressed ovate, mostly broadly ovate, 0.7–1.2 mm long, the herbaceous base ridged; petaline margin 0.4–0.6 mm deep, entire. *Petals* 1.5–2.3 mm long, white or pale pink. *Stamens* 10–12, with 1–3 opposite each sepal. *Longest filaments* 0.25–0.4 mm long. *Anthers* 0.4–0.5 mm long. *Ovary* inferior, 2-locular; ovules 2 per loculus. *Style* 0.5–0.8 mm long; stigma capitate. *Fruits* 1/2–2/3 inferior, 1.3–2.0 mm long, 1.3–1.5 mm wide; sepals erect; petals persistent for some time. *Seeds* 0.9–1.6 mm long, 0.6–0.8 mm wide.

Diagnostic features. Among the species that have a 2-locular ovary with 2 ovules per loculus, *S. thinicola* is distinguished by the following combination of characters: petioles 0.1–0.3 mm long; leaf blades 1.4–3.7 mm long, longer than wide, with apex straight and not pointed; peduncles 0.7–4.0 mm long, mostly 3–9-flowered; hypanthium rugose.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 21 Dec. 2005, *A.D. Crawford* 841 (PERTH); 12 Jan. 2005, *A.D. Crawford* 871 (K, PERTH); 29 Oct. 1991, *G.J. Keighery* 14734 (PERTH); 1 Nov. 1994, *S.J. Patrick* 2142 (PERTH); 12 Dec. 2002, *S.J. Patrick & G. Paczkowska* SP 4676 (PERTH).

Distribution and habitat. Occurs from near Yandi Station south to east of Mullewa (Figure 5A), on yellow sand dunes, with several records from the crest of the dunes.

Phenology. Flowers from October to December, with mature fruits recorded from November to January.

Etymology. From the Latin *thinium* (dune) and *-cola* (dweller) since the species is known only from sand dunes.

Vernacular name. Dune Scholtzia.

Conservation status. Priority One under Conservation Codes for Western Australian Flora. Listed with this priority by Smith and Jones (2018), under the names *S. sp.* Binna East Road (M.E. Trudgen 12013) and *Scholtzia* sp. Valentine Road (S.J. Patrick 2142). This taxon is currently known from five locations, two of which are very close and probably represent a single population.

Co-occurring species. The type specimen (*M.E. & M.R. Trudgen* MET 12013) was collected from a site where it co-occurred with *S. uniflora* (*M.E. & M.R. Trudgen* MET 12011).

Affinities. Very similar to *S. recurva* in morphology and habitat; see *affinities* section under that species for details.

Notes. Like the inflorescences, the infructescences are globular and dense, and located well below the apex of each branchlet. The name *S. sp.* Valentine Road (S.J. Patrick 2142) was applied to southern specimens that tend to have longer peduncles than the other specimens.

Scholtzia trilocularis* Rye, *sp. nov.

Typus: 20 km north of Eneabba on Brand Highway, Western Australia, 8 October 1990, *S. Maley* 8 (*holo:* PERTH 04279115; *iso:* AD, MEL, NSW).

Scholtzia sp. Eneabba (*S. Maley* 8), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub erect, 0.4–2(–3?) m high, 1–2.3 m wide; flowering branchlets with peduncles borne at 1–4 consecutive nodes, often in an umbel-like arrangement. *Leaves* antrorse or widely antrorse. *Petioles* 0.2–0.8 mm long. *Leaf blades* obovate to almost circular, 1.5–3.5 mm long, 1.1–2.1 mm wide, entire; abaxial surface usually raised and flattened at centre in basal 1/2–3/4 and distally ridged along midvein or sometimes ridged along full length, with lateral veins obscure, the oil glands in 1–3 main rows on each side of midvein but inconspicuous. *Peduncles* 4–15 mm long, 0.4–0.6 mm wide, mostly 3–13-flowered; secondary axes up to 1.3 mm long. *Bracts* 0.9–1.8 mm long, deciduous. *Pedicels* mostly 0.6–1.0 mm long. *Flowers* 3.5–7 mm diam. *Hypanthium* 1.0–1.4 mm long, wrinkled-rugose or sometimes reticulate-rugose. *Sepals* usually broadly to depressed ovate, 0.5–1.0 mm long, the outer ones slightly to markedly ridged at base; petaline margin 0.3–0.6 mm deep, entire. *Petals* 1.5–2.5 mm long, pale or medium pink. *Stamens* 8–12, with 1–3 opposite each sepal. *Longest filaments* 0.4–0.7 mm long. *Anthers* c. 0.35 mm long. *Ovary* inferior, 3-locular; ovules 2 per loculus. *Style* 0.7–1.0 mm long; stigma capitate. *Fruits* c. 2/3 inferior, 1.6–1.8 mm long, c. 1.4 mm wide; sepals erect or spreading; petals persistent in early or mature fruit. *Seeds* 1.3–1.6 mm long, 0.6–0.7 mm wide.

Diagnostic features. Among species that have a 3-locular ovary with 2 ovules per loculus, *S. trilocularis* is distinguished by the following combination of characters: leaves entire; peduncles 4–15 mm long, mostly 3–13-flowered; stamens 8–12, with 1–3 opposite each sepal; petals 1.5–2.5 mm long.

Selected specimens examined. WESTERNAUSTRALIA: Loc. No. 144, Arrowsmith River Valley, near Blue Water Rd. Shallow siltstone (Mound Springs 16–19), E side, Arrino, 17 Oct. 2005, *J. Borger* CH 1710-1 (PERTH); Nebroo Nature Reserve, Bunney Rd, Western side Tag 21 ferricrete site, 17 Nov. 2009, *J. Borger* NR21 1 (PERTH); track between Ambania and Casuarina Rds, 10 km S off Geraldton road, 13 Nov. 2005, *J. Docherty* 414 (PERTH); Moore Rd, 9 km S of Mullewa–Geraldton Rd, Indarra Nature Reserve, 23 Oct. 1998, *G.J. Keighery & N. Gibson* 5025 (BRI, CANB, PERTH); Mingenew, Oct. 1909, *J.H. Maiden s.n.* (PERTH); Brand Mudge Rd, 2.9 km N of Hughes Rd, W of Coorow, 22 Oct. 2001, *S.J. Patrick* 4051 (NSW, PERTH); on E boundary of park, Watheroo National Park, W of Watheroo, 7 Oct. 1971, *R.D. Royce* 9697 (PERTH).

Distribution and habitat. Extends from near Ambania (east of Geraldton) south to Watheroo National Park (Figure 6B), usually in sandy habitats, commonly in yellow sand, the dominant species often eucalypts (such as *E. todtiana*), *Allocasuarina campestris*, *Banksia* species or *Xylomelum angustifolium*.

Phenology. Flowers from August to November. Mature fruits recorded in November and December.

Conservation status. Not listed by Smith and Jones (2018); this species is known from a national park and from several nature reserves.

Etymology. From the Latin *tri-* (three) and *locularis* (having compartments or cells). Most of the species with two ovules per loculus have regularly 2-locular ovaries or have both 2- and 3-locular ovaries common, whereas this species is one of four that are regularly 3-locular.

Co-occurring species. Recorded (*M. Hislop* WF 3362) growing with two variants of *S. laxiflora* (*M. Hislop* WF 3363 & WF 3367) near Eneabba.

Affinities. Keys out with *S. spatulata*, which tends to have larger flowers with the sepals less ridged at the base. Another possible close relative is *S. oligandra* F.Muell. ex Benth., which differs in having denticulate to ciliate leaves and only 5–8 stamens.

Notes. In *S. trilocularis* all of the flowers examined had at least one stamen opposite each sepal, whereas in *S. spatulata* there may not be any stamens opposite one of the sepals of a flower.

***Scholtzia truncata* Rye, sp. nov.**

Typus: Eurardy Station, Western Australia, 2 September 2004, *Wildflower Society of WA* EURA 171 (*holo:* PERTH 06922856; *iso:* K, MEL).

Scholtzia sp. Galena (W.E. Blackall 4728), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p.402 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Scholtzia sp. Ajana East Road (M.E. Trudgen 21734 A), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 30 May 2016].

Shrub 0.5–3 m high, 0.6–3.5 m wide; flowering branchlets with peduncles borne at 1–5 consecutive nodes, often with their flowers combined into a terminal globular cluster. *Leaves* appressed to widely antrorse, but mostly antrorse. *Petioles* 0.3–0.5 mm long. *Leaf blades* broadly obovate to very broadly elliptic, 1.3–2.2 mm long, 1.4–2.0 mm wide, entire, with a very short mucro present on at least some of the leaves of each specimen; abaxial surface flattened at the centre for 1/2–2/3 of its length and ridged distally, with lateral veins obscure; oil glands in 1 or 2 main rows on each side of midvein, with 2–5 glands in innermost rows. *Peduncles* 0.5–2.0(–2.3) mm long, 0.4–0.6 mm wide, 1–3-flowered; secondary axes ± absent or up to 0.4 mm long. *Bracts* 0.6–1.8 mm long. *Pedicels* 0.3–1.0 mm long. *Flowers* 3.5–6.0 mm diam. *Hypanthium* 1.0–1.3 mm long, wrinkled or reticulate-rugose to pitted, sometimes becoming fairly smooth in mature fruit. *Sepals* broadly or very broadly ovate, 0.5–0.7 mm long, the base ribbed (but appearing scarious in fruit); petaline margin often hidden from side view, 0.3–0.5 mm deep, entire. *Petals* 1.5–2.5 mm long, white or pale pink. *Stamens* (5–)7–10(–12), with 0–3 opposite each sepal. *Longest filaments* 0.5–0.8 mm long. *Anthers* 0.25–0.3 mm long. *Ovary* inferior, 2- or 3-locular; ovules 1 per loculus. *Style* 0.9–1.6 mm long; stigma peltate. *Fruits* c. 1/2 inferior, 1.4–1.5 mm long, 1.8–1.9 mm wide; sepals strongly incurved; petals deciduous. *Seeds* 0.9–1.3 mm long, 0.6–0.8 mm wide.

Diagnostic features. Among species that have 1 ovule per locus, *S. truncata* is distinguished by the following combination of characters: petioles 0.3–0.5 mm long; peduncles 0.5–2.0(–2.3) mm long, 1–3-flowered; sepals strongly incurved; petals 1.5–2.5 mm long; stamens usually 7–11; style 0.9–1.6 mm long, stigma peltate.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 14 Sep. 1990, *A.H. Burbidge* 4349 (PERTH); 26 Aug. 1991, *A.H. Burbidge* 4365 (PERTH); 6 Aug. 1976, *R.J. Hnatiuk* 760431 (PERTH); 8 Sep. 2016, *B.L. Rye* 290165, *J. Norman* & *B. Parkhurst* (PERTH); 29 Aug. 1985, *C.I. Stacey* 768 (PERTH); 30 Aug. 2003, *Wildflower Society of W.A.* EURA26 (PERTH); 11 Oct. 2004, *C. Wilkins* & *J. Wilkins* CW 1984 (PERTH).

Distribution and habitat. Extends from Eurardy Station south-east to near Indarra (Figure 6A), in yellow to brown sand in varied vegetation dominated by mallees or high shrubs.

Phenology. Flowers from June to September. Fruits recorded in September and October.

Etymology. From the Latin *truncatus* (cut off, blunt-ended) after the more or less truncate young flower buds with strongly incurved sepals that lie almost flat across the top.

Conservation status. Priority Two under Conservation Codes for Western Australian Flora. Listed with this priority by Smith and Jones (2018) under the name *S. sp. Galena* (W.E. Blackall 4728), this species is known from nature reserves and a national Park .

Co-occurring species. Recorded at one location (*Wildflower Society of WA* EURA 1) growing with *S. obovata* and at another (*B.L. Rye* 290165, *J. Norman* & *B. Parkhurst*) growing with *S. peltigera*.

Affinities. This is similar to several other species that have a peltate stigma, but most of those species have longer peduncles (2.5–15 mm *cf.* 0.5–2(–2.3) mm long). Three species with peduncles shorter than 2.5 mm long differ from *S. truncata* in having only 3–6 stamens per flower.

Notes. Currently *S. truncata* includes some specimens with somewhat pitted hypanthia (e.g. reference specimen of *S. sp. Galena*) as well as those with wrinkled ones (reference specimen of *S. sp. Ajana* East Road) but a few specimens are hard to classify into either category because they are somewhat intermediate in hypanthium patterning. This kind of difference in hypanthium patterning has proved useful in distinguishing some members of the genus and is used in the key, but in this case does not appear to be correlated with any other characters that could be used to recognise more than one species. Consequently the two phrase names are considered to be conspecific. *Scholtzia truncata* keys out at two positions (see key to species above) because of this variability in hypanthium ornamentation.

Sepals are strongly incurved at all stages of flowering and fruiting. The fruits can be 2-seeded but mostly contain only one seed.

Scholtzia uniflora Rye, *sp. nov.*

Typus: east of Binu, Western Australia [precise locality withheld for conservation reasons], 13 September 1978, *M.E. Trudgen* 2218 (*holo:* PERTH 03628167; *iso:* CANB, MEL).

Scholtzia sp. Binnu (M.E. Trudgen 2218), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 401 (2000); Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 2 March 2018].

Shrub commonly 1.2–2.5 m high and 1.4–2 m wide; flowering branchlets with peduncles borne at 1–4 consecutive nodes, often with their flowers combined into a dense cluster. *Leaves* antrorse. *Petioles* 0.5–0.8 mm long. *Leaf blades* broadly or very broadly obovate, 2–4 mm long, 2.0–3.5 mm wide, entire; abaxial surface raised only near the middle, often with a flattened section along the midvein that contracts into a ridge distally, with lateral veins usually obscure, the oil glands in more than 3 rows on each side of midvein, with 5–7 glands in innermost rows. *Peduncles* 0–0.5 mm long, 0.4–0.6 mm wide, 1-flowered. *Bracteoles* 1.5–1.8 mm long. *Pedicels* 0.4–0.7 mm long. *Flowers* 5–7 mm diam. *Hypanthium* 1.8–2.0 mm long, wrinkled-rugose. *Sepals* transversely oblong to semicircular or deltate to depressed ovate, 0.7–1.3 mm long, entire, the outer ones smooth or slightly keeled; petaline margin 0.3–0.5 mm deep, entire. *Petals* 2.5–3.5 mm long, pale to medium pink. *Stamens* 15–17, in a continuous circle. *Longest filaments* c. 1 mm long. *Anthers* 0.4–0.5 mm long. *Ovary* inferior, 3-locular; ovules 1 per loculus. *Style* c. 1.6 mm long; stigma ± peltate. *Fruits* largely inferior, 2.2–2.3 mm long, 2.3–2.5 mm wide; sepals erect, but scarious margins incurved; petals deciduous. *Seeds* 1.3–1.4 mm long, 0.8–1.0 mm wide.

Diagnostic features. Among species that have a 3-locular ovary with 1 ovule per loculus, *S. uniflora* is distinguished by the following combination of characters: peduncles absent or up to 0.5 mm long, 1-flowered; stamens 15–17, in a continuous circle.

Selected specimens examined. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 2 Dec. 2004, *A.D. Crawford* 807 (MEL, PERTH); 16 Aug. 2001, *R. Davis* 9935 (CANB, PERTH); 1 July 2001, *J. Docherty* 62 (PERTH); 5 Dec. 1993, *M.E. Trudgen & M.R. Trudgen* MET 12011 (AD, BRI, K, NSW, PERTH).

Distribution and habitat. Occurs east of Binnu (Figure 4A), and has been recorded in yellow sand on the top of a dune, in *Actinostrobis* tall open shrubland.

Phenology. Flowers from July to September.

Etymology. From the Latin *unus* (one) and *-florus* (-flowered). Refers to the presence of only one flower on each peduncle. Of the species with one ovule per loculus, this is the only one that has consistently 1-flowered peduncles.

Conservation status. Priority Two under Conservation Codes for Western Australian Flora. Previously listed (Smith & Jones 2018) as Priority One under the name *S. sp. Binnu* (M.E. Trudgen 2218).

Co-occurring species. At one locality, *S. uniflora* was recorded growing with *S. thinicola*.

Affinities. Similar to *S. sp. Nolba* in having 15–17 stamens and a 3-locular ovary with one ovule per loculus. The fruits in both species are largely inferior and have a smooth, convex summit. *Scholtzia* sp. *Nolba* has larger leaves, multi-flowered peduncles and usually shorter sepals. All other species with 15 or more stamens have a 2-locular ovary with two ovules per loculus.

Scholtzia uniovulata Rye, *sp. nov.*

Typus: Midlands Road, 2.5 km north of Coorow, Western Australia, 28 August 2003, *B. Moyle & N. Gibson* BM 005 (*holo*: PERTH 08126291; *iso*: ?CANB, K, MEL).

Shrub 0.5–3(–4) m high, 0.3–3 m wide; flowering branchlets with peduncles borne at 1–6 consecutive nodes, often with their flowers combined into a dense cluster. *Leaves* antrorse to patent. *Petioles* 0.1–0.3 mm long. *Leaf blades* obovate or broadly obovate, (0.8–)1.3–2.8(–4) mm long, 1.2–1.6 mm wide, ± entire; abaxial surface raised towards the middle, often with a flattened section along the midvein that contracts into a ridge distally, with lateral veins obscure or sometimes visible, the oil glands in 1 or 2 main rows on each side of midvein, with 2–4 glands in innermost rows. *Peduncles* 0.8–2.5(–3.5) mm long, 0.3–0.45 mm wide, mostly 1–3-flowered. *Bracts* 0.8–1.5 mm long. *Pedicels* 0.5–0.8 mm long. *Flowers* 3.5–4.5 mm diam. *Hypanthium* 1.0–1.4 mm long, rugose-pitted. *Sepals* broadly or very broadly obovate to transversely elliptic, of varied length, entirely petaline, the innermost one 0.8–1.2 mm long. *Petals* 1.2–1.6 mm long, white or pale pink. *Stamens* 3–6, 0–2 opposite each sepal (commonly 5 in the arrangement 2,0,1,2,0 or sometimes with mostly fewer than 5). *Longest filaments* 0.2–0.4 mm long. *Anthers* 0.2–0.3 mm long. *Ovary* inferior, 1(2)-locular (rarely 2-locular in a majority of the flowers); ovules 1 per loculus. *Style* 0.5–0.8 mm long; stigma ± peltate. *Fruits* 2/3–3/4-inferior, 1.0–1.2 mm long, *c.* 1.3 mm wide; sepals erect or spreading; petals deciduous. *Seeds* 0.7–0.8 mm long, 0.8–1.0 mm wide. (Figure 1D)

Diagnostic features. Among the species with 1 ovule per loculus, *S. uniovulata* is distinguished by its usually 1-locular ovary. Other important characters: hypanthium pitted; stamens 3–6.

Selected specimens examined. WESTERN AUSTRALIA: Yuna, Sep. 1930, *E. Ashby s.n.* (ADW, NSW); in a dip in Cunderdin–Minnivale Rd, 0.8 km N of Berry Rd, Minnivale Nature Reserve, 15 Oct. 2013, *R. Davis & B.L. Rye* DR 012 (PERTH); Wilroy, 17 Aug. 1964, *J. Galbraith* WA383 (MEL); Cowcowing, Sep.–Oct. 1904, *M. Koch* 1091 (AD, NSW); 7.1 km E of Konnongorring Siding on Dowerin–Konnongorring Rd, *c.* 27 km SW of Wongan Hills, 22 June 1996, *T.R. Lally & B.J. Lepschi* TRL 1029 (CANB, PERTH); 6.1 km on road to Ellendale Pool from Walkaway–Nangetty Rd, 26 Oct. 2001, *S.J. Patrick* 4084 (PERTH); Corrigin to Quairading, 28 Sep. 2002, *M.E. Trudgen* 21783 (AD, BRI, MEL, NSW, PERTH).

Distribution and habitat. Extends from the Greenough River area south-east to near Corrigin (Figure 5B), usually in sandy soils, occasionally with laterite or gravel. Occasionally the species occurs along watercourses, where it has been recorded reaching heights of up to 4 m or possibly more.

Phenology. Flowers from June to November.

Etymology. From the Latin *unus* (one) and *ovulatus* (having ovules). Refers to the presence of only one ovule in each loculus of the ovary and frequently only one ovule per ovary as the ovary is usually unilocular.

Vernacular name. Common Scholtzia. *Scholtzia uniovulata* appears to be distributed over the greatest area in the genus, although the coastal species *S. obovata* has a longer range if *S. umbellifera* is treated as its synonym.

Conservation status. Being one of the most common species in the genus, *S. uniovulata* is not considered to be at risk.

Chromosome number. $n = 11$, *vide* B.L. Rye, *Austral. J. Bot.* 27: 571 (1979) [as *Scholtzia parviflora*]. Voucher: B.L. Powell 73128.

Affinities. Many herbarium specimens have previously been identified as either *S. parviflora* or *S. oligandra*, both of which have an excluded syntype that matches this new species (see Rye 2017). *Scholtzia oligandra* is not closely related, differing in having a 2- or 3-locular ovary with two superposed ovules in each loculus. *Scholtzia parviflora* is very similar in morphology to *S. uniovulata*, but has more uniform sepals, with the innermost one 0.3–0.6 mm long (*cf.* 0.8–1.2 mm), a consistently 2-locular ovary, and usually larger leaves.

Most specimens of *S. uniovulata* are distinguished from those of all other species of *Scholtzia* by having a 1-locular ovary with a single ovule, but the much rarer specimens with a 2-locular ovary in all or most flowers are fairly widely dispersed.

Co-occurring species. No confirmed cases of co-occurrence are recorded on PERTH herbarium specimens but *S. uniovulata* is a widespread species that overlaps in range with many others.

Notes. Many specimens have tiny leaves less than 1.3 mm long on most of their branchlets, although all specimens have at least a few leaves greater than 1.3 mm long. Leaves 3–4 mm long are atypical and have only been observed on very fast-growing shoots. Despite the large number of specimens available for study at PERTH, only one could be found with fully mature, fertile fruits.

Acknowledgements

I am grateful for the loan of specimens from AD, BRI, CANB, MEL and NSW. Images of type specimens were checked on *GlobalPlants* (2018). I would also like to thank Alex George for nomenclatural advice, Ben Parkhurst for collecting type material for one of the species, Rob Davis, Kevin Thiele and Jean Hort for their images, Steve Dillon for help with the mapping, Lisa Rye for arranging the figures and Julia Percy-Bower for assistance with specimen processing. Part of this work was supported by ABRIS funding.

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