

An account of *Eutaxia* (Leguminosae: Mirbelieae) with a focus on the Western Australian species

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Abstract

Wilkins, C.F., Chappill, J.A. & Henderson, G.R. An account of *Eutaxia* (Leguminosae: Mirbelieae) with a focus on the Western Australian species. *Nuytsia* 20: 109–167 (2010). The Western Australian species of the endemic Australian legume genus *Eutaxia* R.Br. are revised. Twenty two species are recognised, all but three of them confined to Western Australia. Six new species are described, *E. acanthoclada* G.R.Hend. & Chappill, *E. inuncta* C.F.Wilkins & Chappill, *E. exilis* C.F.Wilkins & G.R.Hend., *E. hirsuta* C.F.Wilkins & Chappill, *E. lasiophylla* G.R.Hend. and *E. lutea* Chappill & G.R.Hend. *Pultenaea neurocalyx* Turcz. is transferred to *Eutaxia*, *P. neurocalyx* var. *major* Benth. is given specific status as *E. major* (Benth.) C.F.Wilkins & Chappill, and two new subspecies are recognised, *E. neurocalyx* subsp. *nacta* C.F.Wilkins and *E. neurocalyx* subsp. *papillosa* C.F.Wilkins. *Eutaxia diffusa* F.Muell. is reinstated as a distinct species rather than a variety of *E. microphylla*, and *E. empetrifolia* Schldl. and *E. leptophylla* Turcz. are reinstated as distinct species rather than being synonymous with *E. microphylla* (R.Br.) C.H.Wright & Dewar. *Eutaxia densifolia* Turcz. and *E. dillwynioides* Meisn. are reduced to synonyms of *E. parvifolia* Benth, and *Eutaxia obovata* (Labill.) C.A.Gardner is placed in synonymy under *E. myrtifolia* (Sm.) R.Br. which now stands as the correct name for the type of *Eutaxia*.

Introduction

Eutaxia R.Br. (Leguminosae: Mirbelieae) is a genus of 12 currently recognised species restricted to the south-west of Western Australia, except for *E. microphylla* (R.Br.) C.H.Wright & Dewar which occurs in South Australia, New South Wales, Victoria and Tasmania, *E. empetrifolia* Schldl. which occurs in Western Australia and South Australia, and *E. diffusa* F.Muell. which occurs in South Australia, New South Wales, Victoria and southern Queensland. The genus was last revised by Benth (1864), who recognised 8 species. His taxonomic framework has essentially remained unchanged with the exception of the substitution of the names *E. obovata* Turcz. for *E. myrtifolia* (Sm.) R.Br. (Grieve 1998), *E. microphylla* for *E. empetrifolia* (Wright & Dewar 1894, Grieve 1998), the division of *E. microphylla* into two varieties (var. *microphylla* (Court 1957) from the original *Sclerothamnus microphyllus* and var. *diffusa* from *E. diffusa*), and the publication of five new Western Australian species (Wilkins & Chappill 2007). Investigation of *Eutaxia* specimens housed at the Western Australian Herbarium

(PERTH) has uncovered a large number of misidentified specimens and a number of additional new taxa. This revision recognises 22 species in Western Australia, including six new species, two new subspecies, three reinstated species and two new combinations. *Pultenaea neurocalyx* Turcz. is transferred to *Eutaxia* (see notes below).

Genus delimitation. *Eutaxia* was first described by Robert Brown (1811) to accommodate specimens previously included within the genus *Dillwynia* Sm. Two species, *D. myrtifolia* Sm. and *D. obovata* Labill., were moved into the new genus under the name *E. myrtifolia* (Sm.) R.Br. Brown characterised *Eutaxia* as having a bilabiate calyx, swollen fruit, hooked style, capitate stigma and opposite leaves. All but the opposite leaves are shared with *Dillwynia*. At the same time, Brown described the new genus *Sclerothamnus* R.Br. based on *S. microphyllus* from the 'south coast of New Holland'. *Sclerothamnus* was distinguished from *Eutaxia* by its stipitate ovary, filiform style and simple rather than capitate stigma. It was subsequently reduced to a section within *Eutaxia* by Mueller (1858). Mueller's decision to unite *Eutaxia* and *Sclerothamnus* into a single genus may prove erroneous; however, until expanded phylogenetic analyses are undertaken to investigate the relationships between *Eutaxia*, *Dillwynia* and *Pultenaea*, the group of taxa with curved narrow style and simple stigmas are retained in this revision as *Eutaxia* sect. *Sclerothamnus*.

Crisp and Weston (1995) in a morphological cladistic analysis found that three-ribbed leaves and a ribbed calyx were synapomorphies for a clade comprising *Eutaxia*, *Sclerothamnus* and *Pultenaea neurocalyx*. A morphological study by Henderson (1998) supports the inclusion of *P. neurocalyx* within a monophyletic section *Eutaxia*, characterised by a broad style hooked just below the apex and a capitate stigma. The calyx ribs believed to be characteristic of both *Eutaxia* and *P. neurocalyx* were, however, observed to be no more prominent in many *Eutaxia* species than on some *Pultenaea* taxa. Molecular studies (Crisp *et al.* 1999, Orthia *et al.* 2005a, 2005b) also suggest that *P. neurocalyx* is more closely related to *Eutaxia* than to *Pultenaea* Sm. *s. str.*

Crisp and Weston (1995) also identified a single synapomorphy, opposite leaves, for *Eutaxia s. str.*; this feature has been generally used to distinguish the genus from *Dillwynia* and *Pultenaea*. This has resulted in some confusion in the past, however, with the more distantly related opposite-leaved species *Gastrolobium punctatum* (Turcz.) G.Chandler & Crisp and *G. reticulatum* (Meisn.) Benth. both being originally named in *Eutaxia*. Furthermore, opposite leaves are not present in *E. andocada* Chappill & C.F.Wilkins (alternate leaves), *E. actinophylla* Chappill & C.F.Wilkins (whorled leaves) or the six new taxa described herein with close affinity to *E. neurocalyx* (alternate leaves). Uncertainty therefore remains as to the true distinguishing features of the genus, as the characters previously used to define *Eutaxia* are not limited to the genus. Characters consistently present within the genus are adaxially concave leaves, absent or minute stipules and a calyx with three imbricate abaxial lobes and two valvate adaxial lobes in bud.

It should be noted that recent molecular phylogenetic analyses of the Mirbeliaceae genera (Chandler *et al.* 2001; Crisp & Cook 2003; Orthia *et al.* 2005b) have found that generic boundaries within the monophyletic NA (no antipodal cells) group (Cameron & Prakash 1994; Crisp & Cook 2003), to which *Eutaxia* belongs, are contentious. It has been proposed that all genera within the *Pultenaea s. lat.* group (including *Eutaxia*) be synonymised (Crisp & Cook 2003) under *Pultenaea* Sm. (Orthia *et al.* 2005b). If such reclassification proceeds it will not be in the near future and therefore the name *Eutaxia* is maintained here for this revision.

Methods

The first author has examined, measured and recorded morphological information for all species of *Eutaxia* and completed the revision commenced by J. Chappill (deceased 2006) and G. Henderson (*Eutaxia* honours project 1998, whereabouts unknown). Herbarium specimens from A, AD, BM, BRI, CANB, G, GH, HO, K, MEL, NSW, P, PERTH, and fresh specimens from fieldwork collections, were examined by the second and third authors. The first author examined specimens from a subset of these herbaria (BM, G, K, MEL, P and PERTH) since specimens from the remaining herbaria were returned prior to completion of this revision. An exclamation mark! after the type specimen citation means viewed by the first author. The majority of *Eutaxia* species occur in Western Australia and are well represented at PERTH. While all species of *Eutaxia* have been examined, this paper has been restricted in scope to a revision of the genus in Western Australia, as re-examination of additional specimens from other Australian herbaria was not feasible. From specimens viewed by the first author, including the type specimens of *E. microphylla*, *E. empetrifolia* and *E. diffusa*, it is apparent that these three taxa are distinct species. Further new species may be present in eastern Australia.

Distribution maps were compiled using *Online map creation* freeware (http://www.aquarius.geomar.de/omc_intro.html). Precise localities for threatened species have been withheld for conservation reasons.

Taxonomic treatment

Eutaxia R.Br., in Aiton, *Hortus Kewensis* ed. 2, 3: 16 (Oct.–Nov. 1811). *Type citation*: *Dillwynia myrtifolia* Sm., *D. obovata* Labill. *Lectotype* (here designated): *Eutaxia myrtifolia* (Sm.) R.Br.

Sclerothamnus R.Br., in Aiton, *Hortus Kewensis* ed. 2, 3: 16 (Oct.–Nov. 1811). *Type*: *Sclerothamnus microphyllus* R.Br.

Perennial *shrubs*, mat-like, prostrate, sprawling or typically erect, not resinous, not glandular, glabrous or with simple hairs. *Stems* unarmed or with pungent apices. *Stipules* absent or present, inconspicuous, free, interpetiolar, attached to the apex of the pulvinus. *Leaves* persistent, ascending, spreading or appressed, mainly opposite and decussate, alternate or in whorls of 3, simple, pulvinate, concave, margin entire, abaxial surface with one or three ribs, or ribs absent. *Flowers* mainly axillary, 1 or 2, often crowded at ends of branchlets; or with 2–7 flowers with bracts, that are clustered on a leafless, extended flowering section of stem, that is 2–12 mm long and towards the apex of the branchlet, with new leaf growth then extending on the stem above the flowering stem section. *Bracts* either one present in the axil of a vegetative leaf, or the flower subtended by a shorter and often broader and thinner-textured floral leaf, or the flower subtended by a vegetative leaf and bract absent. *Bracteoles* persistent on pedicels, lanceolate to broadly ovate. *Calyx* prominently or inconspicuously 6-, 10- or 25-ribbed, ecostate in bud, three abaxial (lower) lobes ovate, slightly or strongly imbricate and the apex acute; two adaxial (upper) lobes valvate and straight with the apex acute, or falcate (with one straight side and one curved side) with the apex truncate; adaxial lobes fused to a higher level than the three abaxial lobes; all lobes persistent on fruit. *Corolla* papilionoid, yellow throughout or yellow-orange to yellow with dark red markings, glabrous; *standard* lamina base cordate or truncate, with or without auricles; lamina broadly elliptic to broadly ovate, without callosities; the apex emarginate; *wings* oblong to slightly obovate, straight or downcurved; *keel* shorter than standard and wings, straight or slightly downcurved, oblong, slightly obovate or sub-triangular, the apex subacute to rounded. *Stamens* 10, free,

attached to hypanthium; *anthers* oblong, versatile, dorsifixed. Viscid threads observed in fresh pollen (*E. cuneata* J.Chappill 6475). *Intrastaminal disc* absent. *Gynoecium* sessile or stipitate, unilocular, partly or wholly covered in short hairs; *ovules* 2, funicles glabrous, 0.15–0.25 mm long; *style* either filiform, straight or bent, with a simple stigma, or thick and hooked just below a capitate stigma, style glabrous or sparsely hairy towards the ovary. *Fruit* round, ellipsoid, the placental margin straight and opposite margin curved, or both margins with the same curvature, straight, turgid or compressed; style remnant central or offset towards placental margin. *Seed* ellipsoid with slight or prominent radicular lobe, glabrous; aril white or cream, u-shaped around hilum. *Seed anatomy* with hour-glass cells present, tracheid bar present, malpighian cells present, linea lucida absent, mucilage layer present, counter-palisade present, cotyledon cells thin-walled (Chappill *et al.* unpublished data on *E. myrtifolia*). *Canavanine* present in *E. microphylla* (Bell *et al.* 1978). *Alkaloids* absent (Aplin & Cannon 1971). Not reported to be poisonous. *Root nodules* present (Lange 1959, 1961, Barnet 1988).

Chromosome number. $2n = 14, 16, 32$ (Sands 1975).

Typification notes. Although *E. myrtifolia* was the first named species of *Eutaxia*, the name was at that time invalid since *Dillwynia obovata*, which is cited in synonymy, is an older name than *Dillwynia myrtifolia*. *Dillwynia obovata* is a well-known and widely cultivated taxon that has been widely known as *Eutaxia obovata* (Labill.) C.A.Gardner (Grieve 1998); however, this epithet had been previously used by Turczaninow (1853) to describe a different species (synonymous with *E. parvifolia*) before Brown's error was noticed and the combination made from *D. obovata* by Gardner (1930). Although *E. myrtifolia* (Sm.) R.Br. was the incorrect name for the taxon at the time of publication, Turczaninow's work has made the correct combination unavailable and *E. myrtifolia* has to stand as the correct name for the here designated lectotype of *Eutaxia* (see Article 52.3 of the ICBN; McNeill *et al.* 2006).

The name *Eutaxia* comes from the Greek *eu* (= well) and *taxis* (= arrangement), probably referring to the regular arrangement of the leaves.

Key to the species of *Eutaxia*

1. Calyx prominently 15–25-ribbed, spinescent branchlets absent 2
- 1: Calyx with 12 or fewer inconspicuous ribs, or venation obscure; spinescent branchlets absent or present 8
2. Keel apex yellow-orange (W.A.: from Peak Charles to W of Mt Ragged) 1.7. *E. lutea*
- 2: Keel apex red at least at apex 3
3. Calyx outer surface and both leaf surfaces densely hairy or just calyx and upper leaf surface densely hairy (W.A.: Muntadgin to N of Hyden) 1.4. *E. hirsuta*
- 3: Calyx outer surface glabrous (lobe margin with hairs); leaf surfaces glabrous, marginal hairs absent or present 4
4. Calyx total length (from pedicel attachment to apex of lobe) 3.6–4.5(–5) mm long; majority of mature leaves < 2.5 mm long 5
- 4: Calyx total length (4.5–)5–8.5 mm long; majority of mature leaves > 2.5 mm long 7

5. Leaves erect but spreading; keel adaxial margin glabrous
(W.A.: Harrismith to Forrestania and S to Chillinup Pool and
South Stirling Ranges)..... **1.10.a. E. neurocalyx** subsp. **neurocalyx**
- 5: Leaves mainly appressed to stem; keel adaxial margin
with minute hairs..... **6**
6. Stem with dense, long hairs to 0.6 mm long
(W.A.: E of Southern Cross to N of Bremer Range)..... **1.10.b. E. neurocalyx** subsp. **nacta**
- 6: Stem with dense, papillose hairs *c.* 0.05 mm long
(W.A.: from NNW of Bullfinch to Newdegate)..... **1.10.c. E. neurocalyx** subsp. **papillosa**
7. Calyx outer surface dull, green-brown between ribs;
leaf width 0.4–1 mm, leaf lower surface rib same width throughout
(W.A.: Bremer Bay to Cape Arid)..... **1.8. E. major**
- 7: Calyx outer surface glossy, red-brown between ribs; leaf width
1.3–2.5 mm, rib on lower surface of leaf widened toward apex
(W.A.: Ravensthorpe and Cape Arid)..... **1.5. E. inuncta**
8. Style sturdy, hooked; stigma capitate..... **9**
- 8: Style filiform, straight or curved, but never hooked; stigma simple..... **15**
9. Adaxial two calyx lobes with truncate lip, free for < 0.6 mm..... **10**
- 9: Adaxial two calyx lobes acute, free for > 0.7 mm..... **11**
10. Leaves cuneate (wedge shaped) 2–12.5 mm long, apex obtuse
or with short, blunted mucron (W.A.: Cheyne Beach to E of Munglinup)..... **1.1. E. cuneata**
- 10: Leaves obovate 4.5–21 mm long, apex acute to acuminate with long cream
apiculus (W.A.: between Cape Naturaliste and Cape Arid)..... **1.9. E. myrtifolia**
11. Calyx inconspicuously 10–12-ribbed, bracteoles < 1 mm long;
keel apex much narrower than base..... **12**
- 11: Calyx inconspicuously 5–6-ribbed, bracteoles > 1.1(–4) mm long;
keel apex almost same width as base..... **13**
12. Leaves crowded, longer than internodes, 1.8–3.5 mm wide,
apiculus rounded; standard lamina 5.8–6.7 mm wide
(W.A.: N of Capel to Mt Manypeaks)..... **1.2. E. epacridoides**
- 12: Leaves distant, shorter than internodes, 0.4–1(–1.3) mm wide,
apiculus acuminate; standard lamina 2.8–5.1 mm wide
(W.A.: Harvey area to Whicher Range)..... **1.3. E. exilis**
13. Lower three calyx lobes < 2 mm wide; leaves glabrous..... **14**
- 13: Lower three calyx lobes > 2 mm wide; leaves densely hairy at least
on upper surface (W.A.: between Muntadgin, Bronti and Lake Cronin)..... **1.6. E. lasiophylla**
14. Habit slender with long branchlets; leaves usually distant,
very narrowly obovate, oblanceolate to almost linear
(W.A.: Perth to Augusta and E to Mt Manypeaks)..... **1.12. E. virgata**
- 14: Habit crowded with shorter branchlets; leaves usually crowded,
obovate to elliptic, narrowly obovate (W.A.: widespread from Bolgart to
Gracetown and E to Hatter Hill and Cape Arid)..... **1.11. E. parvifolia**

15. Keel yellow or yellow-orange throughout..... 16
- 15: Keel red at least at tip..... 18
16. Calyx outer surface with sparse, spreading, straight hairs *c.* 0.2 mm long
(W.A.: Parker Range, Mt Holland, Forrestania, Lake Barker)..... 2.6. *E. lasiocalyx*
- 16: Calyx glabrous except for lobe margins..... 17
17. Erect shrub; tips of branchlets not spinescent; leaves in whorls of 3
WA: Norseman, Salmon Gums, Mt Newmont)..... 2.2. *E. actinophylla*
- 17: Prostrate mat forming shrub; tips of branchlets spinescent; leaves alternate or
irregularly arranged (W.A.: Forrestania to Mt Madden)..... 2.1. *E. acanthoclada*
18. Leaves alternate, glabrous (W.A.: Peak Charles area)..... 2.3. *E. andocada*
- 18: Leaves opposite and decussate, glabrous or hairy..... 19
19. Leaf and bracteole with apical apiculum uncinat; stems never spine-tipped
(W.A.: from E of Mullewa to Lort River, W of Esperance)..... 2.7. *E. leptophylla*
- 19: Leaf and bracteole apex straight; stems with or without spinous tips..... 20
20. Leaves obovate or narrowly obovate, apex subacute or acute,
leaves mainly > 5 mm long, not spinescent..... 21
- 20: Leaves ovate, narrowly ovate, oblong or narrowly elliptic, apex obtuse,
leaves mainly < 4 mm long, apex branchlets often pungent..... 22
21. Leaf narrowly obovate, apex subacute, base not distinctly tapered,
not discolorous; fruit sub-globose 3–3.5 × 2.6–3 mm (south-west W.A., S.A.)..... 2.5. *E. empetrifolia*
- 21: Leaf distinctly obovate with apex acute, base narrowed to petiole,
lower surface darker than upper surface; fruit ellipsoid, 5–6 × 3.3–4.5 mm
(Qld, N.S.W., Vic., S.A., one collection ? W.A.)..... 2.4. *E. diffusa*
22. Calyx outer surface with sparse, white hairs; leaf abaxial surface verrucose,
stems not pungent (W.A.: Beverley, Kokeby, Quairading, Yellowdine)..... 2.10. *E. rubricarina*
- 22: Calyx glabrous except for lobe margins; leaf abaxial surface smooth except for rib..... 23
23. Majority of mature leaves < 1 mm long (new growth leaves up to 3 mm long
and narrowly ovate); leaf margin with hairs; apex of branchlets hairy,
never pungent (W.A.: Riverina Station, S to Lake Cronin, Duranillin, Lake Magenta,
Gnowangerup)..... 2.9. *E. nanophylla*
- 23: Majority of mature leaves on plant > 1 mm long; leaves and stem glabrous,
or rarely margins hairy; apical branchlets often pungent (N.S.W., S.A., Tas., Vic.)..... 2.8. *E. microphylla*

Notes. Two putative new species of *Eutaxia* have recently been collected and are recommended as priority species for further survey. They are from Jasper Hill (R.J. Cranfield 8607) and North Ironcap (P. Armstrong *et. al.* 06/898). There is one fruiting specimen of each taxon and until further collection there is insufficient material for descriptions. Both have the following features: stipules minute; style filiform and bent, the stigma simple; calyx outer surface glabrous, without prominent ribs; fruit capsules prominently stipitate.

The first putative species from east of Jasper Hill superficially resembles *E. microphylla* with its pungent branchlets and small leaves but is easily identifiable in having narrowly obovate, verticillate leaves rather than being ovate and opposite - decussate. It differs from *E. actinophylla*, which also has verticillate leaves, in having distinctive, very long fruiting pedicels and glabrous fruits.

The second putative species is from north of North Ironcap. It is similar to *E. rubricarina* in having hairy, verrucose leaves and a red keel, but differs in having a glabrous calyx and alternate rather than opposite - decussate leaves.

Eutaxia R.Br. section **Eutaxia**, in F.Muell., *Fragm.* 1: 7 (Mar. 1858).

Ovary sessile or shortly stipitate (stipe < 0.6 mm); *style* thick and hooked just below the apex; *stigma* capitate.

1.1. Eutaxia cuneata Meisn., in Lehm., *Pl. Preiss.* 1: 65 (Sep. 1844). *Type citation*: 'In rupestribus collium Konkoberup hills (Kent) [Western Australia] d. 19. Nov. 1840. Herb. Preiss. No. 1022.' (*lecto*, here designated: LD; *isolecto*: G!, NY (image!)).

Shrub, erect, densely or rarely sparsely branched, 0.3–1.6 × 0.6–1.3 m. *Stems* grey-brown, to red-brown, not tuberculate, not spinescent, glabrous. *Stipules* mainly absent or cream, *c.* 0.15 × 0.1 mm. *Pulvinus* 0.2–0.5 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length, *petiole* 0.4–0.8 mm long; *blade* discolorous, mid green over grey-brown, cuneate, 2–17 × 1.1–7 mm, abaxial surface smooth, with one prominent central vein and two faint lateral veins at base, both surfaces and margin glabrous, the apex obtuse or somewhat cuspidate, straight. *Flowers* axillary, in pairs or solitary. *Bracts* in the axil of a vegetative leaf, oblong or ovate, 0.7–1.2 × 0.4–0.8 mm. *Bracteoles* positioned *c.* halfway down pedicel, red-brown, ovate, 0.6–1.3 × 0.4–0.6 mm, both surfaces glabrous, margin and the apex with sparse, spreading, straight hairs *c.* 0.1 mm long. *Pedicels* straight, rarely recurved, 1.5–4 mm long. *Buds* excluding emergent petals 3.5–5 × 2.2–2.5 mm, glabrous except for margins of lobes. *Hypanthium* 0.4–0.55 mm long. *Calyx* inconspicuously 6-ribbed, green or red-brown without markings, or with red spots, dull; total calyx length 3.5–5 mm; three abaxial lobes fused at base for 1.5–1.9 mm, symmetrical, 1.5–2 × 0.8–1.3 mm; two adaxial lobes fused at base for 3.5–4.5 mm, broadly ovate, falcate, 0.3–0.5 × 1–1.3 mm, the apex truncate. *Standard* claw 2–3 × 0.35–0.8 mm; lamina base truncate, auriculate; lamina orange-yellow with a yellow, elliptic eye bordered by a brick red, broad halo; lamina elliptic to broadly ovate, 6.5–7 × 7.3–9.6 mm, emarginate indent 0.5–0.7 mm long. *Wings* claw 1.5–2.8 mm long; adaxial spur straight or slightly curved, 0.4–0.8 mm long; lamina orange-yellow, darker towards the base, straight or downturned, oblong to slightly obovate, 5.5–6.3 × 1.6–1.9 mm; the apex obtuse. *Keel* claw 1.5–2.3 mm long; lamina dark orange-red throughout, straight, more or less oblong, 4.2–4.7 × 1.7–1.8 mm, glabrous, the apex somewhat acute. *Stamen filaments* 2.1–5 × 0.1–0.3 mm; *anthers* yellow, 0.3–0.5 × 0.25–0.3 mm. *Gynoecium* sessile; *ovary* 2–2.8 × 0.6–0.8 mm, lower half glabrous, remainder with moderately dense, spreading, straight hairs, *c.* 0.6 mm long; *style* hooked towards the apex, 1.8–3.1 × 0.2 mm, lower 1/3 with moderately dense, spreading, straight hairs *c.* 0.6 mm long, glabrous on upper 2/3; *stigma* capitate. *Fruit* compressed, ellipsoid, placental margin straight, opposite margin curved, 5–5.2 × 2.6–2.7 mm, outer surface with scattered, appressed, straight and wavy hairs *c.* 0.2 mm long. *Seed* dark brown with black markings, ellipsoid, 2–2.4 × 1.4–1.45 mm; *aril* white, *c.* 1.5 × 0.5 mm. (Figure 1)

Chromosome number: $2n = 16$ (voucher Sands 638.12.14; Sands 638.16.17 cited as *E. parvifolia* by Sands 1975).

Selected specimens. WESTERN AUSTRALIA: Fitzgerald River, 3 Aug. 1970, *K.M. Allan* 330 (MEL, NSW, PERTH); S of Jerramungup, 24 Aug. 1965, *J.C. Anway* 268 (PERTH); S of Ravensthorpe, Sep. 1925, *W.E. Blackall* & *C.A. Gardner s.n.* (PERTH); NW of Coujinup Hill, 12 Aug. 1983, *M.A. Burgman* 1992 (PERTH); W of Lort River Bridge, on S Coast Hwy, 18 Sep. 2000, *J.A. Chappill, M.D.*

Crisp & L. Cook 6475 (PERTH); Pallinup River Reserve, W of bridge, 16 Aug. 1986, *E.J. Croxford* 5059 B (PERTH); Montem [Mount] Desmond, 30 Aug. 1962, *C.A. Gardner* 14067 (PERTH); Kundip, 22 Aug. 1965, *C.A. Gardner* 16225 (PERTH); Junction of Fitzgerald and Lusetta Rivers, 12 July 1970, *A.S. George* 9967 (CANB, PERTH); Museum Greenbelt, Jerramungup, 15 Sep. 1994, *W.R. Lullfitz* 38 (PERTH); Fitzgerald R crossing on Hassell Hwy, 4 Nov. 1992, *T.D. Macfarlane* 2111 (CANB, PERTH); N end of Ravensthorpe Range SE of Mt Short, 30 Aug. 1980, *B.R. Maslin* 4768 (K, PERTH); SE of Ongerup, 12 July 1964, *K.R. Newbey* 3034 (MEL, PERTH); Location 900, in gully leading into Yerritup Creek, N of coast at Stokes Inlet, 25 Sep. 1968, *A.E. Orchard* 1184 (AD, CANB, PERTH); E of Jerramungup, 24 Aug. 1963, *V.E. Sands* 638.16.17 (PERTH, SYD); Needilup, Oct. 1986, *B. Smith* 28/86 (PERTH); W of Bremer Bay township, 1 Oct. 1966, *P.G. Wilson* 4333 (CANB, K, PERTH); S of road from Ravensthorpe to Hamersley R, 26 Aug. 1965, *E. Wittwer* 378 (PERTH).

Distribution and habitat. *Eutaxia cuneata* is found close to the south coast of Western Australia, from Cheyne Beach to Ravensthorpe (Figure 2). It has been collected in heath, scrub and open woodland on a range of soil types, including clay, loam, sand and gravel.

Flowering period. July to October.



Figure 1. Flowering stem of *Eutaxia cuneata*. Photo Mary Hancock.

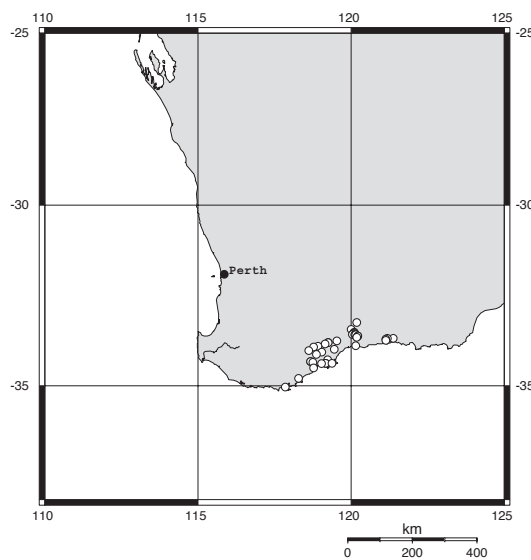


Figure 2. Distribution of *Eutaxia cuneata* in Western Australia.

Conservation status. This species is widespread and not considered to be under threat at this time.

Etymology. From the Latin *cuneatus* in reference to the cuneate leaf shape present in this species.

Notes. *Eutaxia cuneata* most closely resembles the commonly cultivated species *E. myrtifolia*. These species share the distinctive truncate adaxial calyx lip and small (*c.* 1 mm long) ovate bracteoles positioned towards the middle of the pedicel. They differ only by their leaf form, *E. cuneata* having cuneate leaves with an obtuse or apiculate apex while *E. myrtifolia* has obovate leaves with an acute to acuminate apex. The leaves of *E. cuneata* are also generally smaller (2–12.5 mm long), than those of *E. myrtifolia* (4.5–21 mm long).

The type specimen at LD has been chosen as the lectotype over the NY specimen as it is of superior quality (Crisp pers. comm. 2009). Both sheets were viewed by Meissner (see Crisp 1983).

1.2. *Eutaxia epacridoides* Meisn., in Lehm., *Pl. Preiss.* 1: 64 (Sep. 1844). *Type citation:* ‘In solo turfoso inter frutices densos prope montes Melville et Elphinstone (Plantagenet) d. 11. Oct. 1840. Herb. Preiss. No. 412 et 867.’ *Lecto, here designated:* L. Preiss 867 (LD); *isolecto:* G!, GOET, MO, NY (image!), P!, W. *Paralecto:* L. Preiss 412 (G!, MEL, NY (image!), PERTH! 00861197, PERTH! 01006746, S).

Shrub, erect to spreading or decumbent, sparsely branched, 0.25–1.2 × 0.15–0.6 m. *Stems* green, smooth or tuberculate, not spinescent, glabrous. *Stipules* cream, 0.1–0.3 × 0.1–0.15 mm. *Pulvinus* 0.2–1 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length, *petiole* 0.3–0.8 mm long; *blade* concolorous grey-green, or abaxial surface darker grey-green, narrowly elliptic, 9.5–20 × 1.8–3.8 mm, abaxial surface smooth, ribs absent or with one prominent central vein and two faint lateral veins at base, both surfaces and margin glabrous; the apex acute and straight. *Flowers* axillary, in pairs or rarely solitary. *Bracts* in the axil of a vegetative leaf, ovate, 1–1.8 × 0.6–1 mm. *Bracteoles* on middle to upper portion of pedicel, red-brown, subulate, 0.4–0.9 × 0.3–0.6 mm; both surfaces glabrous; margins with scattered, spreading, straight hairs *c.* 0.05 mm long. *Pedicels* recurved, rarely straight, 1.3–4.1 mm long. *Buds* excluding emergent petals 5.5–6.5 × 1.2–2.3 mm, glabrous except for margins of lobes. *Hypanthium* 0.3–0.7 mm long. *Calyx* prominently 10- or rarely 12-ribbed, green or red-brown without markings, dull; total calyx length 5.5–6.5 mm long; three abaxial lobes fused at base for 1.2–2 mm, equal in length or middle lobe slightly longer, 2.3–3 × 0.7–0.9 mm, with lateral lobes 1.9–2.9 × 0.65–0.9 mm; two adaxial lobes fused at base for 2.8–3.6 mm, ovate, straight or falcate, 0.8–1.5 × 0.8–1.2 mm, the apex acute. *Standard* claw 2.5–2.8 × 0.35–0.5 mm; lamina base truncate, with or without auricles; lamina yellow-orange with red markings on front surrounding a pale yellow eye, back almost completely dark red; lamina elliptic to obovate, 6–7.1 × 5.7–6.7 mm, emarginate indent 0.5–1.3 mm. *Wings* claw 2.3–2.6 mm long; lamina adaxial spur straight, *c.* 0.4 mm long; lamina yellow-orange infused with pale red at the base, straight, oblong to slightly obovate, 5.3–5.7 × 1.2–1.4 mm; the apex rounded to truncate. *Keel* claw 2.1–2.7 mm long; lamina deep maroon red at the apex fading to cream at the base, straight, triangular, 4–6.4 × 1.3–1.4 mm, glabrous; the apex narrow, subacute. *Stamen filaments* 2.2–5 × 0.15–0.3 mm; *anthers* cream, 0.25–0.4 × 0.2–0.25 mm. *Gynoecium* sessile or with stipe to 0.25 mm long; *ovary* 1.3–1.8 × 0.4–0.7 mm, with moderately dense, spreading, straight hairs 0.6–0.8 mm long, evenly distributed or more dense towards the apex; *style* hooked towards the apex, 1.7–3.3 × 0.15–0.35 mm, glabrous; *stigma* capitate. *Fruit* compressed, ellipsoid, *c.* 5.5 × 2.7 mm, placental margin slightly curved, non-placental margin strongly curved, outer surface with scattered, spreading, straight hairs *c.* 1 mm long towards the apex. *Seed* brown, with or without black markings or black, ellipsoid, 2–2.1 × 1.2 mm; *aril* cream, *c.* 0.8 × 0.4 mm.

Chromosome number. $2n = 16$ (voucher Sands 638.12.2; cited by Sands 1975).

Selected specimens. WESTERN AUSTRALIA: Karridale, Oct. 1905, *C. Andrews s.n.* (PERTH); Busselton - Nannup Road, Busselton, 21 Sep. 1975, *A. Annels* 1119 (PERTH); Kordabup Road, 12 Sep. 1991, *A.R. Annels* 1655 (PERTH); E of Bornholm, 17 Sep. 1966, *E.M. Bennett* 1138 (PERTH); Along South Western Hwy, NW of Walpole, 11 Sep. 1971, *R.Y. Berg* RYB 173 A (PERTH); Stewart Road, W of Vasse Highway, 30 Nov. 2000, *J.A. Chappill & C.F. Wilkins* 6579 (PERTH); Torbay, *s.dat.*, *A. Cayzer s.n.* (PERTH); NNE of Windy Harbour, 6 Sep. 1995, *R.J. Cranfield* 10332 (PERTH); Swan River, *s.dat.*, *J. Drummond* 2: 128 (K); Western foot of Mt Manypeaks, 5 Sep. 1935, *C.A. Gardner* 3332 (PERTH); W of Denmark, 10 Sep. 1957, *R.T. Lange* 240, (PERTH); W of St John Brook, 12 Sep. 1957, *R.T. Lange* 266 (CANB, PERTH); W of Darradup/Vasse Hwy intersection and N of Darradup Road, 21 Jan. 1997, *C. McChesney & P. Ellery* B 62.11 (PERTH); W of Nicol Road/Thompson Road intersection, N of Nicol, 12 Feb. 1997, *C. McChesney & C. Day* W 19.7 (PERTH); Rosa Brook, 9 Sep. 1976, *G.S. McCutcheon* 805 (PERTH); Scott R, E of Augusta, 21 Sep. 1973, *E.C. Nelson* ANU 17301 (CANB, PERTH); Cowaramup, 30 Oct. 1947, *R.D. Royce* 2449 (PERTH); Margaret R, 16 Oct. 1954, *R.D. Royce* 4899 (PERTH); Alexandra Bridge - Manjimup, 17 Aug. 1963, *V.E. Sands* 638.12.2 (PERTH, SYD); From Walpole towards Shannon, Darling District, 20 Sep. 1983, *J. Taylor & P. Ollerenshaw* JT 1996 (CANB, PERTH); W of Walpole, 8 Sep. 1965, *B.L. Turner* 5500 (PERTH).

Distribution and habitat. Endemic to Western Australia, *Eutaxia epacridoides* occurs in coastal regions in the south-western corner of Western Australia, from N of Capel to Mt Manypeaks (Figure 3). It is usually found in swampy lowland areas on sandy soil in open woodland or shrubland, and is often associated with *Eucalyptus marginata*.

Flowering period. August to November.

Conservation status. This species is widespread and not considered to be under threat at this time.

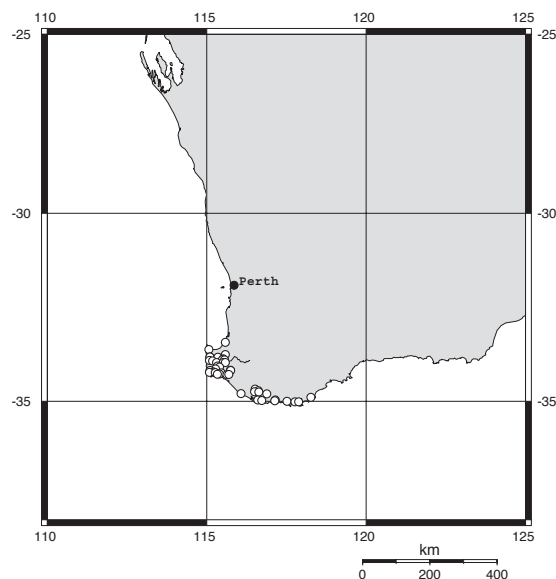


Figure 3. Distribution of *Eutaxia epacridoides* in Western Australia.

Etymology. The epithet *epacridoides* is in reference to the epacrid-like appearance of this species.

Notes. *Eutaxia epacridoides* and *E. exilis* can be easily distinguished from other *Eutaxia* species by their distinctive, prominently 10–12-ribbed calyx. This species differs from *E. exilis* by having larger flowers, leaves that are overlapping, dense and generally larger (4.5–18 mm long) and the apex while acute has a blunted apiculus rather than being acuminate.

The flowers are similar in shape to those of *E. virgata*, but that species has larger (2–3.7 mm long) bracteoles and only five calyx ribs. The very small (*c.* 1 mm long) subulate bracteoles of *E. epacridoides* and *E. exilis* are similar to those of *E. myrtifolia* and *E. cuneata*, but the first two species have adaxial calyx lobes with an acuminate apex, rather than having a truncate adaxial calyx lip that is characteristic of the latter two species.

The LD specimen of Preiss 867 has been chosen as the lectotype as suggested by M.D. Crisp (pers. comm. 2009). The labelling on the LD sheet is unambiguous. On the left of the sheet is a specimen that is the most complete (a whole plant including the root), with a full descriptive label including the Preiss number 867 and annotated '*Eutaxia epacridoides* nob.' by Meissner. The other specimen (on the right of the sheet) is also fully and clearly labelled, with the number 412. On the NY sheet the left hand specimen has a number 867 on a paper tag slipped over the stem, but the right hand specimen is unlabelled. This will, however, provide an unambiguously labelled isolectotype of 867 in NY (and also a labelled packet).

1.3 *Eutaxia exilis* C.F. Wilkins & G.R. Hend., *sp. nov.*

E. epacridoides affinis sed internodio longitudine folium superantes, floribus parvioribus et pedicellis brevioribus, apiculo folii acuminato non obtuso differt.

Typus: east of Blackwood and Great North Roads, Western Australia [precise locality withheld for conservation reasons], 21 October 1998, *R. Davis* 7689. (*holo:* PERTH 05139414!).

Eutaxia epacridoides subsp. *sparsifolia* G.R. Henderson ms, Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.au> [accessed 12 Nov. 2008].

Shrub erect to straggling or decumbent, sparsely branched 0.20–1 × 0.15–0.6 m. *Stems* red-brown or green, smooth or slightly tuberculate, not spinescent, glabrous. *Stipules* cream, 0.1–0.3 × 0.1 mm, rarely absent. *Pulvinus* 0.2–0.4 mm long. *Leaves* spreading, opposite and decussate, internode length longer than leaf length, *petiole* 0.1–0.3 mm long; blade concolorous mid-green, narrowly elliptic, 3–12 × 0.7–1.2 mm, not tuberculate, abaxial surface with one prominent central vein and two faint lateral veins at base, both surfaces and margin glabrous; the apex acuminate, straight. *Flowers* axillary, in pairs or rarely solitary. *Bracts* in the axil of a vegetative leaf, lanceolate, 1.4–2.3 × 0.4–0.6 mm. *Bracteoles* on mid to upper portion of pedicel, brown, subulate, 0.3–0.9 × 0.25–0.3 mm, both surfaces glabrous, margins with scattered, spreading, straight hairs *c.* 0.05 mm long. *Pedicels* recurved or straight, 0.6–1.3 mm long. *Buds* excluding emergent petals 3.8–4.8 × 1.2–2 mm, glabrous except for margin of calyx lobes. *Hypanthium* *c.* 0.3 mm long. *Calyx* prominently 10–12-ribbed, red-green or pale red-brown without markings, ribs paler red, slightly glossy or dull between ribs; total calyx length 3.8–4.8 mm; three abaxial lobes fused at base for 1.1–1.5 mm, middle lobe slightly longer, 2.2–3.3 × 0.8–0.9 mm, lateral lobes 1.9–2.8 × 0.65–0.9 mm; two adaxial lobes fused at base for 2.5–2.9 mm, ovate, straight or rarely falcate, 0.8–1.5 × 0.8–1 mm, the apex acute. *Standard* claw 2.2–2.7 × 0.5–0.6 mm; lamina base

truncate, without auricles; lamina yellow-orange with dark red markings surrounding yellow-green eye, lower surface predominantly dark red, elliptic to obovate, 3.1–4.6 × 2.8–5.1 mm; emarginate indent 0.5 mm long. *Wings* claw 1.8–2.4 mm long; lamina adaxial spur straight, c. 0.4 mm long; lamina yellow-orange infused with pale pink at the base, straight, oblong, 3.1–4.5 × 0.7–1.2 mm, the apex rounded to truncate. *Keel* claw 1.8–2 mm long; lamina orange-red at the apex fading to cream at the base, straight, narrowly triangular, 4–4.8 × 0.8–1.2 mm, glabrous, the apex narrow and rounded. *Stamen filaments* 2.2–3.7 × 0.15–0.3 mm; *anthers* cream, 0.25–0.4 × 0.2–0.25 mm. *Gynoecium* sessile or with stipe to 0.25 mm; *ovary* 1–1.1 × 0.3–0.5 mm, with moderately dense, spreading, straight hairs 0.6–0.8 mm long, evenly distributed or more dense towards the apex; *style* hooked towards the apex, 1.5–2 × 0.15–0.2 mm, glabrous; *stigma* capitate. *Fruit* compressed, ellipsoid, placental margin slightly curved, non-placental margin strongly curved, immature size 3.3 × 1.5 mm, outer surface with scattered hairs c. 0.7 mm long, mainly towards margins. *Seed* not seen. (Figure 4)

Chromosome number. Unknown.

Selected specimens. WESTERN AUSTRALIA: [localities withheld] 23 Sep. 1992, *A. Annels* 2456 (PERTH); 29 Sep. 2000, *R.R. Archer* 92 (PERTH); 12 Dec. 1996, *N. Casson & P. Ellery* 82.2 (PERTH); 11 Dec. 1996, *N. Casson, P. Ellery & C. McChesney* SC 74.5 (PERTH); 3 Sep. 1997, *P.A. Jurjevich* 1120 (PERTH); 13 Oct. 1948, *R.D. Royce* 2797 (PERTH); 23 Oct. 1952, *R.D. Royce* 3915 (PERTH).

Distribution and habitat. *Eutaxia exilis* has been collected from scattered localities near Harvey, Nannup, Margaret River and near the Blackwood River (Figure 5). It is found in low lying, damp areas on sandy soils, with associated vegetation of very low open woodland, or shrubland.

Flowering period. September to November.

Conservation status. Recently listed as Priority Three under the Department of Environment and Conservation's (DEC) Conservation Codes for Western Australian Flora, due to its restricted habitat and distribution.

Etymology. From the Latin *exilis* (= thin) in reference to the sparse, narrow, leaves present in this species compared with its closest relative *E. epacridoides*.

Notes. Superficially this species resembles *E. virgata* due to the small, sparsely distributed leaves, and it has been mistaken for this species in the past. It can be distinguished by the prominently 10-ribbed calyx, very small bracteoles, long, narrow keel petals and acuminate leaf apices. *Eutaxia epacridoides* can be differentiated from *E. exilis* by its more densely distributed, generally broader leaves, larger flowers and the more blunted leaf apiculus.

Some specimens have been labelled *E. epacridoides* subsp. *Whicher Range* (R. Davis 7689) but this name is not recorded on *FloraBase*.

The epithet *sparsifolia* was unsuitable for use at species level as *E. sparsifolia* (= *Dillwynia uncinata* (Turcz.) J.Black) was previously described by Mueller in 1855.



Figure 4. Flowering stem of *Eutaxia exilis* (scan of section of holotype PERTH 05139414); scale bar = 1 cm.

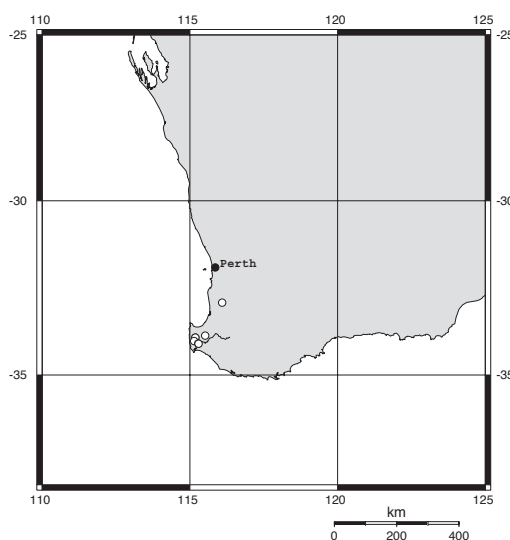


Figure 5. Distribution of *Eutaxia exilis* in Western Australia.

1.4. *Eutaxia hirsuta* C.F. Wilkins & Chappill, *sp. nov.*

Caulis et calyx dense pilosus. Species tomento denso in calyce et caulibus a congeneribus diversa.

Typus: Wogarl Reserve, Western Australia [precise locality withheld for conservation reasons], 21 October 2000, *A. Gunness, B. Moyle, A. Bellman s.n.* (W.A. Wildflower Society) (*holo:* PERTH 05802644!; *iso:* CANB!).

Eutaxia neurocalyx (Turcz.) Chappill & G.R. Henderson subsp. *hirsuta* Chappill & G.R. Henderson ms, Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.au> [accessed 12 Nov. 2008]

Shrub erect, sparsely branched, *c.* 45 cm high, width unknown. *Stems* red-brown, smooth, not spinescent, with dense, spreading, straight hairs 0.4–0.7 mm long. *Stipules* absent. *Pulvinus* 0.4–1 mm long. *Leaves* closely appressed, alternate, internode length shorter than leaf length; *petiole* 0.1–0.15 mm long; blade concolorous grey-green, not tuberculate, ovate, 0.7–3 × 0.8–1.2 mm, abaxial surface 0–3 prominent ribs, margins and both surfaces with dense, spreading, straight hairs 0.5–0.8 mm long, the abaxial surface glabrescent; the apex obtuse and straight. *Flowers* mostly axillary, solitary or in pairs, and/or with 2–5 flowers with bracts clustered on a 1–2 mm long, leafless, densely hairy flowering stem section towards the apex of branchlets. *Bracts* similar to floral leaves but shorter, broader and thinner-textured, ovate, 2.5–3.5 × 1.8–3 mm. *Bracteoles* on upper portion of pedicel, brown, ovate, 3.5–4.3 × 1.2–1.8 mm, margin and both surfaces with dense, spreading, straight hairs *c.* 0.7 mm long. *Pedicels* straight, 0.6–4.1 mm long. *Buds* excluding emergent petals 4.5–5.5 × 2.5 mm, with

dense, spreading, straight hairs 0.8–1.7 mm long on outer surface and margin of lobes. *Hypanthium* 0.3–0.5 mm long. *Calyx* prominently 25-ribbed, red brown with cream ribs, dull; total calyx length 4.5–5.5 mm long; three abaxial lobes fused at base for 2–2.3 mm, $3.2\text{--}4.3 \times 1\text{--}1.6$ mm; two adaxial lobes fused at base for 4.4–5 mm, ovate, straight or falcate, $1.2\text{--}2.3 \times 0.7\text{--}1$ mm, acute. *Standard* claw $2.5\text{--}4.5 \times 0.5\text{--}0.7$ mm; lamina base rounded, slightly auriculate; lamina yellow-orange with red markings around yellow eye, red-brown on back, obovate or elliptic, $6.3\text{--}10 \times 7\text{--}9.3$ mm long; emarginate indent 0.3–0.6 mm. *Wings* claw 2.5–4 mm long; lamina adaxial spur straight or curved, *c.* 0.4 mm long; lamina yellow, downturned, obovate, $5.5\text{--}7 \times 2.5\text{--}2.6$ mm, the apex rounded to truncate. *Keel* claw 2.6–3.5 mm long; lamina deep red at the apex fading to cream at the base, straight, oblong, $3.9\text{--}4.5 \times 1.6\text{--}1.8$ mm, glabrous, the apex rounded. *Stamen filaments* $3.3\text{--}6.7 \times 0.25\text{--}0.3$ mm; *anthers* cream, $0.4\text{--}0.5 \times 0.3$ mm. *Gynoecium* sessile; *ovary* $1\text{--}1.8 \times 0.4\text{--}0.7$ mm, with moderately dense, spreading, straight hairs 0.6–0.8 mm long, evenly distributed or denser towards the apex; *style* hooked towards the apex, $3.8\text{--}4.4 \times 0.3\text{--}0.4$ mm, glabrous; *stigma* capitate. *Fruit* and *seed* not seen. (Figure 6)

Chromosome number. Unknown

Selected specimens. WESTERN AUSTRALIA: [localities withheld] *s.dat.*, *E.T. Bailey* 266 (PERTH); Sep. 1947, *E.T. Bailey* 301 (PERTH); 14 Oct. 1968, *J.S. Beard* 5762 (PERTH); Nov. 1971, *W.H. Butler s.n.* (PERTH).

Distribution and habitat. *Eutaxia hirsuta* is known only from Muntadgin to north of Hyden (Figure 7). It occurs on sandy, gravelly sand plains in low open heath.

Flowering period. September to November.

Conservation status. Recently listed as Priority Two under DEC Conservation Codes for Western Australian Flora.

Etymology. From the Latin *hirsutus* (= covered in coarse hairs) referring to the long, dense hairs present on the calyx.

Notes. *Eutaxia hirsuta* differs from the other species in the densely hairy calyx, stem, bracts and bracteoles. As well as the dense hair difference, *E. hirsuta* differs from *E. neurocalyx* in having the standard obovate rather than being ovate, with a longer claw (2.5–4 mm rather than being <2 mm long) and the calyx is longer (5.5–7 mm rather than being 4–5.5 mm long).

Specimens of this species at PERTH have been annotated as *Eutaxia* sp. Wogarl (*A. Gunness et al. s.n.* 21/10/2000) but this phrase name has not been recorded on FloraBase.

1.5. *Eutaxia inuncta* C.F. Wilkins & Chappill, *sp. nov.*

E. majori affinis sed calyce nitido et foliis latioribus, pagina superiore folii costa ad apice lata facta differt.

Typus: West of Esperance, Western Australia [precise locality withheld for conservation reasons], 18 September 2000, *J.A. Chappill, M.D. Crisp & L. Cook* 6474 (*holo:* PERTH 07831579!; *iso:* CANB!, MEL!).



Figure 6. Flowering stem of *Eutaxia hirsuta* (scan of section of holotype PERTH 05802644); scale bar = 1 cm.



Figure 7. Distribution of *Eutaxia hirsuta* in Western Australia.

Eutaxia neurocalyx (Turcz.) Chappill & G.R. Henderson subsp. *major* Chappill & G.R. Henderson ms, Western Australian Herbarium, in FloraBase, <http://florabase.dec.wa.au> [accessed 12 Nov. 2008].

Shrub erect or spreading, sparsely branching 0.15–1.3 × 0.3 m. *Stems* red-brown, without tubercles, not spinescent, with dense, spreading, straight hairs, 0.1–0.2 mm long. *Stipules* mainly absent or inconspicuous, *c.* 0.1 × 0.1 mm. *Pulvinus* 0.8–1.5 mm long. *Leaves* spreading, alternate, internode length shorter than leaf length; *petiole* 0.15–0.5 mm long; *blade* mainly concolourous, olive green, or discolourous from abaxial surface with red-brown markings, smooth, ovate or narrowly elliptic, 1.8–10.1 × 0.8–3 mm, abaxial surface 1–3-ribbed, (main rib broadening towards the apex), both surfaces glabrous, margin of new growth with sparse to dense, spreading, straight hairs *c.* 0.15 mm long; the apex acute or obtuse, straight. *Flowers* solitary, axillary, with 3–8 clustered towards the apex of branches on a short or elongated flowering section of stem, 1–18 mm long. *Bracts* similar to floral leaves but broader and thinner-textured, ovate to broadly ovate, 1.5–4.8 × 1.3–4 mm. *Bracteoles* on pedicel at base of calyx, green or orange-brown, ovate to broadly ovate, 2.5–5 × 1.6–3.6 mm; abaxial surface glabrous; adaxial surface with dense spreading, straight hairs *c.* 0.1 mm long; margin with sparse, spreading, straight hairs *c.* 0.1 mm long. *Pedicels* straight, 0.1–0.3 mm long. *Buds* excluding emergent petals, (4.5–)5–8.5 × 2.5–3.5 mm, glabrous except for margin of lobes. *Hypanthium* 0.4–0.8 mm long. *Calyx* prominently *c.* 25-ribbed, pale green glossy, soon becoming orange-brown glossy, without markings; total calyx length (4.5–)5–8.5 mm; three abaxial lobes fused at base for 1.4–2.1 mm, symmetrical, or central lobe slightly longer, 4.6–4.7 × 2–2.5 mm; two adaxial lobes fused at base for 4.4–5 mm, ovate, straight, 1.2–1.7 × 0.9–1.2 mm, the apex acute. *Standard* claw 2.7–3.5 × 0.5–0.6 mm; lamina base truncate with small auricles; yellow-orange or orange with basal yellow eye rimmed by red flares, red veins on rear; lamina ovate, or broadly ovate, rarely elliptic, 6.5–9.3 × 7.6–11 mm, emarginate indent 0.6–0.7 mm long. *Wings* claw 2.5–3 mm long; lamina adaxial spur straight, 0.5–0.8 mm long; lamina dark red base and apical half yellow-orange, straight, or downturned, oblong to obovate,

6–7.8 × 2.2–3 mm; the apex obtuse. *Keel* claw 2–3 mm long; lamina dark red apex, fading to base; straight, oblong, 3.8–4.8 × 1.8–2.4 mm, towards the apex of adaxial margin with scattered hairs *c.* 0.05 mm long, the apex straight, rounded. *Stamen filaments* 2.3–5.3 × 0.1–0.2 mm; *anthers* white, 0.4–0.5 × 0.3–0.4 mm. *Gynoecium* stipe 0–0.2 mm long; *ovary* 2.3–4.5 × 1.3–2.3 mm, with dense, spreading, straight hairs, *c.* 0.8 mm long, evenly distributed; *style* hooked towards the apex, 2.4–3.5 × 0.25–0.5 mm, lower half with sparse, spreading, straight hairs *c.* 0.5 mm long, upper half glabrous; *stigma* capitate. *Fruit* inflated, ellipsoid, placental margin slightly curved, non-placental margin strongly curved, 5.5–5.7 × 2.4–2.7 mm, outer surface with dense, spreading, straight hairs *c.* 0.8 mm long. *Seeds* brown, ellipsoid, *c.* 1.6 × 1.4 mm; aril cream, *c.* 0.8 × 0.3 mm. (Figure 8)

Chromosome number. $2n = 14$ (vouchers Sands 638.17.7, 638.18.2, cited by Sands, 1975 as *Pultenaea neurocalyx*).

Selected specimens. WESTERN AUSTRALIA: N of Esperance, 16 Oct. 1931, *W.E. Blackall & C.A. Gardner* 1100 (PERTH); SSE of Kau Rocks, NE of Intersection 3 on Condingup Road, 2 Sep. 1984, *M.A. Burgman & C. Layman* MAB 3336 (PERTH); E of Styles Road on Norwood Road, 16 Sep. 2000, *J.A. Chappill, M.D. Crisp & L. Cook* 6444 (PERTH); Gibsons Soak, 16 Sep. 1934, *C.A. Gardner s.n.* (CANB, PERTH); E of Duke of Orleans Bay Road, 19 Sep. 1976, *R.J. Hnatiuk* 761043 (PERTH); N of Esperance, 15 Oct. 1998, *P.C. Jobson & K.M. Downs* 5830 (CANB, NSW, PERTH); NE of Hopetoun, 2 Nov. 1962, *M.E. Phillips* 24071 (CANB, NSW); N of Esperance, 18 Oct. 1985, *E. & S. Pignatti* 1172 (PERTH); Cape Le Grand National Park, E of Esperance, 21 Oct. 1969, *R.D. Royce* 8725 (PERTH); N of Gibson, N of Esperance, near Esperance Plains Research Station, 23 Oct. 1969, *R.D. Royce* 8850 (PERTH); E of Ravensthorpe, Ravensthorpe to Esperance, 25 Aug. 1963, *V.E. Sands* 638.18.2 (PERTH, SYD); Daniels Road, Ravensthorpe to Hopetoun, 25 Aug. 1963, *V.E. Sands* 638.17.7 (PERTH, SYD); E of Scaddan on Styles Road, 11 Sep. 1984, *P. van der Moezel* PGV 461 (PERTH); W of Esperance, 2 Sep. 1947, *J.H. Willis s.n.* (MEL, PERTH); E of Ravensthorpe, 2 Sep. 1947, *J.H. Willis s.n.* (MEL).

Distribution and habitat. *Eutaxia inuncta* is found towards the south coast of Western Australia between Ravensthorpe and Cape Arid (Figure 9). It has been collected in low open heath on sandy soil.

Flowering period. August to November.

Conservation status. This species is widespread and is not considered to be under threat at this time.

Etymology. From the Latin *inunctus* (as if oiled), referring to the glossy mature calyx.

Notes. *Eutaxia inuncta* is similar to *E. neurocalyx*, *E. major*, *E. hirsuta* and *E. lutea* in having prominently ribbed leaves, bracteoles and calyx. *E. inuncta* is most similar to *E. major* but can be distinguished by the hairs usually present on the stems, the calyx that is glossy and red brown between the ribs, and the broader leaves have a central rib on the lower surface that broadens prominently towards the apex.

1.6. *Eutaxia lasiophylla* G.R.Hend., *sp. nov.*

In margine et superficiebus ambabus folii pilis densis, effusis, rectis 0.15–0.2 mm longis, vel pilis densis solum in pagina adaxialis et in margine; calyx rubro-brunneus glaber; stylus crassus, uncinatus; stigma capitatum.



Figure 8. Flowering stem of *Eutaxia inuncta* (scan of section of holotype PERTH 07831579); scale bar = 1 cm.

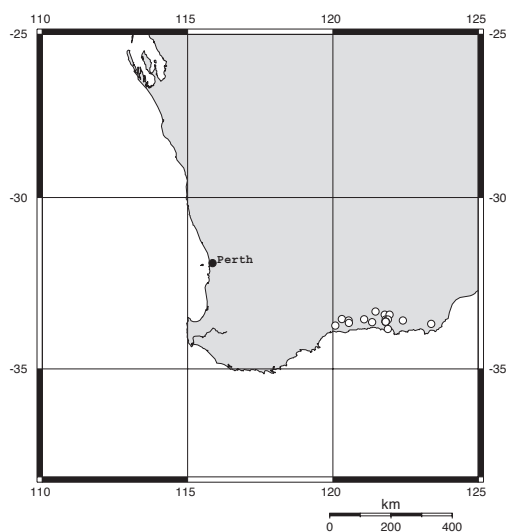


Figure 9. Distribution of *Eutaxia inuncta* in Western Australia.

Typus: NW of Southern Cross on Bullfinch Road, Western Australia [precise locality withheld for conservation reasons], 10 September 2000, J.A. Chappill 6410 (*holo*: PERTH 07684541!; *iso*: CANB!, K!, NSW!).

Shrub erect, densely branched, 0.1–0.8 × 0.15–0.8 m. *Stems* red-brown, without tubercles, not spinescent, with dense, spreading, straight hairs *c.* 0.15 mm long. *Stipules* absent. *Pulvinus* 0.2–0.3 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length, *petiole* 0.1–0.25 mm long; *blade* concolorous, olive green to grey-green, not tuberculate, oblong, or narrowly ovate, (0.8)–2–4.5 × 0.8–1 mm, abaxial surface ribs absent or distinctly 1- or 3-ribbed, both surfaces and margin with dense, spreading, straight hairs 0.15–0.2 mm long, or dense hairs only on adaxial surface and margin; the apex rounded, straight. *Flowers* axillary, solitary or in pairs. *Bracts* similar to floral leaves but shorter, broader and thinner-textured, ovate or oblong, 1.3–2.5 × 0.6–2 mm. *Bracteoles* on pedicel just below calyx, red-brown, rarely green, broadly ovate, 1.5–3 × 1.4–2 mm, glabrous or hairs on adaxial surface *c.* 0.1 mm long. *Pedicels* straight, 1–2.5 mm long. *Buds* excluding emergent petals 4.3–8 × 2.5–4 mm, glabrous except for margins of lobes. *Hypanthium* 0.5–0.7 mm long. *Calyx* faintly 6-ribbed, red-brown on older or pressed flowers, without markings or rarely with dark red diffuse spots on adaxial lobes, grey-green throughout on fresh young flowers, dull; total calyx length 4–6 mm, three abaxial lobes fused at base for 1.6–2.6 mm, equal in length, central lobe slightly wider, 2.1–2.7 × 2–2.8 mm; two adaxial lobes fused at base for 3.8–4.3 mm, broadly ovate, straight, 0.5–0.7 × 1.3–1.6 mm, the apex broadly acute, rarely rounded. *Standard* claw 2.7–3.7 × 0.45–0.8 mm; base cordate, not auriculate; lamina orange-yellow with red-brown markings in throat and a bright yellow, oblong eye bordered by a broad halo of orange-red to purple-red markings conspicuous on lower surface; lamina broadly ovate or broadly elliptic, 5.4–6.2 × 10–12.2 mm; emarginate indent 0.5–0.6 mm long. *Wings* claw 2.5–2.8 mm long; lamina adaxial spur curled more or less, 1.5–2 mm long; lamina orange-red, fading to orange-yellow at the apex, straight or downturned, oblong, 6.3–6.8 × 1.8–2.1 mm, the apex rounded to truncate. *Keel* claw 2.2–2.5 mm long; lamina orange-red base, dark red towards the

apex, straight, oblong, 4.7–6 × 2.3–2.5 mm, glabrous, the apex rounded to truncate. *Stamen filaments* 3.5–5.7 × 0.2–0.5 mm; *anthers* white, c. 0.4 × 0.3–0.35 mm. *Gynoecium* sessile; *ovary* 1.2–1.4 × 0.5–0.8 mm, with sparse, spreading, straight hairs, c. 0.3 mm long on upper half or throughout; *style* hooked towards the apex, 3.4–4.3 × 0.3–0.4 mm, lower half sparsely covered with spreading, straight hairs c. 0.5 mm long; *stigma* capitate. *Fruit* and *seed* not seen. (Figure 10)

Chromosome number $2n = 16$ (voucher *James 639.1.1*; cited as *E. microphylla* by Sands 1975)

Selected specimens. WESTERN AUSTRALIA: Bronti plains, just E of Southern Cross, between Southern Cross and Kalgoorlie, 5 Oct. 1931, *W.E. Blackall & C.A. Gardner* 880 (PERTH); from Moorine Rock toward Perth, along Great Eastern Highway, 10 Sep. 1968, *E.M. Canning* WA/68 2681 (CANB); W of Bodallin, Sep. 1990, *J.A. Chappill* 1071 (PERTH); E of Lake O'Connor Road on Hyden-Norseman Road, 20 Sep. 1999, *J.A. Chappill* 6224 (PERTH); Smythe Road, S of Yerbillion, 8 Sep. 2000, *J.A. Chappill, L. Cobb & H. Ngo* 6404 (PERTH); E of Carrabin by road, 12 Sep. 1976, *R. Coveny & B. Habersley* RC 8358 (K, NSW, PERTH); W of Forrestania X-roads, 10 October 2003, *G.F. Craig* 5895 (PERTH); SW of Bodallin, 16 Sep. 1982, *R.J. Cranfield* 2450 (PERTH); Flint's Farm NE of Hyden, 12 Sep. 2000, *J.M. Flint* 212 (PERTH); Bronti, 1 Oct. 1931, *C.A. Gardner* 2785 (BM, K, PERTH); E of Hyden, 22 Aug. 1998, *G.R. Henderson, J.A. Chappill & R. Butcher* GRH 2 (PERTH); Between Bullfinch and Southern Cross, 3 Sep. 1963, *S.H. James* 639.1.1 (PERTH, SYD); Sandplains Nature Reserve 28940, N of Hackling Road, 28 Sep. 1997, *G.J. Keighery & N. Gibson* 4082 (PERTH); from Southern Cross towards Coolgardie on the Great Eastern Highway, 12 Sep. 1999, *A. Monro, G.T. Chandler & S. Donaldson* AMM 20 (CANB, PERTH); W of Southern Cross, along Great Eastern Highway, 10 Sep. 1968, *M.E. Phillips* WA/68 775 (A, CANB, L); Muntadgin, Sep. 1947, *T.W. Stone & E.T. Bailey* ETB 821 (PERTH).

Distribution and habitat. *Eutaxia lasiophylla* is found in inland areas between Muntadgin, Bronti and Lake Cronin (Figure 11). It has been collected in shrubland on white or yellow sand over laterite.

Flowering period. August to October.

Conservation status. This species is widespread and is not considered to be under threat at this time.

Etymology. From the Greek *lasios* (= woolly), and *phyllon* (= leaf) in reference to the hairy leaves present in this species.

Notes. This species bears superficial resemblance to *E. microphylla* due to the small (< 5 mm long) opposite and decussate, spreading leaves but it lacks the distinctive elongate, filiform style and simple stigma of that species, having instead a thick, hooked style and capitate stigma. It differs from *E. hirsuta* in its glabrous rather than being a densely hairy calyx without prominent ribs and differs from *E. neurocalyx* in having opposite and decussate rather than being alternate leaves, persistent hairs on the adaxial or both surfaces of the leaf and on the margin, rather than being just on the margin, and in having larger flowers. Specimens collected in northern areas, between Merredin and Southern Cross, have hairs covering the leaves, while specimens collected around Forrestania, east of Hyden, have hairs only on the adaxial surface.

Specimens of this species held at PERTH have been determined as *Eutaxia* sp. Carrabin (*R. Coveny & B. Habersley* 8358) but this name has not been recorded on FloraBase.



Figure 10. Flowering stem of *Eutaxia lasiophylla* (scan of section of holotype PERTH 07684541); scale bar = 1 cm.

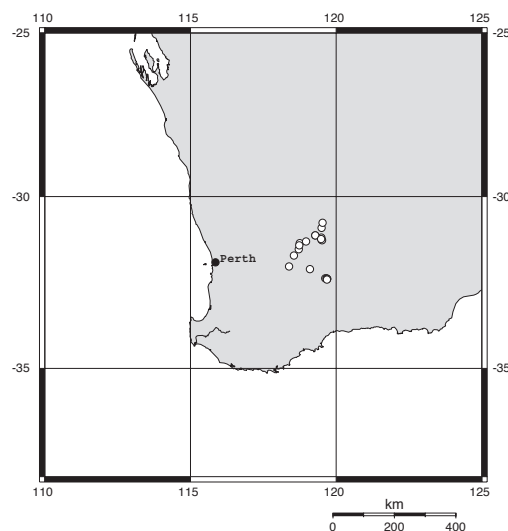


Figure 11. Distribution of *Eutaxia lasiophylla* in Western Australia.

1.7. *Eutaxia lutea* Chappill & G.R.Hend., *sp. nov.*

E. neurocalyx affinis sed corolla lutea non carina rubra differt.

Typus: Cascades Road, towards Lake King from West Point Road, Western Australia, 19 September 1999, G.T. Chandler, A. Monro & S. Donaldson 932 (*holo*: PERTH 05916852!; *iso*: AD, CANB, MEL, NSW).

Shrub erect or spreading, densely branching, 0.2–0.6 × 0.2–0.5 m. *Stems* pale brown, without tubercles, not spinescent, covered in dense, spreading, minute, straight, white hairs *c.* 0.05 mm long, becoming glabrous at maturity. *Stipules* absent. *Pulvinus* 0.2–0.3 mm long. *Leaves* appressed, alternate or opposite and decussate, internode length shorter than leaf length, *petiole* 0–0.1 mm long; blade concolourous, grey-green, or abaxial surface slightly darker, red-brown diffused, smooth or rarely tuberculate, ovate to linear, 0.6–4 × 0.6–1.6 mm, abaxial surface ribs 1–3 or not visible, blade glabrous, or apical third of abaxial surface and margin with moderately dense, spreading, straight or wavy hairs *c.* 0.1 mm long; the apex obtuse. *Flowers* near apex of stem, axillary, solitary or rarely two per leaf axil. *Bracts* similar to floral leaves but shorter, broader and thinner-textured, ovate, 1.8–3.5 × 1–2.6 mm. *Bracteoles* at base of calyx, green or red-green, ovate, 2.5–4 × 1.1–2.6 mm, glabrous, or abaxial surface and margins with scattered, spreading, straight hairs *c.* 0.15 mm. *Pedicels* straight, 0–0.25 mm long. *Buds* excluding emergent petals, 3–4.5 × 1.7–2.5 mm, outer surface glabrous except for lobe margins or rarely with scattered, white hairs to 0.2 mm long on upper third of lobe. *Hypanthium* 0.4–0.6 mm long. *Calyx* prominently 15–25-ribbed, red-brown, without markings, dull or rarely glossy, total length 3–4.5 mm; three abaxial lobes fused at base for 1.3–1.7 mm, middle abaxial lobe 2.6–2.7 × 1.4–1.5 mm, lateral lobes 2.3 × 1.2–1.3 mm; two adaxial lobes fused at base for 2–2.9 mm, ovate, straight, 0.8–1.3 × 0.8–1.3 mm, the apex acute. *Standard* claw 1.8–2.3 × 0.4–0.6 mm; lamina base rounded, auricles absent; lamina yellow-orange with red flare or pale pink tinge in throat; lamina

elliptic, 4–5.5 × 4.8–6.1 mm, emarginate indent 0.2–0.3 mm. *Wings* claw 1.7–2.1 mm long; lamina adaxial spur straight, 0.3–1.1 mm; lamina yellow-orange, base with tinge of pink, straight, oblong to slightly obovate, 3.5–4.6 × 1.3–1.9 mm, the apex obtuse. *Keel* claw 1.4–2.1 mm long; lamina yellow-orange, base with tinge of pink, straight, oblong, 3.5–4.7 × 1.5–2.3 mm, glabrous, the apex obtuse. *Stamen filaments* 2–4.7 × 0.25–0.3 mm; *anthers* cream to yellow, 0.3–0.5 × 0.2–0.4 mm. *Gynoecium* sessile; *ovary* 0.9–1.7 × 0.35–0.7 mm, with dense, spreading, straight hairs, *c.* 0.5 mm long evenly distributed; *style* hooked towards apex, 1.9–2.8 × 0.2–0.25 mm, lower third with sparse, spreading, straight hairs *c.* 0.2 mm long, glabrous above; *stigma* capitate. *Fruit* inflated, placental margin slightly curved, non-placental margin strongly curved, (immature) *c.* 3.3 × 2 mm, outer surface with dense, appressed, white hairs throughout, to 0.2 mm long. *Seeds* not seen. (Figure 12)

Selected specimens. WESTERN AUSTRALIA: NW of Mt Heywood, 16 Oct. 1970, *T.E.H. Aplin* 4132 (NSW, PERTH); Sparkle Hill, W of Mt Ragged, 18 Oct. 1970, *T.E.H. Aplin* 4259 (MEL, PERTH); S of Truslove, N of Esperance), 15 Oct. 1931, *W.E. Blackall* 1044 (PERTH); Gravel pit, WNW of Bald Rock, 2 Oct. 1983, *M.A. Burgman & S. McNee* MAB 2647 (PERTH); E of Muckinwobert Rock, 3 Oct. 1983, *M.A. Burgman & S. McNee* MAB 2690 (PERTH); NW of Munglinup, 7 Nov. 1998, *J.A. Chappill & R. Butcher* JAC 6100 (PERTH); E of Salmon Gums, 28 Oct. 1999, *J.A. Chappill & C.F. Wilkins* JAC 6273 (PERTH); W of Lort River, 29 Oct. 1999, *J.A. Chappill & C.F. Wilkins* JAC 6305 (PERTH); Fields Road, N of Bishop's Road, 29 Oct. 1999, *J.A. Chappill & C.F. Wilkins* JAC 6306 (PERTH); E of Wittenoom Road on Greens Road, S of Mt Burdett, 25 Sep. 1992, *G.F. Craig* GFC 2238 (ESP, GFC, PERTH); NNW of Young River crossing on Ravensthorpe–Esperance main road, 15 Oct. 1968, *E.N. Jackson* 1425 (AD, PERTH); Truslove Road, E of Cox Road, E of Truslove, 6 Nov. 1992, *T.D. Macfarlane & H.R. White* TDM 2130 (CANB, PERTH); S of Peak Charles, 9 Nov. 1979, *K.R. Newbey* 6426 (PERTH); S of Scaddan, N of Esperance, 23 Oct. 1969, *R.D. Royce* 8864 (NSW, PERTH); NE of Scaddan on Cox Road, 16 Oct. 1982, *P. van der Moezel* PGV 206 (PERTH).

Distribution and habitat. *Eutaxia lutea* is known from Peak Charles north-east of Ravensthorpe to Sparkle Hill, west of Mt Ragged (Figure 13), in shrubland or mallee woodland, on deep white or grey sand, brown gravelly clay, or white, grey or brown sandy clay over limestone.

Flowering period. September to November.

Conservation status. This species is widespread and not considered to be under threat at this time.

Etymology. From the Latin *lutea* (= yellow) in reference to the all yellow-orange corolla of this species.

Notes. *Eutaxia lutea* differs from *E. neurocalyx* in having an all yellow-orange corolla without a red keel.

Specimens of this species held at PERTH have been determined as *Eutaxia* sp. Cascades Road (G.T. Chandler *et al.* 932), but this name has not been recorded on Western Australian Herbarium in *FloraBase*.

1.8. *Eutaxia major* (Benth.) C.F. Wilkins & Chappill, *stat. nov.*

Pultenaea neurocalyx Turcz. var. *major* Benth., *Fl. Austral.* 2: 130 (Oct. 1864). *Type citation:* 'Phillips Ranges, Mount Bland, Robertson's Brook, etc., Maxwell.' *Lecto, here designated:* Around a spring



Figure 12. Flowering stem of *Eutaxia lutea* (scan of section of holotype PERTH 05916852); scale bar = 1 cm.

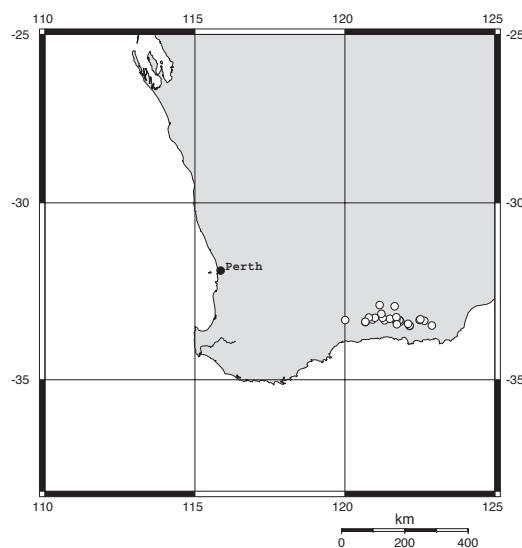


Figure 13. Distribution of *Eutaxia lutea* in Western Australia.

near the base of the south side of Mount Bland, [Western Australia], *s. dat.*, *G. Maxwell s.n.* (MEL 35245!). *Paralecto*: Phillips Ranges, *s. dat.*, *G. Maxwell s.n.* (?K, central specimen (image PERTH!); MEL 1519200!). Robertson's Brook, *s. dat.*, *G. Maxwell s.n.*, (MEL 625017!) [= *E. inuncta*].

Eutaxia neurocalyx (Turcz.) Chappill & G.R. Henderson subsp. *leptophylla* Chappill & G.R. Henderson ms, Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.au> [accessed 12 November 2008].

Shrub erect, spindly, sparsely branching, 0.2–1 × 0.2–1 m. *Stems* green or pale red, with cream ribs, without tubercles, not spinescent, glabrous (flowering section of stem glabrous or with dense, spreading, straight hairs 0.05–0.4 mm long). *Stipules* absent or rarely cream, *c.* 0.1 × 0.1 mm. *Pulvinus* 0.5–1.0 mm long. *Leaves* appressed or spreading, alternate or rarely opposite, internode length shorter than leaf length; *petiole* 0.1–0.3 mm long; *blade* concolourous, pale grey-green, mainly narrowly elliptic, linear, or ovate, 1.3–9 × 0.4–1.2 mm, smooth, abaxial surface distinctly 1–3-ribbed, both surfaces glabrous, margins of young leaves with or without sparse, spreading, straight hairs 0.05–0.1 mm long, the apex acute or rounded, straight. *Flowers* 2–7 in short terminal cluster, or on an elongated flowering section of the stem, 2–12 mm long. *Bracts* similar to floral leaf but shorter, broader and thinner-textured, broadly ovate to ovate, 1.5–5 × 1.4–2.6 mm. *Bracteoles* on pedicel, at base of calyx, pale green or red with cream margins, broadly ovate or ovate, 1.8–2.3 × 1–2 mm, both surfaces glabrous, margin glabrous or with dense, spreading, straight hairs *c.* 0.2 mm long. *Pedicels* straight, 0.2–0.8 mm long. *Buds* excluding emergent petals, 5–8.3 × 1.8–2.5, glabrous except for margin of lobes. *Hypanthium* 0.4–0.5 mm long. *Calyx* prominently 25-nerved, dappled red markings and cream or pale green ribs, dull; total length 5–8.3 mm long; three abaxial lobes fused at base 1.8–2.8 mm, equal length or central lobe slightly longer, 2.6–4 × 1.5–2 mm; two adaxial lobes fused at base for 3.2–5.1 mm, ovate, straight, 0.9–1.7 × 0.9–1.2 mm, the apex acute. *Standard* claw 2.5–3.2 × 0.5–1 mm; lamina base cordate, auriculate or non auriculate; lamina orange-yellow with dark red markings around a triangular, yellow-orange eye; broadly elliptic, or broadly ovate, 6–9 × 8–11.2 mm, emarginate indent

0.2–0.8 mm long. *Wings* claw 1.8–3 mm long; lamina adaxial spur straight, 0.4–0.5 mm long; lamina base red, apical 2/3 orange-yellow, straight or downturned, obovate, 5.5–8 × 1.8–3 mm, the apex rounded. *Keel* claw 1.8–2.8 mm long; lamina deep orange-red throughout, straight, oblong, 3.6–4.9 × 2–2.2 mm, glabrous, the apex rounded. *Stamen filaments* 3–5.8 × 0.15–0.2 mm; *anthers* cream, 0.4–0.5 × 0.3–0.35 mm. *Gynoecium* stipe 0.15–0.2 mm long; *ovary* 1.3–1.8 × 0.5–0.7 mm, with dense, spreading, straight hairs, c. 0.6 mm long, evenly distributed; *style* hooked just below the apex, 2.9–3.9 × 0.2–0.5 mm, with scattered to dense hairs at base, glabrous above; *stigma* capitate. *Fruit* inflated, placental margin slightly curved, non-placental margin strongly curved, 4.3–4.8 × 2.5–3 mm, outer surface with medium density, spreading, straight, white hairs 0.4–0.8 mm long. *Seeds* not seen.

Chromosome number. Unknown.

Selected specimens. WESTERN AUSTRALIA: SW of Clyde Hill, 18 Oct. 1970, *T.E.H. Aplin* 4284 (MEL, PERTH); NE of Mt Heywood, 2 Oct. 1995, *W.R. Archer* 2109516 (AD, CANB, HO, MEL, PERTH); West Mt Barren, 16 Oct. 1928, *W.E. Blackall & C.A. Gardner* 2210 (PERTH); Maxwell's lookout, Fitzgerald River National Park, 13 Oct. 1990, *J.A. Chappill* 1506 (PERTH); Near Kau Nature Reserve, NW of Orleans Bay Road-Fisheries Road intersection, 29 Oct. 1999, *J.A. Chappill & C.F. Wilkins* 6283 (PERTH); East Mt Barren, 17 Oct. 1983, *M.G. Corrick* 8762 (MEL, PERTH); NE of Condingup, 10 Oct. 1992, *G. F. Craig* 2317 (PERTH); N of Fisheries Road ESE of Howick, 18 Sep. 1968, *N.N. Donner* 2614 (AD, CANB, K, PERTH); Fitzgerald River National Park, N of Quaalup homestead, 19 Oct. 1991, *W. Greuter* 22971 (PERTH); Rubbish tip area of Hopetoun and power line track E of Ravensthorpe / Hopetoun Road, 25 Oct. 1994, *E.D. Kabay* 908 (PERTH); E along road to Bremer Bay from junction with Gairdner South Road, 12 Oct. 1988, *T.D. Macfarlane* TDM 1848 (PERTH); W of Hopetoun, Sep. 2000, *M. MacMahon* 33 (BRI, PERTH); Western Australia, s.dat., *Maxim s.n.* (NSW); W. Australia, s.dat., *F. von Mueller s.n.* (P); East Mount Barren, WNW of Hopetoun, 4 Oct. 1966, *T.B. Muir* 4178 (MEL); NW of Mt Bland, 23 Sep. 1962, *K.R. Newbey* 492 (PERTH); Fitzgerald River National Park, 24 Oct. 1970, *R.D. Royce* 9303 (PERTH); lower slopes of East Mount Barren, Hamersley Drive, 12 Sep. 1983, *J. Taylor & P. Ollerenshaw* JT 1718 (CANB, PERTH); N of Hopetoun, 13 Aug. 1982, *C.E. Woolcock* 5a (PERTH); Cape Arid, 21 Sep. 1982, *C.E. Woolcock* 5d (PERTH); Swamp Road, Bremer Bay, 15 Sep. 1982, *C.E. Woolcock* 5e (PERTH).

Distribution and habitat. *Eutaxia major* is found in Western Australia between Bremer Bay and Cape Arid (Figure 14). It has been collected in open woodland, shrubland or heathland on sandy soil. It is often associated with *Banksia* species.

Flowering period. July to November.

Conservation status. This species is widespread and is not considered to be under threat at this time.

Etymology. From the Latin *major* (= greater), applied by Bentham with reference to the larger flowers and calyx when compared to *E. neurocalyx*.

Notes. *Eutaxia major* and *E. inuncta* are distinguished from *E. neurocalyx* in having larger flowers (calyx 5–8.3 mm long). The leaves of *E. major*, while more slender, are similar in shape to those of *E. inuncta*, but *E. major* can be distinguished by having a calyx that is dull dappled red or green with cream ribs rather than being glossy and red-brown throughout, and in the leaf rib on the lower surface being the same width throughout, rather than being much wider towards the apex.

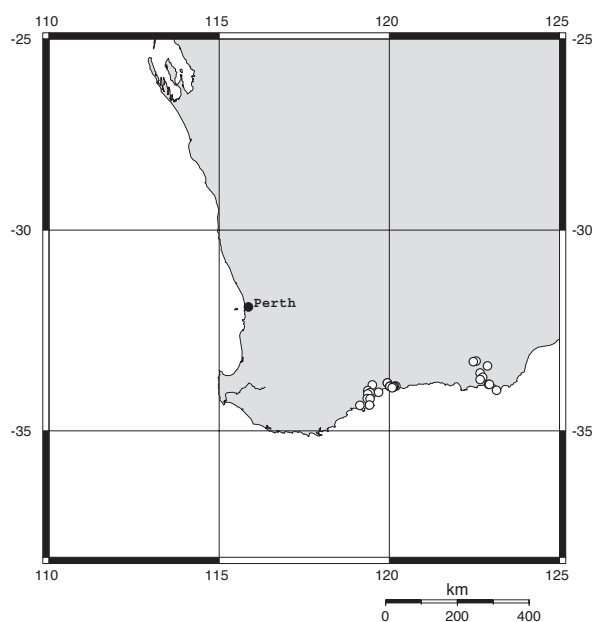


Figure 14. Distribution of *Eutaxia major* in Western Australia.

MEL 35245 has been chosen as the lectotype as it was viewed by Bentham, matches the type description, and has the definite locality of Mt Bland (around a spring near the base of the S side of Mt Bland), rather than the the broadly defined Phillips Range, or a Maxwell collection from no stated locality. The collection from Robertson's Brook (MEL 625017) is referable to *E. inuncta*. A specimen at Kew (image seen; PERTH 01025325) collected by Maxwell and labelled as from 'Phillips Range etc.' appears to be a mixed collection of *E. inuncta* on the lateral specimens and a possible paralectotype of *E. major* as the central specimen. It is, however, impossible to verify this from the poor quality photo.

Eutaxia baxteri was described from horticultural material and a type specimen has not been located. The illustration has therefore been chosen as the lectotype.

The epithet *leptophylla*, as used by Chappill and Henderson in the manuscript name *E. neurocalyx* subsp. *leptophylla*, is unavailable at species rank as it is pre-occupied by *Eutaxia leptophylla* Turcz.

1.9. *Eutaxia myrtifolia* (Sm.) R.Br., in Aiton, *Hort. Kewensis* ed 2, 3: 16 (Oct.-Nov. 1811). *Dillwynia myrtifolia* Sm., *Trans. Linn. Soc.* 9: 263 (1808). *Type citation*: '...found by Mr. Menzies at King George's Sound...I have not seen the fruit.' (*holo*: LINN; *iso*: BM 550742!).

Eutaxia myrtifolia (Sm.) R.Br. var. *angustifolia* Meisn., in Lehm., *Pl. Preiss.* 2: 216 (Aug. 1848). *Type citation*: 'Swan River, coll. II. No. 110.' [Western Australia, 1842, *J. Drummond* 2: 110] (*lecto*, *here designated*: BM 550738!; *isolecto*: CGE, G!, LD, MEL, P!, NSW).

Dillwynia obovata Labill., *Nov. Holl. Spec. Plant.* 1: 110, t. 140 (Dec. 1805), *nom. illeg.*, non Turcz. (1853); *Eutaxia obovata* (Labill.) C.A.Gardner, *Enum. Plant. Aust. Occ.*: 61 (July 1930). *Type citation*: 'HABITAT in terra Van-Leuwin.' [Western Australia] (*holo*: FI-W; *iso*: B, BM550741!, FI-W, G!, LINN, P!).

Eutaxia baxteri Knowles & Westc., *Floral Cab.* 1: 89, t. 43 (Feb. 1838). *Type citation.* ‘Our drawing was taken from a plant in the collection of the Birmingham Botanical and Horticultural Society...a native of New Holland, and was probably raised by Mr. Knight from Mr. Baxter’s last importation of seeds in 1830.’ (*lecto, here designated:* [icon] *Floral Cab.* 1: t. 43).

Shrub erect or rarely prostrate, densely branching 0.5–2.5 × 0.35 m. *Stems* red-brown or green with red tubercles, cream ribbed, not spinescent, glabrous or rarely with sparse, spreading, straight hairs 0.01–0.05 mm long. *Stipules* cream, 0.15–0.4 × 0.1–0.3 mm. *Pulvinus* 0.3–0.8 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length; *petiole* 0.2–1.7 mm long; *blade* concolorous mid-green, or discolorous with abaxial surface red-brown or purple, not tuberculate, obovate, 4.5–21(–27) × 2–6 mm, abaxial surface with one prominent central rib, often one major and two minor, lateral ribs, both surfaces and margin glabrous; the apex acute to acuminate and straight. *Flowers* axillary, 1 or 2 flowers. *Bracts* in the axil of a vegetative leaf, ovate, 0.4–1.3 × 0.3–0.7 mm. *Bracteoles* positioned *c.* halfway down the pedicel, green or brown, ovate, 0.4–1 × 0.35–0.7 mm, glabrous or towards the apex or margin with scattered, spreading, straight hairs *c.* 0.01 mm long. *Pedicels* straight, 2–4.8 mm long. *Buds* excluding emergent petals, 3–5 × 1.8–2.5 mm, glabrous except for margins of lobes. *Hypanthium* 0.5–0.8 mm long. *Calyx* inconspicuously 6-ribbed, mid-green without markings or green tube and red markings on lobes, dull; total calyx length 3–5 mm long; three abaxial lobes fused at base for 1.6–2.2 mm, equal length and width, 1.3–2.4 × 0.9–1.2 mm; two adaxial lobes fused at base for 3.6–4.3 mm, broadly ovate, falcate, 0.3–0.5 × 0.9–1.4 mm, the apex obtuse. *Standard* claw 2.2–2.9 × 0.35–0.7 mm; lamina base truncate, auriculate; lamina orange-yellow with a greenish-yellow, ovate eye bordered with a broad halo of red and conspicuous dark red veins absent or present; lamina broadly ovate, 5.8–7.3 × 7.7–9 mm, glabrous, emarginate indent 0.4–0.6 mm long. *Wings* claw 2.5–3 mm long; lamina adaxial spur straight or curved, 0.3–1 mm long; lamina orange-yellow, darker orange-red towards the base, downturned, slightly obovate, 5.4–6 × 1.2–1.9 mm, the apex obtuse to truncate. *Keel* claw 2–2.4 mm long; lamina red, straight, oblong, 4.3–5.2 × 1.5–2.2 mm, glabrous, the apex somewhat acute. *Stamen filaments* 3–5.3 × 0.25–0.4 mm; *anthers* cream, 0.3–0.4 × 0.2–0.3 mm. *Gynoecium* sessile; *ovary* 1.3–1.5 × 0.5–0.6 mm, upper half with moderately dense, spreading, straight hairs, *c.* 0.8 mm long, lower half with shorter, appressed hairs; *style* hooked towards the apex, 2.9–3.4 × 0.25–0.3 mm, base with scattered white hairs to 0.3 mm long, apical 2/3 glabrous; *stigma* capitate. *Fruit* compressed, placental margin slightly curved, non-placental margin strongly curved, 5–6 × 3–4.8 mm, outer surface with sparse, spreading, wavy hairs *c.* 0.5 mm long. *Seeds* black, ellipsoid, 1.4–2.1 × 1.1–1.4 mm; aril cream, *c.* 1 × 0.7 mm.

Chromosome number. Unknown.

Selected specimens. WESTERN AUSTRALIA: Walpole - Nornalup National Park, Ficifolia Road, 19 Nov. 1987, *A.R. Annels* 2235 (PERTH); Mt Manypeaks, Albany E, 4 Oct. 1994, *S. Barrett* 25 (PERTH); North Twin Peak Island, Recherche Archipelago, 24 May 1972, *M.I.H. Brooker* 3679 (PERTH); Porongorups Scenic Drive, E of Narikup Road, 15 Dec. 1990, *J.A. Chappill & C.F. Wilkins* JAC 1370 (PERTH); Walk trail Cape le Grande to Hellfire Bay, 15 Dec. 1990, *J.A. Chappill & C.F. Wilkins* JAC 1870 (PERTH); Cape Leeuwin, Jan. 1956, *D. Churchill* 17 (PERTH); Water Catchment Reserve, off Bettys Beach Road, Albany E, 11 Aug. 1984, *E.J. Croxford* 3382 (PERTH); NNW Northcliffe, 12 Mar. 1997, *R. Davis* 2820 (PERTH); Willyung Hill, N of Albany, 23 Sep. 1984, *D.B. Foreman* 834 (CANB, MEL, PERTH); Yallingup, 22 Sep. 1940, *C.A. Gardner s.n.* (PERTH); S of Milyeannup Coast Road, NE of intersection with Roberts Road, 25 Oct. 1990, *N. Gibson & M. Lyons* 979 (PERTH); Torbay Head area, West Cape Howe National Park, 25 May 1991, *N. Gibson & M. Lyons* 664 (PERTH); Hassell Beach, S of southern end of beach (Cheynes Beach), 22 Aug. 1979, *L. Haegi* 1851 (K, NSW, PERTH); N along Gardiner River Road from Chesapeake Road, 18 Mar. 1997, *K. Kershaw & C. Day*

P 91.6 (PERTH); Mt Elphinstone, Albany W, 4 Oct. 1986, *M.E. Nash s.n.* (PERTH); SW of East Mt Barren, Fitzgerald River National Park, 2 Nov. 1976, *K.R. Newbey* 4912 (PERTH); High Island in the Duke of Orleans Bay, 20 Oct. 1985, *E. & S. Pignatti* 1248 (CANB, PERTH); Dunsborough, 16 Oct. 1949, *R.D. Royce* 3171 (PERTH); At Tagon Harbour, Cape Arid National Park, E of Esperance, 3 Dec. 1971, *R.D. Royce* 10042 (PERTH); Karridale, 24 Oct. 1953, *R.D. Royce* 4673 (PERTH); Frenchman Bay, SE of Albany, 8 Sep. 1967, *P.G. Wilson* 6244 (CANB, PERTH).

Distribution and habitat. Endemic to the south-west of Western Australia, *E. myrtifolia* has been collected from coastal regions and islands off the coast between Cape Naturaliste and Cape Arid. Collections at PERTH said to be from Kenwick (*Meebold* 11655) and Ongerup (*Hassell s.n.*), and from MEL said to be from Pinjarra (*Mueller s.n.*) have not been verified. There are no records from the Stirling Range although it is common in the Porongorup Range (Figure 15). This species has been collected from heath, shrubland and open woodland on clay, loam or commonly sand over granite. Associated species include *Eucalyptus patens*, *E. marginata*, *E. megacarpa*, *Corymbia calophylla*, *Agonis flexuosa* and *A. parviceps*.

Flowering period. April to November.

Conservation status. This species is widespread and not considered to be under threat at this time.

Etymology. The specific epithet refers to the myrtle-like leaves present in this species.

Notes. This species has a strong resemblance to *E. cuneata*, sharing with this species the distinctive

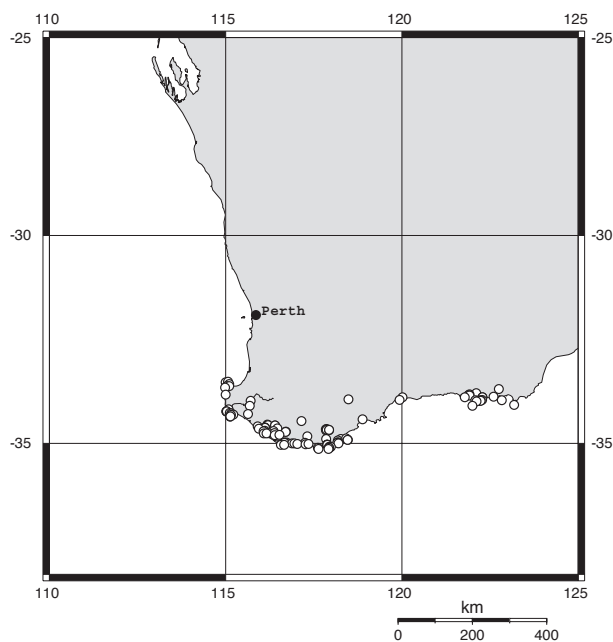


Figure 15. Distribution of *Eutaxia myrtifolia* in Western Australia.

truncate adaxial calyx lip and small (*c.* 1 mm long), ovate bracteoles positioned towards the middle of the pedicels. The two species can be differentiated by their leaf forms. Although *E. myrtifolia* exhibits a range of leaf densities and shapes, they are always more or less obovate with a distinct acute or acuminate apex. Specimens from coastal areas tend to have broader, upward-pointed leaves, while those from forest areas tend to have narrower, outspread leaves.

BM 550738, from Shuttleworth's Herbarium, is selected as the lectotype of *E. myrtifolia* (Sm.) R.Br. var. *angustifolia* Meisn. as it is annotated by Meissner, unlike duplicates of this collection at CGE and LD (M.D. Crisp pers. comm. 2009). Meissner is known to have accessed collections by James Drummond in Shuttleworth's Herbarium (Crisp 1983). There is another specimen on BM 550738 (bottom RH corner) collected by Gilbert and not annotated by Meissner.

The original description of *E. baxteri* was based on a plant grown from seed thought to have been collected by William Baxter. A type specimen has not been located and so the illustration is chosen as a suitable lectotype.

1.10. *Eutaxia neurocalyx* (Turcz.) Chappill & G.R.Hend., *comb. nov.*

Pultenaea neurocalyx Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 26 (1): 281 (1853). *Type citation*: 'Drum. coll. V: 63' [Western Australia, 1847–1849, *J. Drummond* 5: 63] (*holo*: KW; *iso*: G! K, MEL 35248!, P!, PERTH 01026267!, 01025864!).

Shrub erect or spreading, sparsely branching, 0.2–0.5 × 0.2–1 m. *Stems* without tubercles, pale brown with dense, spreading or appressed, straight, wavy, or papillose, hairs, 0.05–0.5 mm long, not spinescent. *Stipules* absent. *Pulvinus* 0.2–0.7 mm long. *Leaves* spreading or appressed to stem, alternate, rarely opposite and decussate, internode length shorter than leaf length; *petiole* 0.05–0.2 mm long; *blade* ovate, not tuberculate, concolourous olive green or grey green, or slightly discolourous with abaxial surface slightly darker, without purple markings, 0.8–2.5(–4) × 0.7–1(–1.5) mm, abaxial surface distinctly, ribs absent or 1–3, both surfaces glabrous, margins of new growth with sparse to dense, spreading, straight hairs 0.1–0.3 mm long, the apex obtuse, straight. *Flowers* axillary, solitary or paired, or with 2–7 flowers clustered together towards the apex of branchlet on a compressed or elongate flowering section of the stem 2–5 mm long. *Bracts* similar to floral leaf but shorter and often broader and thinner-textured, ovate, 1.3–3 × 0.8–1.8 mm. *Bracteoles* at base of calyx, ovate-lanceolate, 1.3–3 × 0.8–2 mm, green becoming orange-brown, margin with sparse, spreading, straight hairs *c.* 0.1 mm long. *Pedicels* straight, 0.1–0.3 mm long. *Buds* excluding emergent petals 3.6–5 × 1.8–2.5 mm, glabrous, except for hairs on margin of lobes. *Hypanthium* 0.4–0.7 mm long. *Calyx* prominently 15–25-ribbed, green becoming orange-brown without markings, matt or glossy; total length 3.6–5 mm long; three abaxial lobes fused at base for 1–2.2 mm, equal length and equal width, or central slightly wider than laterals, 2.2–3.8 × 1–1.5 mm; two adaxial lobes fused at base for 2.5–3.7 mm, straight, 0.8–1.2 × 0.6–1 mm, the apex acute. *Standard* claw 1.8–3.5 × 0.4–0.8 mm; lamina base truncate to slightly cordate, auriculate or auricles absent; lamina yellow-orange, basal eye ovate, yellow-green, bordered by a halo of dark red veins conspicuous on rear, broadly ovate, 5.5–8 × 6.1–10 mm; emarginate indent 0.1–0.5 mm long. *Wings* claw 1.8–3 mm long; lamina adaxial spur distinctly hooked, or straight, 0.5–1.3 mm long; lamina yellow-orange, infused with red at the base, downturned, slightly obovate, 4.3–6.5 × 1.2–2.1 mm, the apex rounded to truncate. *Keel* claw 1.5–2.7 mm long; lamina orange or red, fading towards the base, oblong, 3–4.2 × 1.3–1.9 mm, adaxial margin glabrous or with scattered to medium density hairs to 0.05 mm long, the apex obtuse. *Stamen filaments* 1.8–5 × 0.15–0.4 mm; *anthers* pale cream, 0.3–0.5 × 0.25–0.3 mm. *Gynoecium* stipe 0.1–0.3 mm long; *ovary* 1.5–1.8 × 0.6–0.7 mm, with dense, spreading, straight hairs, *c.* 0.6 mm long, evenly distributed; *style* hooked

towards the apex, $1.8-3 \times 0.25-0.35$ mm, lower half with sparse, spreading, straight hairs *c.* 0.5 mm long, upper half glabrous; *stigma* capitate. *Fruit* inflated, ellipsoid, placental margin slightly curved, non-placental margin strongly curved, $3-4 \times 2.4-2.5$ mm, outer surface covered with straight, dense, spreading, straight hairs *c.* 0.8 mm long. *Seeds* immature.

Chromosome number: Unknown.

Etymology. From the Greek *neuron* (= nerve) and *calyx*, in reference to the prominently ribbed calyx present in this species.

1.10.a. *Eutaxia neurocalyx* subsp. *neurocalyx*

Leaves spreading, longer than other subspecies, 1.5–3 (4) mm long; *keel* adaxial margin glabrous, *stem* with dense, curly or straight hairs *c.* 0.5 mm long.

Selected specimens. WESTERNAUSTRALIA: Boolanelling Nature Reserve, 3 Sep. 1998, *E. Bennett* BO 6.38 (PERTH); S of Harrismith in Toolibin catchment, 23 Nov. 1999, *E. Bennett & T. Sleep* 4.010 A (PERTH); Nature Reserve no. 36598, SSW Kulin on Grays Road, 8 Oct. 1984, *J.M. Brown* 135 (PERTH); E of Forrestania crossroads on road to Norseman, 17 Oct. 1984, *J.M. Brown* 165 (PERTH); E of Williams Road, Quairading area, 4 Nov. 1998, *J.A. Chappill & R. Butcher* 6048 (PERTH); Holden Road off Tarin Rock Road W, 23 Oct. 1986, *E.J. Croxford* 5324 (PERTH); Gravel Reserve, near Kulin Road turnoff, Harrismith-Lake Grace Road, 21 Oct. 1986, *E.J. Croxford* 5340 (PERTH); Lukin's property, SE of Kukerin, 14 Oct. 2003, *J. Gray* 158 (PERTH); NE of Mt Barberton on North Woogenilup Road to South Stirlings, 26 Oct. 1985, *G.J. Keighery* 7315 (AD, CANB, PERTH); South Stirling Nature Reserve, 24 Oct. 1991, *G.J. Keighery* 12582 (PERTH); WNW of Chillinup Pool, 17 Sep. 1974, *K.R. Newbey* 4378 (PERTH); E of Lake Grace township, 25 Sep. 1983, *J. Taylor & P. Ollerenshaw* 2262 (MEL).

Distribution and habitat. This subspecies occurs in Western Australia from Harrismith to east of Forrestania and south to Chillinup Pool and South Stirling Ranges (Figure 16). It is found in mallee heath or *Allocasuarina* shrubland, in yellow or grey sand over clay, or brown sandy gravel soil over laterite.

Flowering period. September to November.

Conservation status. This subspecies is widespread and has no special conservation needs at this time.

Notes. Differs from *E. neurocalyx* subsp. *nacta* and *E. neurocalyx* subsp. *papillosa* in having spreading rather than having appressed leaves that are mostly longer and with more incurved margins, and in having a glabrous keel.

1.10.b. *Eutaxia neurocalyx* subsp. *nacta* C.F. Wilkins, *subsp. nov.*

Caulis pilis densis ad 0.4 mm longis; folia parva, ad caulem appressa, margo adaxialis carinae pilis albis ad 0.1 mm longis ornatus.

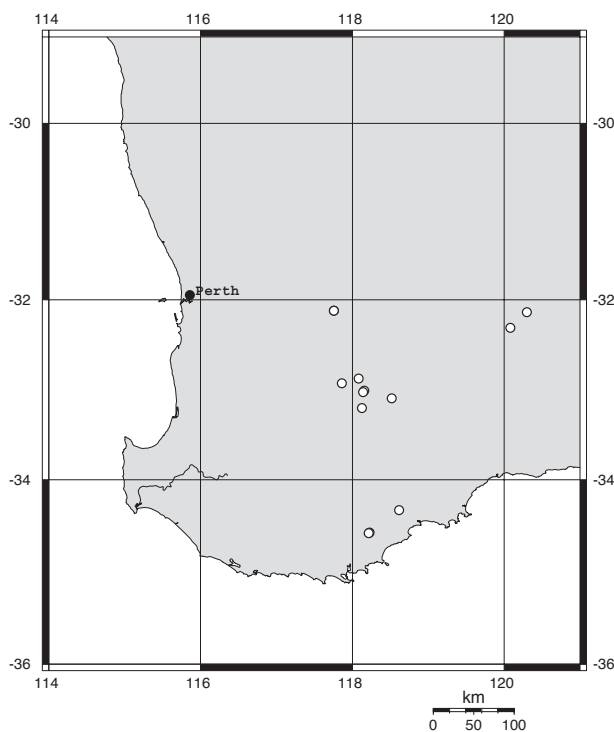


Figure 16. Distribution of *Eutaxia neurocalyx* subsp. *neurocalyx* in Western Australia.

Typus: south-south-west of Queen Victoria Rocks, Western Australia [precise locality withheld for conservation reasons], 24 September 1993, *G.J. Keighery* 12,976 (*holo*: PERTH 04187415; *iso*: CANB).

Stem with dense hairs to 0.4 mm long; *leaves* small (< 1.5 mm long) and appressed close to stem, *keel* adaxial margin with white hairs to 0.1 mm long. (Figure 17)

Selected specimens. WESTERN AUSTRALIA: [localities withheld] 11 Sep. 1962, *T.E.H. Aplin* 1962 (PERTH); Nov. 1971, *W.H. Butler s.n.* (PERTH); 15 Sep. 1999, *G.T. Chandler; A. Monro & S. Donaldson* GTC 879 (CANB, PERTH); Sep. 1934, *C.A. Gardner s.n.* (BM, K, PERTH); 7 May 1992, *A.S. George* 16936 (CANB, PERTH); 25 Oct. 1978, *T.F. Houston* 210-6 (PERTH); 1892, *E. Merrill s.n.* (MEL); 7 Dec. 1987, *J. Pierce* 463 (PERTH); 8 Sep. 1976, *T. & J. Whaite* 4074 (NSW).

Distribution and habitat. This subspecies is distributed from Karalee, east of Southern Cross to McDermid Rock which is N of the Bremer Range (Figure 18). It is found in *Callitris preissii* tall open shrubland, and *Allocasuarina* heath with scattered mallee and *Acacia*, in flat plains of deep yellow-red loamy sand, yellow sand or gravelly sand.

Flowering period. May to November.

Conservation status. Recently listed as Priority Three under DEC Conservation Codes for Western Australian Flora.



Figure 17. Flowering stem of *Eutaxia neurocalyx* subsp. *nacta* (scan of section of holotype PERTH 04187415); scale bar = 1 cm.

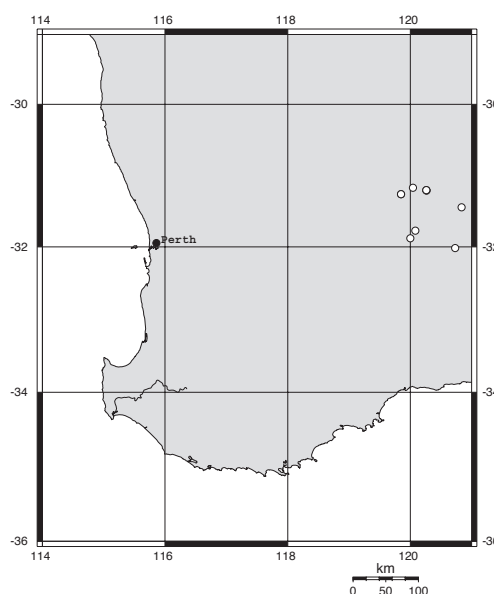


Figure 18. Distribution of *Eutaxia neurocalyx* subsp. *nacta* in Western Australia.

Etymology. From the Greek *naktos* (= pressed close) in reference to the closely appressed leaves present in this subspecies.

Notes. This subspecies is similar to *E. neurocalyx* subsp. *papillosa* in having small, ovate, appressed leaves and keel marginal hairs, but differs in having woolly hairs covering the stem, rather than having short, white papillose hairs. Both differ from *E. neurocalyx* subsp. *neurocalyx* which has spreading leaves and a glabrous keel.

1.10.c. *Eutaxia neurocalyx* subsp. *papillosa* C.F. Wilkins, *subsp. nov.*

Caulis papillis brevis densis albis ad 0.05 mm longis instructus; folia ad caulem appressa vel vix effusa; margo adaxialis carinae pilis ad 0.1 mm longis indutus.

Stem with dense, short, white, papillose hairs to 0.05 mm long; *leaves* mainly < 1.5 (–2) mm long, appressed to stem or slightly spreading; *keel* adaxial margin with hairs to 0.1 mm long. (Figure 19).

Typus: 74 km W of Kumarl which is ca 122 km N of Esperance, Western Australia, 10 October 1966, P.G. Wilson 5706 (*holo:* PERTH! 01751786; *iso:* CANB!, MEL!, NSW!).

Selected specimens. WESTERN AUSTRALIA: SE of Merredin near Koonadgin, 21 Sep. 1995, H. Adamson 8100 (PERTH); Norseman-Lake King Track, E of Lake King Store, 6 Oct. 2001, B. Archer 1995 (CANB, MEL, PERTH); Newdegate, 17 Nov. 1931, W.E. Blackall 1294 (PERTH); from Newdegate towards Lake Grace, 7 Nov. 1968, E.M. Canning 7376 (NSW); Dragon Rocks Nature Reserve, 24 Oct. 1991, A.M. Coates 3308 (PERTH); E of Bungalbin Hill, 8 Sep. 1989, R.J. Cranfield & P.J. Spencer

7778 (PERTH); W of Newdegate PO, 28 Sep. 1993, *M.D. Crisp & W. Keys* 8525 (CANB, GAUBA, PERTH); Kodj Kodjin Nature Reserve, N of Kellerberrin, 23 Sep. 1986, *L. Darlington s.n.* (PERTH); E of Southern Cross on Great Eastern Hwy, 7 May 1992, *A.S. George* 16936 (CANB, PERTH); Comitun Dam Nature Reserve, ESE of Kellerberrin, 1 Oct. 1997, *G.J. Keighery & N. Gibson* 5832 (PERTH); SSW Queen Victoria Rock, 24 Sep. 1993, *G.J. Keighery* 12976 (PERTH); E of Hyden on road to Forrestania crossroads, 18 Oct. 1995, *B.J. Lepschi* 2169 (PERTH); E of Lake King, 22 Oct. 1991, *T.D. Macfarlane* TDM 1983 (PERTH); N Bungulla Reserve, NW of Kellerberrin, 30 Aug. 1977, *B.G. Muir* 285 (3.4) (PERTH); WNW of Kumarl, on Kumarl-Lake King Road, 10 Oct. 1966, *T.B. Muir* 4381 (MEL); E of Lake Grace, 12 Nov. 1963, *K.R. Newbey* 1029 (PERTH); E of Hyden, 14 Oct. 1963, *K.R. Newbey* 3038 (PERTH); S of Mt Correll, NNW of Bullfinch, 24 Sep. 1982, *K.R. Newbey* 9586 (PERTH); NE of Bungalbin, 18 Sep. 1991, *B.H. Smith* 1530 (CANB, K, MEL, PERTH, S).

Distribution and habitat. This subspecies occurs in Western Australia from NNW of Bullfinch to Newdegate (Figure 20). It is found in mainly yellow, creamy-white, or red brown sand, brown or greenish clay with gravel, or gravelly soil over massive ironstone, in *Grevillea* heath or mallee and tall shrubland.

Flowering period. August to November.

Conservation status. This subspecies is widespread and has no special conservation needs at this time.

Etymology. From the Latin *papillosus* (= covered with papillae) is in reference to the papillose hairs present on the stem in this subspecies.

Notes. This subspecies is similar to *E. neurocalyx* subsp. *nacta* in having small (1–2 mm long) ovate to elliptic, mainly appressed leaves, and the adaxial margin of the keel with minute, white hairs to 0.1 mm long, but differs in having stem hairs that are papillose and to 0.05 mm long rather than having long hairs to 0.4 mm long. *Eutaxia neurocalyx* subsp. *neurocalyx* has more spreading, mainly longer leaves and a glabrous keel margin. There is one old collection (*T.E. George* 114), from near Yunderup that resembles *E. neurocalyx* subsp. *papillosa* in having a hairy keel margin and papillose stem, that needs recollection for positive identification as it would be a significant range extension.

1.11. *Eutaxia parvifolia* Benth., *Enum. Pl. [Endlicher]*: 34 (Apr. 1837). *Type citation*: ‘King Georges Sound. (Hügel).’ (*holo*: W).

Eutaxia dillwynioides Meisn., in Lehm., *Pl. Preiss.* 1: 63 (Sep. 1844). *Type citation*: ‘In regionibus interioribus Australiae meridionali-occidentalis, m. Oct. 1840. Herb. Preiss. No. 1191.’ (*lecto, here designated*: LD; *isolecto*: NY (image!), P!).

Eutaxia densifolia Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 26: 271 (1853). *Type citation*: ‘Drummond V. n. 76.’ [Western Australia, 1847–1849, *J. Drummond* 5: 76] (*holo*: KW; *iso*: BM 550737!, E, G!, K (image!), MEL, NSW, P!, PERTH!, W).

Eutaxia obovata Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 26: 271 (1853). *Type citation*: ‘Drum. V. n. 46.’ [Western Australia, 1847–1849, *J. Drummond* 5: 76] (*holo*: KW; *iso*: BM550736!, G!, K (image!), MEL, NSW, W).



Figure 19. Flowering stem of *Eutaxia neurocalyx* subsp. *papillosa* (scan of section of holotype PERTH 01751786); scale bar = 1 cm.

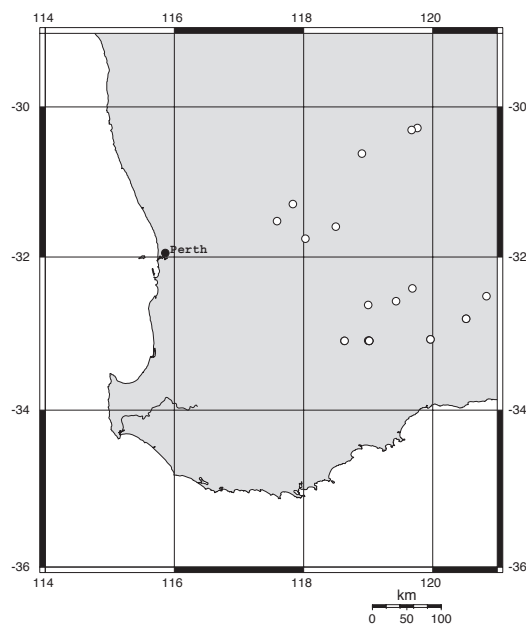


Figure 20. Distribution of *Eutaxia neurocalyx* subsp. *papillosa* in Western Australia.

Dillwynia incerta Domin, *Vestn. Král. České Spolecn. Nauk, Tr. Mat.-Prir.*, 2: 37 (1923). *Type citation*: 'W.A. [Western Australia]: Warrunup Hill. Stirling Range, leg. Capt. A.A. Dorrien-Smith.' (*holo*: K (image !); *iso*: PERTH!).

Shrub erect or prostrate, densely branching 0.2–2 × 0.2–1.4 m. *Stems* red-brown with or without green spots, not or rarely glaucous, without tubercles, not spinescent, glabrous. *Stipules* red-brown, 0.1–0.3 × 0.1–0.15 mm. *Pulvinus* 0.3–0.8 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length, *petiole* 1–3 mm long; blade concolourous olive green, or abaxial surface slightly darker, not tuberculate, obovate to elliptic, narrowly obovate, 2.5–17 × 1–3 mm, abaxial surface, ribs mainly 1, rarely absent or 2–3, both surfaces and margin glabrous; the apex obtuse to acuminate and apiculate and straight. *Flowers* axillary, solitary, often crowded towards the apex of the branches. *Bracts* similar to floral leaf but shorter and often broader and thinner-textured, but mainly the flower is subtended by a vegetative leaf. *Bracteoles* on upper portion of pedicel, green, lanceolate to narrowly elliptic, 2–4 × 0.5–1.4 mm, glabrous. *Pedicels* straight or recurved, 1–2.4(–4) mm long. *Buds* excluding emergent petals 2.8–5 × 1.6–2.5 mm, glabrous except for margins of lobes. *Hypanthium* 0.35–0.5 mm long. *Calyx* unribbed or with 6 faint veins, red-brown without markings, or green with red markings at junction of free lobes and tube, slightly glossy or dull; three abaxial lobes fused at base for 1.3–1.5 mm, symmetrical, 2.4–3.1 × 0.9–1.1 mm; two adaxial lobes fused at base for 2.4–3.1 mm, ovate, straight, 1.1–1.4 × 0.9–1.1 mm, the apex acute. *Standard*

claw 1.9–2.8 × 0.45–0.8 mm; lamina base cordate, auriculate; lamina yellow or orange-yellow with a yellow ovate eye bordered by a broad halo of orange-red, red vein markings prominent on back, broadly ovate to broadly elliptic, 4–6.1 × 7.1–9.1 mm, emarginate indent 0.4–0.9 mm long. *Wings* claw 1.8–2.3 mm long; lamina adaxial spur straight, or curved, 0.6–0.8 mm long; lamina yellow or orange-red fading to yellow at the apex, downturned, oblong, or obovate, 4.4–6.5 × 1.7–2 mm, the apex obtuse to truncate. *Keel* claw 1.6–2.1 mm long; lamina yellow-cream with apical third red or all red, straight, obovate, 3.4–3.8 × 1.3–1.8 mm, glabrous, the apex acute. *Stamen filaments* 2.3–4.5 × 0.1–0.4 mm; *anthers* white to yellow, 0.35–0.4 × 0.2–0.35 mm. *Gynoecium* stipe 0.4–0.9 mm long; *ovary* 1.3–1.8 × 0.45–0.6 mm, lower half glabrous, upper half with moderately dense, spreading, straight hairs, 0.4–0.5 mm long; *style* hooked towards the apex, 1.8–2.6 × 0.17–0.28 mm, lower half with sparse, spreading, straight hairs c. 0.2 mm long, upper half glabrous; *stigma* capitate. *Fruit* compressed, ellipsoid, placental margin slightly curved or straight, non-placental margin strongly curved, 4.5–7 × 2–3.5 mm, outer surface with sparse, spreading and appressed, wavy hairs c. 0.6 mm long. *Seed* mid-brown to dark brown, ellipsoid, 1.1–1.8 × 1.1–1.6 mm; aril u-shaped, white, c. 0.8 × 0.3 mm.

Chromosome number. Unknown.

Selected specimens. WESTERN AUSTRALIA: Granite Peak walk trail, 29 Sep. 1994, *A.R. Annels* 4527 (CANB, PERTH); Tarin Rock, 24 Sep. 1974, *T.E.H. Aplin* 6013 (AD, MEL, PERTH); Tenterden, 7 Oct. 1967, *A.M. Ashby* 2347 (CANB, K, PERTH); From Shannon R Settlement towards Walpole, 14 Oct. 1968, *E.M. Canning s.n.* (CANB); W of Peaceful Bay Road, on S Coast Highway, 11 Oct. 1997, *J.A. Chappill & R. Butcher* 5900 (PERTH); Near corner of Ledge Point Road and Gull Rock Road, 28 Nov. 2000, *J.A. Chappill & C.F. Wilkins* 6552 (PERTH); Cape Arid National Park, Tagon Road. S of its junction with Merivale Road, 25 Sep. 1985, *M.G. Corrick* 9534 (CANB, MEL); Mount Manypeaks, 20 Oct. 1985, *M.G. Corrick* 9708 (CANB, MEL); Mount Trio, vicinity of car park, 30 Oct. 1986, *R.S. Cowan* A-491 (AD, CANB, MEL, PERTH); Stirling Range, SE of Wedge Hill, 24 Sep. 1979, *M.D. Crisp* 6120 (CANB, NSW, PERTH); Bremer Bay, W of Wellstead turnoff, 4 Oct. 2002, *M.D. Crisp* 9503 (CANB); E from Bow bridge, 19 Sep. 1992, *B.G. Hammersley* 630 (PERTH); Bow River, Nov. 1912, *S.W. Jackson s.n.* (NSW, PERTH); Valley of the Giants Road, 25 Oct. 1997, *B.J. Lepschi & B.A. Fuhrer* 3664 (PERTH); Hatter Hill, 3 Sep. 1970, *K.R. Newbey* 3348 (PERTH); N of Cheyne Inlet, off Sandalwood Road, 8 Aug. 1974, *G. Perry* 244 (AD, BRI, NSW, PERTH); N of Gracetown, 4 Nov. 2000, *J. Scott* 302 (PERTH); E of Esperance, near Munglignup Creek, 30 Sep. 1968, *P.G. Wilson* 8074 (CANB, PERTH); Nuyts Wilderness, Walpole-Nornalup National Park, 28 Oct. 1994, *A. Worz* 04.10.28.08 (PERTH).

Distribution and habitat. This species is widespread from Bolgart to Albany and east to Cape Arid (Figure 21). It occurs in heathland and open woodland on sand.

Flowering period. July to November.

Conservation status. This species is widespread with no special needs for conservation at this time.

Etymology. From the Latin *parvus* (= small) and *folius* (= leaved) in reference to the small leaves mainly present in this species.

Notes. The leaf form of *E. parvifolia* can approach that of both *E. cuneata* and *E. myrtifolia*, but it can be easily distinguished from these species by the two acuminate rather than truncate adaxial calyx

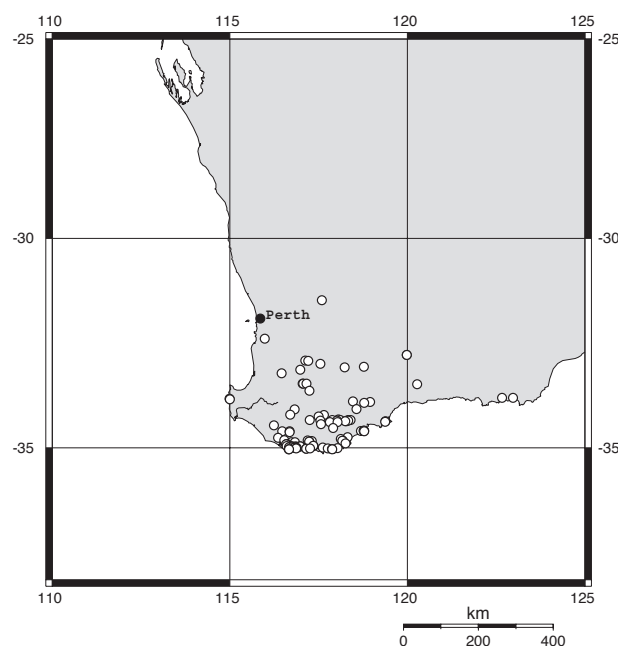


Figure 21. Distribution of *Eutaxia parvifolia* in Western Australia.

lobes and long, lanceolate bracteoles. The flowers are superficially similar to those of *E. microphylla* but differ in their thick and hooked, rather than filiform and elongate style, and capitate rather than simple stigma. The leaf form is highly variable, ranging from less than 5 mm long and cuneate to over 10 mm long and oblanceolate. Specimens collected in inland areas generally have smaller leaves, while specimens with long, narrow leaves similar to the type of *E. densifolia* are found near Albany and in the Stirling Ranges. The continuous range of leaf variation does not allow separate recognition of the *densifolia* or *obovata* Turcz. forms, as leaves often curl inwards when pressed, giving the superficial appearance of a linear leaf. This species does, however, warrant a more detailed examination than was possible in this revision.

Eutaxia dillwynioides has been confused with *Dillwynia dillwynioides* (Meisn.) Druce (Grieve 1998), although Meissner's description of glabrous branchlets and dark brown membranous calyx differs markedly from the villous branchlets and calyx of the latter species. No specimens that are labelled *E. dillwynioides* are housed at the Western Australian Herbarium, but two were uncovered amongst loans from the Paris herbarium, one of which was labelled with the collection number of the type specimen cited by Meissner in the original description. This specimen showed little resemblance to *D. dillwynioides*, instead matching *E. parvifolia*. The second specimen was different again, matching the description of *E. microphylla*. *Aotus dillwynioides* Meisn., described in the same publication as *E. dillwynioides*, is synonymous with *D. dillwynioides*.

Eutaxia dillwynioides has been lectotypified on the Lund specimen (Crisp 1983 and Crisp pers. comm. 2009) because the material at Lund is of a superior quality to that at NY.

Dillwynia incerta Domin was collected by A.A. Dorrien-Smith. A Kew specimen has been chosen as the lectotype. Domin worked with the Dorrien-Smith specimens in Kew. The sheets in K (there are

two) have been annotated, possibly by Gardner, as the ‘type’ of the name. One corner of one sheet is cut off and an annotation slip says ‘specimen presented to W. Australia herbarium’. The complete specimen without the corner cut off is the chosen lectotype. No specimen by this collector are known in Prague (pers. comm. M. Crisp 2009).

1.12. *Eutaxia virgata* Benth., *Enum. Pl. [Endlicher]*: 34 (Apr. 1837). *Type citation*: ‘Swan River. [Western Australia] (Huegel)’ (*holo*: W; *iso*: K (image!)).

Eutaxia ericoides Meisn., in Lehm., *Pl. Preiss.* 1: 63 (Sep. 1844). *Type citation*: ‘In colonia ad fluv. Cygnorum legit Jac. Drummond, n. 245 et coll. 1.’ *Lecto, here designated*: Swan River [Western Australia], 1839 [1835–1838], *J. Drummond s.n.* (BM 550739!); *isolecto*: BM 550740! G!, K (image!). *Paralecto*: [Western Australia, 1842], *J. Drummond* 2: 245 (BM 550739!, A, E, G!, K (image!), MEL, P!, W).

Eutaxia ericoides Meisn. var. *filicaulis* Meisn., in Lehm., *Pl. Preiss.* 1: 64 (Sep. 1844). *Type citation*. ‘In dumetis arenosis ad fl. Cygnorum, d. 9. Apr. 1839. Herb. Preiss. No. 877.’ (*lecto, here designated*: LD; *isolecto*: G!, GH, GOET, K (image!), MEL 2048986, NY (image!), P!, S, W).

Shrub erect, spreading or semi-prostrate, often straggly, sparsely branching 0.15–1.5 × 0.1–1.2 m. *Stems* red-brown or green, slight tubercles present or absent, not spinescent, glabrous. *Stipules* absent or cream or green, 0.05–0.3 × 0.05–0.15 mm. *Pulvinus* 0.15–0.4 mm long. *Leaves* spreading, or appressed towards the apex of branchlet, opposite and decussate, internode length mainly longer or shorter than leaf length; *petiole* 0.15–0.4 mm long; *blade* discolourous, pale green over mid green, abaxial surface with or without purple markings; very narrowly obovate, oblanceolate to almost linear, 1.8–15 × 0.5–2 mm, smooth, ribs absent or 1- or 3-ribbed, both surfaces and margin glabrous; the apex acute to somewhat rounded and straight. *Flowers* axillary, 1 or 2 or rarely 3 together. *Bract* narrowly ovate, to ovate, 1.5–2.1 × 0.6–1.6 mm, in the axil of a shorter and thinner-textured floral leaf; or the flower rarely subtended by a vegetative leaf and bract absent. *Bracteoles* mid pedicel, green or red-brown, narrowly ovate, 1.7–3.7 × 0.5–1.2 mm, without ribs, glabrous or few hairs on the apex. *Pedicels* straight, rarely recurved, 1–4.5 mm long. *Buds* excluding emergent petals 3.3–5.5 × 1.9–2.2 mm, outer surface glabrous, except for margins of lobes. *Hypanthium* 0.25–0.5 mm long. *Calyx* inconspicuously 6-ribbed; green with dark red blotches or red-brown, dull; three abaxial lobes fused at base for 1.8–1.9 mm, symmetrical, 2.2–2.9 × 1–1.2 mm; two adaxial lobes fused at base for 3.5–3.7 mm, ovate, straight or slightly falcate, 1–1.4 × 0.9–1 mm, the apex acute. *Standard* claw 3.2–3.7 × 0.6–0.9 mm; lamina base truncate, attenuate or slightly cordate, not auriculate; lamina yellow-orange with red markings on back, with an orange-red or yellow oblong-ovate eye bordered by a broad halo of dark maroon red; lamina broadly ovate to orbicular, 5.8–6.6 × 6.5–9.8 mm, emarginate indent 0.6–0.7 mm. *Wings* claw 2–3.5 mm long; lamina adaxial spur straight, 0.4–1.2 mm long; lamina yellow-orange at the apex, red in the centre fading to cream at the base, straight, oblong, or slightly obovate, 6.1–6.5 × 1.7–1.8 mm, the apex rounded to truncate. *Keel* claw 2–3 mm long; lamina dark red, orange-yellow, base cream or green infused with pink; outside edge straight, inside edge gently curved, 4–4.3 × 1.5–1.8 mm, glabrous, the apex rounded to truncate. *Stamen filaments* 3–5.7 × 0.25–0.3 mm; *anthers* cream, 0.35–0.5 × 0.3–0.35 mm. *Gynoecium* sessile; *ovary* 1.3–2.3 × 0.4–0.6 mm, basal half glabrous, upper half with moderately dense, spreading, straight hairs, *c.* 0.7 mm long; *style* hooked towards the apex, 2.3–2.9 × 0.2–0.3 mm, glabrous; *stigma* capitate. *Fruit* compressed, placentar margin slightly curved, non-placentar margin strongly curved, 5.7–7.1 × 2.5–3.3 mm, outer surface with scattered, appressed, straight hairs *c.* 0.5 mm long. *Seed* black, ellipsoid, 1.8–2.2 × 1.2–1.4 mm; aril u-shaped attached around hilum, *c.* 1 × 0.4 mm, cream.

Chromosome number. $2n = 16$ (vouchers *Sands* 638.10.4 and *Sands* 638.12.10; cited by *Sands* 1975).

Selected specimens. WESTERN AUSTRALIA: Nornalup Road, N of Northumberland Road, WNW of Denmark, 30 Oct. 1991, *A.R. Annels* ARA 1875 (PERTH); North of Wilgarrup siding, SW corner of loc. 12588, 17 Oct. 1994, *A.R. Annels* ARA 4657 (CANB, PERTH); Yallingup, Dec. 1930, *W.E. Blackalls* s.n. (PERTH); From Perth towards Brookton, along Brookton Hwy, 7 Oct. 1968, *E.M. Canning* EMC 6048 (A, CANB, L, PERTH); N of Rosa Brook Road on Neilson Road, 10 Dec. 1996, *N. Casson & A. Annels* SC 58.5 (PERTH); N of SW Highway on Corio Road, 11 Nov. 1998, *J.A. Chappill & R. Butcher* 6156 (PERTH); Brockman Hwy, E of Karridale, 25 Oct. 1983, *M.G. Corrick* 8926 (CANB, PERTH); Off Railway Reserve, SE of Bowelling, 7 Sep. 1992, *V. Crowley* DKN 318 (PERTH); Radio Mast Hill, Cranbrook, 10 Oct. 1982, *E.J. Croxford* 2273 (PERTH); ESE of Rosa Glen, 21 Sep. 1995, *R. Davis* 215 (PERTH); Gnangara, Oct. 1945, *C.A. Gardner* s.n. (PERTH); NNE of Mandurah, 2 Oct. 1992, *N. Gibson & M.N. Lyons* 1507 (PERTH); Serpentine, 22 Oct. 1899, *R. Helms* s.n. (CANB, NSW, PERTH); SW Brennans Ford, Scott R, E Augusta, 21 Feb. 1982, *G.J. Keighery* 4483 (PERTH); S of Mt Barker, Cephalotus Swamp, 7 Oct. 1978, *K.F. Kenneally* 6930 (PERTH); Along Torbay Road at the western end from South Coast Highway, 28 Oct. 1992, *T.D. Macfarlane, H.R. White* TDM 2085 (PERTH); S of Nannup, 11 Nov. 1969, *V. Mann & A.S. George*, VM 75 (PERTH); Banganup Lake, near Jandakot, 25 Sep. 1970, *B.R. Maslin* 1250 (PERTH); Lane Pool Reserve, W of Treesville, Harris River Flats, Harvey District, 12 Oct. 1989, *J.L. Robson* JLR 494 (PERTH); Capel, 15 Aug. 1963, *V.E. Sands* 638.10.4 (PERTH, SYD); NNW of Mt Johnston, 6 Sep. 1997, *D. Trenowden* 341 (PERTH).

Distribution and habitat. Endemic to Western Australia. *Eutaxia virgata* has been collected mostly from coastal regions in the south-western corner of Western Australia, from Perth to Augusta and east to Mt Manypeaks (Figure 22). It is found in swampy areas or in open heath or forest on flat, wet

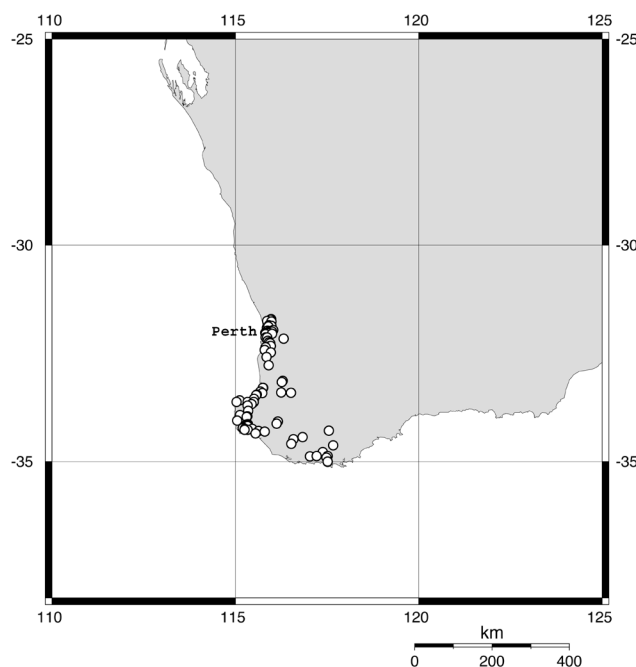


Figure 22. Distribution of *Eutaxia virgata* in Western Australia.

sandy or clay soil. Associated species include *Eucalyptus marginata*, *Corymbia calophylla*, *Agonis linearifolia*, *A. parviceps*, *Melaleuca preissiana* and other *Melaleuca* species.

Flowering period. Flowers throughout the year.

Conservation status. This species is widespread with no special conservation needs at this time.

Etymology. From the Latin *virgatus* (= long and slender) which describes the habit of this species.

Notes. *Eutaxia virgata* is easily identified by its long, slender stems and small, sparse, almost linear leaves. These features are shared only with the taxon called *E. exilis* which has been mistaken for *E. virgata* in the past. *Eutaxia virgata* can be distinguished from *E. exilis* by its larger bracteoles, five compared with 10 calyx ribs, smaller keel petal with a rounded the apex and leaves with a somewhat rounded compared with an acuminate apex.

BM 550740! (right hand side specimens) are here chosen as the lectotype of *Eutaxia ericoides* as they are part of Shuttleworth's collection, which would have been viewed by Meisner, are good quality specimens and match the type description. It is uncertain if the left hand side specimens of Drummond 245 are part of the labelled Shuttleworth collection on the right.

The specimen of *Eutaxia ericoides* Meisn. var. *filicaulis* Meisn. at LD is here designated as the lectotype, following (Crisp 1983 and pers. comm. 2009), as it is of better quality than the material at NY where Meisner was affiliated.

Eutaxia section **Sclerothamnus** (R.Br.) F.Muell., *Fragm.* 1: 7 (Mar. 1858).

Sclerothamnus R.Br., in Aiton, *Hortus Kewensis* ed. 2, 3: 16 (Oct.–Nov. 1811). *Type:* *Sclerothamnus microphyllus* R.Br.

Ovary stipitate (stipe 0.5–2 mm long), usually densely covered in soft hairs; *style* filiform and elongate or bent but never hooked, glabrous; *stigma* simple.

2.1. *Eutaxia acanthoclada* G.R.Hend. & Chappill, *sp. nov.*

Frutex prostratus ramulis pungentibus; foliis et calyx glaber; corolla omnino luteo-aurantiaca.

Typus: south of Forrestania Crossroads on the Southern Cross – Ironcaps Road, Western Australia [precise locality withheld for conservation purposes], 27 October 1999, J.A. Chappill & C.F. Wilkins JAC 6261 (*holo:* PERTH 07684460!; *iso:* CANB!).

Eutaxia sp. Hatter Hill (K.R. Newbey 6532), Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.au> [accessed 12 Nov. 2008].

Shrub mat-forming, prostrate, cushion-like, much-branched, 6–10 × 10–35 cm. *Stems* glaucous pale red to grey, without tubercles, tips of branchlets prominently spinescent, glabrous. *Stipules* absent or cream 0.05–0.1 × 0.1 mm. *Pulvinus* 0.2–0.5 mm long. *Leaves* spreading, opposite and decussate,

alternate, or irregularly arranged, internode length shorter than leaf length, *petiole* 0.15–0.3 mm long; *blade* concolorous or discolorous, pale grey-green, over darker grey-green, without purple markings on abaxial surface; obovate 1.5–4.3 × 0.8–1.2 mm, venation obscure or one vein visible, not tuberculate, both surfaces and margin glabrous, the apex obtuse, straight. *Flowers* axillary, solitary. *Bracts* present in the axil of a full size or smaller vegetative leaf, elliptic or obovate, 0.8–1.8 × 0.55–0.8 mm. *Bracteoles* on upper pedicel, red or grey-green, lanceolate, 0.8–2 × 0.3–0.6 mm, glabrous. *Pedicels* straight, 2–3.8 mm long. *Buds* excluding emergent petals 2.3–3.5 × 1.1–1.8 mm, glabrous except for margins of lobes. *Hypanthium* 0.45–0.7 mm long. *Calyx* venation obscure, pale red-brown without markings, dull; three abaxial lobes fused at base for 0.9–1.3 mm, symmetrical, 1.8–2.4 × 0.8–1.1 mm; two adaxial lobes fused at base for 1.2–1.7 mm, equal length and width, ovate to narrowly ovate, straight, 1.2–1.9 × 0.65–0.9 mm, the apex acute. *Corolla* entirely yellow-orange, *standard* claw 1.1–1.5 × 0.7 mm; lamina base cordate or truncate, auriculate; lamina broadly ovate to elliptic, 3.4–4.2 × 5–6 mm, emarginate indent 0.2–0.3 mm long. *Wings* claw 1.3–1.4 mm long; lamina adaxial spur straight, *c.* 0.5 × 0.3 mm long; lamina oblong, straight, 3.7–4.4 × 1.3–1.4 mm, the apex rounded to truncate. *Keel* claw *c.* 1.5 mm long; lamina ellipsoid, with inside edge straight, outside edge strongly arcuate, 3.6–4.2 × 1.6–2.3 mm, glabrous, the apex rounded. *Stamen* filaments 2.8–4.7 × 0.15–0.2 mm; *anthers* orange, 0.4–0.7 × 0.3–0.4 mm. *Gynoeceum* stipe 0.3–0.6 mm long; *ovary* 1–1.8 × 0.6–0.8 mm, with dense, spreading, straight hairs *c.* 0.7 mm long, evenly distributed; *style* curved, 1.8–3 × 0.1–0.15 mm, glabrous; *stigma* simple. *Fruit* inflated, ellipsoid, placental margin slightly curved, non-placental margin strongly curved, 3–4.3 × 2.1–3 mm, outer surface with dense hairs. *Seed* immature, brown, glabrous. (Figure 23)

Chromosome number. Unknown.

Selected specimens. WESTERNAUSTRALIA: [localities withheld] 3 Nov. 1931, *W.E. Blackall* 1270 (PERTH); 27 Oct. 1999, *J.A. Chappill & C.F. Wilkins* 6248 (PERTH); 27 Oct. 1999, *J.A. Chappill & C.F. Wilkins* 6263 (PERTH); 5 Nov. 1998, *J.A. Chappill & R. Butcher* 6071 (PERTH); 31 Oct. 1993, *R.J. Chinnock & G.S. Richmond* RJC 8601 (AD, PERTH); 9 Oct. 1965, *F. Humphreys* s.n. (PERTH); 21 Feb. 2007, *W. Johnston* WJ 099 (MDN, PERTH); 3 Sep. 1970, *K.R. Newbey* 3343 (PERTH); 29 Oct. 1991, *B. Smith* 1587 (MEL); Nov. 1929, *H. Steedman* s.n. (PERTH).

Distribution and habitat. Collected from Westonia and in the vicinity of Lake Cronin, Hatters Hill, Mt Gibbs and Mt Madden (Figure 24). Found in *Eucalyptus* woodland areas on clay-loam, well-drained sandy loam or ironstone gravel.

Flowering period. September to November.

Conservation status. Listed as Priority Three under DEC Conservation Codes for Western Australian Flora (Smith 2010).

Etymology. From the Greek *acantho* (= spiny), *cladus* (= branch) refers to the pungent apices present on branchlets of this species.

Notes. The yellow-orange corolla with no markings in *Eutaxia acanthoclada* is similar to *E. actinophylla* and *E. lasiocalyx*, which also share the same elongate, filiform style, simple stigma and lanceolate bracteoles. *Eutaxia acanthoclada* differs from *E. lasiocalyx* in having a glabrous rather than a hairy calyx and is easily distinguished from *E. actinophylla* and *E. lasiocalyx*, by its prostrate, cushion-like habit and abundant, prominent, spinescent tips to the branchlets.



Figure 23. Flowering stem of *Eutaxia acanthoclada* (scan of section of holotype PERTH 07684460); scale bar = 1 cm.



Figure 24. Distribution of *Eutaxia acanthoclada* in Western Australia.

2.2. *Eutaxia actinophylla* Chappill & C.F. Wilkins, *Nuytsia* 17: 470–472 (2007). *Type*: new Norseman-Hyden Track, Western Australia [precise locality withheld for conservation reasons], 29 September 1999, *B. Archer* 1387 (*holo*: PERTH 07463472!; *iso*: CANB, NSW).

Eutaxia verticillata Chappill ms., Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.au> [accessed 12 Nov. 2008].

Shrub erect, compact 0.15–0.5 × 0.3–0.6 m. *Stems* green or red-brown with yellow ribs, without tubercles, not spinescent, glabrous. *Stipules* absent or cream, 0.05–0.1 × 0.04–0.1 mm. *Pulvinus* c. 0.3 mm long. *Leaves* spreading, in whorls of 3, internode length shorter than leaf length, *petiole* 0.2–0.25 mm long; *blade* concolourous mid-green to grey-green, or purple on abaxial surface, elliptic to obovate, smooth, (1.3–)2–4.5(–6) × 0.5–1.3 mm, abaxial surface with veins not visible or single, leaf glabrous; the apex acute or obtuse and straight. *Flowers* axillary, solitary. *Bracts* absent with flower

in the axil of a vegetative leaf, or the flower subtended by a shorter and thinner-textured floral leaf, ovate, or obovate, 1.2–2.9 × 0.5–0.9 mm. *Bracteoles* at base of calyx, green, ovate, 1–2 × 0.5–1.2 mm, glabrous, the apex acute. *Pedicels* straight, 0.8–1.3 mm long. *Buds* excluding emergent petals 3–4 × 1.5–2.8 mm, glabrous except for margins of lobes. *Hypanthium* 0.5–0.6 mm long. *Calyx* veins not visible or with 5 faint veins, green with red tinge towards the apex and red spots at join of lobes, dull; three abaxial lobes fused at base for 1.4–1.6 mm, symmetrical, 2–2.6 × 1.1–1.3 mm, the apex acute; two adaxial lobes valvate, fused at base for 1.8–2.6 mm, ovate, straight, 1.5–1.9 × 1.4–1.5 mm, the apex acute. *Standard* claw 1.1–1.6 × 0.6–0.75 mm; lamina base cordate, auricles absent; lamina golden-yellow with yellow eye and red flare near base; lamina broadly ovate, 3.8–5 × 6–7.4 mm, emarginate indent 0.4–0.5 mm long. *Wings* claw 0.9–1.3 mm long; adaxial spur absent, or straight, c. 0.3 × 0.5 mm; lamina golden-yellow; oblong, straight, 3.7–4.7 × 1.4–2 mm; the apex obtuse. *Keel* claw 1.1–1.3 mm long; lamina lemon-yellow, straight, oblong, 3.3–4.7 × 1.6–2.8 mm, glabrous, the apex obtuse. *Stamen filaments* 2.5–4.8 × 0.3–0.4 mm; *anthers* cream to yellow, 0.6–0.7 × 0.4–0.5 mm. *Gynoecium* sessile or stipe to 0.2 mm long; *ovary* 1.7–2.1 × 0.6–0.9 mm, with dense, spreading, straight hairs, 0.6–1 mm long, evenly distributed; *style* filiform, curved, 1.6–2.2 × 0.15–0.2 mm, with medium density, spreading, straight hairs 0.2–0.7 mm long on lower third, glabrous above; *stigma* simple. *Fruit* inflated, ellipsoid, both margins strongly curved, 3.6–4.8 × 2.5–2.6 mm, with dense, spreading, wavy hairs. *Seeds* black, ellipsoid, 1.8–2 × 1.2–1.4 mm; *aril* u-shaped surrounding hilum, 0.7–1 × 1 mm, translucent white.

Chromosome number. Unknown.

Selected specimens. WESTERN AUSTRALIA: [localities withheld] 29 Sep. 1999, *B. Archer* 1386 (CANB, MEL, NSW, PERTH); 9 Dec. 2001, *B. Archer* 2071 (MEL, PERTH); 9 Dec. 2001, *B. Archer* 2073 (AD, CANB, MEL, PERTH); 3 Nov. 1990, *W.R. Archer* 3119015 (MEL, PERTH); 10 Oct. 1931, *W.E. Blackall* 995 (PERTH).

Distribution and habitat. *Eutaxia actinophylla* occurs in southern Western Australia near Norseman, Salmon Gums and Mt Newmont (Figure 25). This species grows in shrubland on red clay loam with a shallow covering of gravel or in red sandy loam over granite

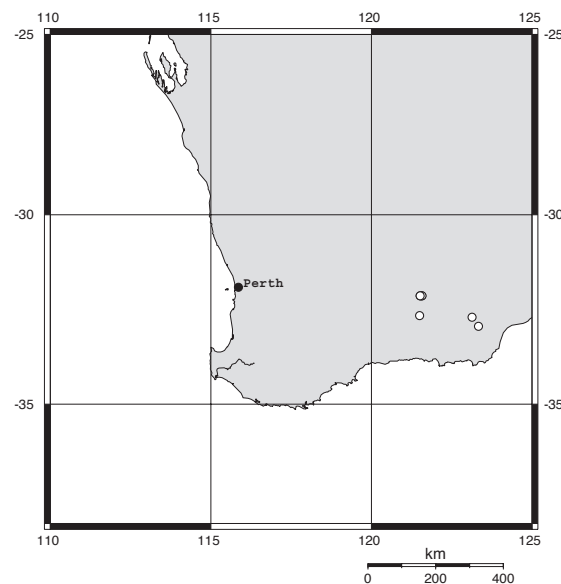


Figure 25. Distribution of *Eutaxia actinophylla* in Western Australia.

Flowering period. September to December.

Conservation status. Listed as Priority One under DEC Conservation Codes for Western Australian Flora (Smith 2010), as it is only known from a few collections on the Hyden to Norseman track and an old collection at Salmon Gums.

Etymology. From the Greek *actinos* (= ray or spoke of wheel) and *phyllon* (= leaf). This species is named for its leaves, which are in regular whorls of three.

Notes. *Eutaxia actinophylla* shares the feature of a yellow corolla and glabrous outer surface of the calyx with *E. acanthoclada*; however, in addition to the whorled leaves, it differs in having non-spinescent apices of branchlets and an erect rather than a prostrate habit.

Although previously listed on FloraBase as *Eutaxia verticillata* Chappill ms, this name was not adopted. *Eutaxia* and *Pultenaea* may be combined in the future (Crisp & Cook 2003) under *Pultenaea* Sm. (Orthia *et al.* 2005b) and the epithet is preoccupied in the latter genus as *Pultenaea verticillata* Turcz.

Specimens of this species held at PERTH have been determined as *Eutaxia* sp. Norseman (*B. Archer* 1977) but this name has not been recorded on *FloraBase*.

2.3. *Eutaxia andocada* Chappill & C.F.Wilkins, *Nuytsia* 17: 471, 474–475 (2007). *Type:* north-east of Peak Charles, Western Australia [precise locality withheld for conservation reasons], 16 September 2000, *J.A. Chappill, M.D. Crisp & L. Cook* JAC 6439 (*holo:* PERTH 07460392!; *iso:* CANB, NSW).

Eutaxia sp. Peak Eleanora (M.A. Burgman 3862), Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.au> [accessed 12 Nov. 2008].

Eutaxia alternifolia Chappill & C.F.Wilkins ms., Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.au> [accessed 12 Nov. 2008].

Shrub erect, sparsely branching, 0.2–0.4 × 0.3 m. *Stems* reddish brown, smooth, with medium density, spreading, straight hairs *c.* 0.2 mm long, branchlets spinescent. *Stipules* absent or cream, *c.* 0.15 × 0.1 mm. *Pulvinus* 0.2–0.3 mm long. *Leaves* appressed, alternate, internode length shorter than leaf length; *petiole* 0.1–0.25 mm long; *blade* slightly discolourous, adaxial surface pale grey green, abaxial surface with tinge of red; elliptic, rarely obovate, 1.3–4.3(–5) × 0.7–1.8 mm; abaxial surface and margin with scattered, spreading, straight hairs 0.15–0.2 mm long, distinctly 1–3-ribbed and tuberculate; adaxial surface glabrous; the apex obtuse and straight. *Flowers* axillary, solitary. *Bract* absent and flower in the axil of a vegetative leaf, or the flower subtended by a shorter and thinner-textured floral leaf, *c.* 1.7 × 0.8 mm. *Bracteoles* on pedicel, just below the calyx, grey-green, becoming red-brown, ovate-lanceolate or obovate, 0.8–2.1 × 0.3–0.8 mm, glabrous. *Pedicels* straight, 0.7–1.5 mm long. *Buds* excluding emergent petals, 2.6–4.5 × 1.3–1.7 mm, glabrous except for margin of lobes. *Hypanthium* 0.5–0.6 mm long. *Calyx* not prominently ribbed, green with a red tinge, with dark red spots at junction of lobes, dull; total calyx length 2.6–4.5 mm; three abaxial lobes fused at base for 1.1–1.5 mm, symmetrical, middle and lateral lobes 1.4–2.5 × 1.1–1.2 mm; two adaxial lobes fused at base for 1.8–2.8 mm, ovate, straight, 0.9–1.7 × 0.9–1 mm, the apex acute. *Standard* claw 1.4–1.9 × 0.4 mm; lamina base slightly cordate, non-auriculate; lamina yellow-orange with dark

red markings on veins on back, base with pale lemon, ovate to triangular eye with minute orange markings, surrounded by red vein markings; lamina broadly ovate, $3.5\text{--}5 \times 4.9\text{--}7$ mm; emarginate indent $0.2\text{--}0.5$ mm long. *Wings* claw $1.1\text{--}1.9$ mm long; adaxial spur straight, *c.* 0.3×0.3 mm; lamina straight, yellow-orange with central red marking, oblong, $4\text{--}5 \times 1.3\text{--}1.7$ mm, the apex rounded. *Keel* claw $1.1\text{--}2$ mm long; lamina orange-yellow with dark red tip, straight, oblong or slightly obovate, $3.9\text{--}4.7 \times 1.5\text{--}2.7$ mm, glabrous, the apex rounded. *Stamen filaments* $3.3\text{--}5.5 \times 0.1\text{--}0.2$ mm; *anthers* cream, $0.4\text{--}0.5 \times 0.3\text{--}0.35$ mm. *Gynoecium* stipe $0.5\text{--}1.1$ mm; *ovary* $1.1\text{--}2 \times 0.6\text{--}0.9$ mm, with evenly distributed dense, spreading, straight hairs $0.5\text{--}0.8$ mm long; *style* curved, $2.8\text{--}3.9 \times 0.15\text{--}0.2$ mm, with few scattered hairs at base, glabrous above; *stigma* simple. *Fruit* and *seed* not seen.

Chromosome number. Unknown.

Selected specimens. WESTERN AUSTRALIA: [localities withheld] 28 Sep. 1984, *M.A. Burgman* 3862 (PERTH); 22 Aug. 1995, *R. Davis* 29 (PERTH).

Distribution and habitat. *Eutaxia andocada* is only known from the vicinity of Peak Charles and Peak Eleanora (Figure 26), where it grows in shrubland on white sand or brown sandy clay over granite.

Flowering period. August to September.

Conservation status. Listed as Priority One under DEC Conservation Codes for Western Australian Flora (Smith 2010).

Etymology. From the Greek *andocadon* (= alternately) in reference to the alternate leaves present in this species.

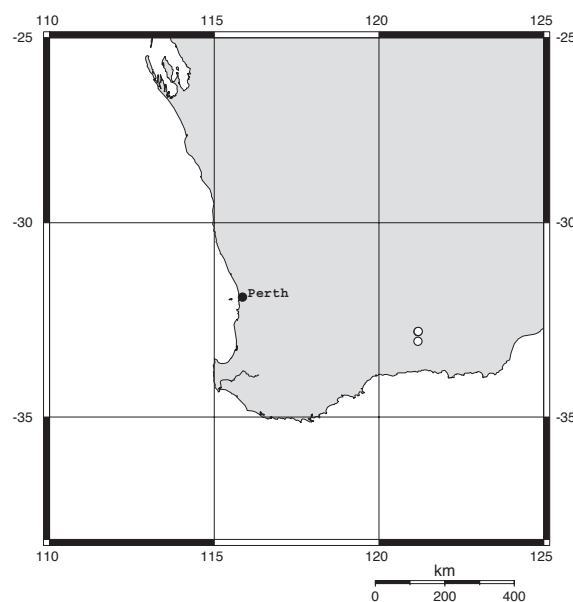


Figure 26. Distribution of *Eutaxia andocada* in Western Australia.

Notes. This species differs from *E. microphylla* and *E. rubricarina* in having leaves alternate rather than being opposite, and a keel which is orange-yellow with a dark red tip compared with all red as in *E. rubricarina*.

Although previously listed on FloraBase as *E. alternifolia* Chappill and C.F. Wilkins ms, this name was not adopted as *Eutaxia* and *Daviesia* Sm. may be combined in the future (Crisp & Cook 2003) under *Pultenaea* Sm. (Orthia *et al.* 2005b) and the epithet is preoccupied in the latter genus as *Daviesia alternifolia* Endl.

2.4. *Eutaxia diffusa* F.Muell., *Fragm.* 1 (1): 7 (1858); *Sclerothamnus diffusus* F.Muell., *First Gen. Rep. Gov. Bot. Veg. Colony*: 12 (1853), *nom. nud.*; *Eutaxia virgata* var. *diffusa* Regel, *Suppl. Indicem Seminum [quae Hortus Botanicus Imperialis Petropolitani]*: 37 (1866); *Eutaxia microphylla* var. *diffusa* (F.Muell.) Court, *Vict. Naturalist* 73(10): 173 (1957). *Type citation*: 'In Australia felice et colonia South Australia, a montibus Flinders Range et sinu St. Vincent's Gulf usque ad Murray flumen et tractum Bacchus Marsh.' *Lecto, fide* Court (1957): 'In itinere per plagas interioris S. Aust. monte Mt Remarkable [illegible word] lectus', *s. dat.*, *F. Mueller s.n.* (MEL 624495); *isoleccto*: 'interior towards Mt Remarkable Oct. 1850' (K (image!)), on mixed sheet, left hand side, designated *a*, with *paralecto b* on same sheet). *Paralecto*: 'Gawler town' (K (image!)), on mixed sheet, right hand side, designated *b*, with *isoleccto a* on same sheet), P!. 'Murray River' (BM 550743!, K). 'Austral. Felix' (K (image!)), P!).

Shrub erect, densely branched 0.5–1 × 0.4–1.1 m. *Stems* colour unknown, smooth, glabrous, not spinescent. *Stipules* cream, 0.1–0.15 × 0.1 mm. *Pulvinus* 0.8–1 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length; *petiole* 0.15–0.5 mm long; *blade* strongly discolourous, grey green, over brownish green without purple markings; obovate to narrowly obovate, (2–)4.5–9.7 × (0.8–)1.5–3.7 mm, abaxial surface with veins 3 veins, smooth, both surfaces glabrous, the apex acute, straight. *Flowers* axillary, solitary. *Bract* absent and flower in the axil of a vegetative leaf or bract within vegetative leaf *c.* 1.5 × 0.7 mm. *Bracteoles* on the pedicel just below the calyx, red-green, or green, lanceolate, 1.8–3 × 0.8–1.1 mm, glabrous, the apex acute. *Pedicels* straight, 1.5–3 mm long. *Buds* excluding emergent petals 4.7–4.5 × 2.3–2.8 mm, outer surface glabrous, except for margin of lobes. *Hypanthium* *c.* 0.6–0.8 mm long. *Calyx* faintly 5-ribbed, colour unknown, dull; total calyx length 3.3–5.3 mm; three abaxial lobes fused at base for 1.3–1.6 mm, symmetrical, equal length, 2.2–2.5 × 1.1–1.3 mm; two adaxial lobes fused at base for 2.3–2.8 mm, ovate to narrowly ovate, straight, 1.5–1.7 × 0.9–1.3 mm, the apex acute. *Standard* claw 2.2–3 × 0.4–0.5 mm; lamina base cordate, with or without basal auricles; lamina yellow with or without red veins and or red central markings, broadly ovate, 4.9–6.7 × 7–8.4 mm; emarginate indent 0.5–0.6 mm long. *Wings* claw 2.1–2.5 mm long; lamina yellow, adaxial spur straight, *c.* 0.5 × 0.5 mm; lamina straight, oblong, 5–5.8 × 1.7–2 mm, the apex rounded. *Keel* claw 2.3–2.7 mm long; lamina orange-yellow with darker orange towards the apex, oblong, to elliptic, straight, 5.3–6.2 × 2.3–2.8 mm, glabrous; the apex rounded. *Stamen filaments* 4.7–8.3 × 0.1–0.2 mm; *anthers* cream, 0.6–0.7 × 0.35–0.45 mm. *Gynoecium* stipe 1.2–1.7 mm long; *ovary* 2.3–2.5 × 0.9–1 mm, with evenly distributed dense, spreading, straight hairs, *c.* 0.4 mm long; *style* curved, 3.5–4 × 0.1–0.15 mm, base with sparse, spreading, straight hairs, *c.* 0.2 mm long, remainder glabrous; *stigma* simple. *Fruit* inflated, ellipsoid, both margins strongly curved, 5–6 × 3.3–4 mm, outer surface with dense, appressed, straight hairs, *c.* 0.3 mm long. *Seeds* black, ellipsoid, *c.* 2.5 × 1.8 mm, smooth, shiny; *aril* u-shaped surrounding hilum, *c.* 2 × 0.5 mm, translucent yellow.

Chromosome number. $2n = 16$ (vouchers Sands 649.5.1, 649.6.4 in Sands (1975) as *E. microphylla* var. *diffusa*)

Selected specimens. QUEENSLAND: Near Coolmunda Dam, E of Inglewood, 3 Sep. 1975, *L. Pedley* 4235 (BRI). NEW SOUTH WALES: Ingleburn, Sep. 1910, *J.L. Boorman s.n.* (BM, NSW); E along the Quandialla road from the Mid-Western Hwy, near Wyalong, 30 Nov. 1984, *R. Coveny & P. Hind* 12074 (CANB, MEL, NSW, PERTH). VICTORIA: Campbell's Creek, 26 Sep. 1911, *C.H. Derrick s.n.* (G); Southern fringes of the Big Desert N of Lillimur, 24 Sep. 1957, *A.J. Hicks* 102 (K); Little Desert (Parish of Jungkum), NW Victoria, 1 Oct. 1960, *A.J. Hicks* 291 (K); Calder Highway, E of Melbourne, 5 Oct. 1952, *R. Melville, M. Cohn, W. Perry, H. Henkel & J. Kellam* 1458 (MEL, PERTH); Near Bacchus Marsh, 3 Nov. 1910, *J.R. Tovey s.n.* (G); Wimmera, *s.dat.*, *F. von Mueller s.n.* (P). SOUTH AUSTRALIA: S of Swan Reach, ENE of Adelaide, 16, Sep. 1971, *J. Carrick* 2938 (G); Gawler, *s.dat.*, *F. von Mueller s.n.* (P); Kangaroo Island, Brownlow road, W of Kingscote, 5 Sep. 1964, *V. E. Sands* 649.5.1 (PERTH); S of N Hill to Winnian, near Bordertown, 9 Sep. 1964, *V.E. Sands* 649.6.4. (PERTH, SYD). WESTERN AUSTRALIA: S of Ongerup, 26 Sep. 1964, *K. Newbey* 1481 (PERTH).

Distribution and habitat. *Eutaxia diffusa* is recorded from Inglewood in Queensland to New South Wales and NW Victoria, and west to South Australia (Figure 27). It is recorded as growing in brown clayey loam with scattered *Eucalyptus behriana*, *Acacia trineura* and *Melaleuca lanceolata*. There is a single collection from S of Ongerup in SE Western Australia (Newbey 1481) but as there have been no further collections from this area, this disjunction would need to be verified.

Flowering period. August to October, fruiting in November.

Conservation status. This species is widespread and not considered to be under threat at this time.

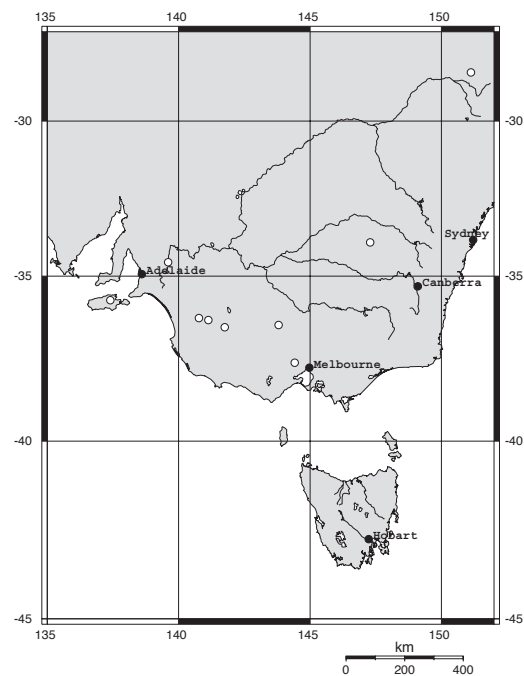


Figure 27. Distribution of *Eutaxia diffusa* in southern Australia.

Etymology. From the Latin *diffusa* (=spreading widely and loosely) possibly refers to the branching habit of the plant, or the less crowded leaves.

Notes. *Eutaxia diffusa* differs from *E. empetrifolia* in having leaves with an acute compared with a sub acute apex and a usually longer petiole. It shares with *E. empetrifolia* narrowly obovate to obovate leaves with the leaf base always narrower than the apical third of the leaf. Both species differ in leaf shape from *E. microphylla*, which has ovate or narrowly oblong, or linear elliptic leaves with the truncate base wider or the same width as the apical third of the leaf, an obtuse apex, and leaf margins that are sometimes ciliate compared with always glabrous. The apex of the branchlets of *E. diffusa* are never pungent as seen in many collections of *E. microphylla*.

Before her death, Chappill determined specimens as *E. microphylla* var. *microphylla* or *E. microphylla* var. *diffusa* following Court (1957) and Jessup and Toelken (1986). Harden (2002) and Walsh and Entwistle (1996) give these varieties specific status and this is accepted here. The type form of *S. microphyllus* is distinct from that of *E. diffusa* and the here reinstated *E. empetrifolia*. Due to the complex nature of this group, further research such as DNA sequence analysis of these three species is recommended.

Court (1957) previously lectotypified the Mt Remarkable specimen collected by Mueller (MEL 624495) when he described the variety *Eutaxia microphylla* var. *diffusa* (F. Muell.) Court. It is a large piece of flowering material and the best quality specimen, with a clear label annotated by Bentham. Mueller is known to have sent material to Kew that Bentham had seen so there is a duplicate in K (Herbarium Benthamianum).

2.5. *Eutaxia empetrifolia* Schltld., *Linnaea* 20: 667 (1847). *Type citation.* ‘An trocken, sandigen Orten bei Bethanien. November. Blumen orange.’ [Bethany, South Australia, *s. dat.*, H.H. Behr *s.n.*] (*holo*: HAL?; *iso*: G!).

Shrub sprawling to erect, densely branched 0.2–0.5 × 0.4–1 m. *Stems* green with pale cream ribs, without tubercles, glabrous, not spinescent. *Stipules* cream, 0.1–0.15 × 0.1 mm. *Pulvinus* 0.4–0.6 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length; *petiole* 0.05–0.1 mm long; *blade* not discolourous, grey green, without purple markings; narrowly obovate, 0.7–4.5 (–7) × 0.4–1.3 mm, abaxial surface with veins not visible or 1–3 veins, smooth, both surfaces glabrous, the apex subacute to rounded, straight. *Flowers* axillary, solitary. *Bract* absent and flower in the axil of a full size or shorter vegetative leaf. *Bracteoles* on the pedicel just below the calyx, red-green, or green, lanceolate, 1.5–2.3 × 0.6–0.8 mm, glabrous, the apex acute. *Pedicels* straight, 1.3–3.5 mm long. *Buds* excluding emergent petals 2.5–3.8 × 1.3–2.3 mm, outer surface glabrous, except for margin of lobes. *Hypanthium* *c.* 0.3–0.4 mm long. *Calyx* faintly 5-ribbed, mainly green tube with pale red or red lobes, with or without red spots base of lobes, dull; total calyx length 2.5–3.5 mm; three abaxial lobes fused at base for 1.3–1.6 mm, symmetrical, equal length, 1.7–2.1 × 0.9–1.1 mm; two adaxial lobes fused at base for 1.9–2.1 mm, ovate to narrowly ovate, straight, 1–1.5 × 0.6–0.7 mm, the apex acute. *Standard* claw 1.5–1.9 × 0.3–0.4 mm; lamina base cordate, with or without basal auricles; lamina yellow with red veins and red central markings, broadly ovate, 4.3–5.1 × 5.1–6.6 mm; emarginate indent 0.3–0.6 mm long. *Wings* claw 1.4–1.8 mm long; lamina yellow, adaxial spur straight, *c.* 0.5 × 0.5 mm; lamina straight, oblong, 4.3–4.5 × 1.4–1.9 mm, the apex rounded. *Keel* claw 1.5–1.8 mm long; lamina yellow with dark red towards the apex, oblong, to elliptic, straight, 3.5–4.3 × 1.9–2.4 mm, glabrous; the apex rounded. *Stamen filaments* 1.8–6.1 × 0.1–0.2 mm; *anthers* cream, 0.5–0.7 × 0.3–0.45 mm. *Gynoecium* stipe 0.7–1.1 mm long; *ovary* 1.5–1.7 × 0.5–0.7 mm, with evenly distributed dense, spreading, straight hairs, *c.* 0.4 mm long; *style* curved, 2.4–3.2 × 0.1–0.15 mm, base with sparse,

spreading, straight hairs, *c.* 0.2 mm long, remainder glabrous; *stigma* simple. *Fruit* inflated, ellipsoid, both margins strongly curved, $3\text{--}3.5 \times 2.8\text{--}4$ mm, outer surface with dense, appressed, straight hairs, *c.* 0.3 mm long. *Seeds* black, ellipsoid, *c.* 1.5×1 mm, smooth, shiny; *aril* u-shaped surrounding hilum, *c.* 0.8×0.6 mm, translucent white.

Chromosome number: Unknown.

Selected specimens. WESTERN AUSTRALIA: Near intersection of Parmango and Howick roads, Reserve 32128, Oct. 1984, *M.A. Burgman* 4224 (PERTH); Oldfield R crossing on West Point Road, 19 Sep. 1999, *G.T. Chandler*, *A. Monro*, *S. Donaldson* GTC 927 (CANB, PERTH); Lakes Road E of Wagin-Wickepin Road, E of Nomans Lake Hall, 20 Sep. 1999, *J.A. Chappill & R. Butcher* JAC 6220 (PERTH); NE of old Kundip townsite, 7 Dec. 2003, *G.F. Craig* 5995 (PERTH); Yillimilling Nature reserve, ENE of Narrogin, 10 Oct. 1996, *M.D. Crisp* 8918 & *W. Keys* (CANB, PERTH, MEL); W of Bremer Bay Road along Reef beach Road, 9 Oct. 2002, *R. Davis* 10453 (MEL, PERTH); Oldfield River at crossing of Esperance – Ravensthorpe Road, 13 Oct. 1968, *H.J. Eichler* 20237 (AD, CANB, PERTH); Dongolocking Nature Reserve, NE of Wagin, 13 Oct. 1999, *G.J. Keighery & N. Gibson* 4812 (PERTH); Kamballup along Woogenellup Road, 28 Oct. 1992, *T.D. Macfarlane & H.R. White* TDM 2090 (PERTH); NE of Howick Hill, Neridup, 21 Sep. 1968, *A.E. Orchard* 1137 (AD, CANB, PERTH); Cape Arid National Park, camping ground, 9 Sep. 1983, *J. Taylor & P. Ollerenshaw* JT 1562 (AD, CANB, MEL, PERTH).

Distribution and habitat. In South Australia, *Eutaxia empetrifolia* is only recorded from the type specimen collection, and the remainder are from south-western Western Australia (Figure 28). It occurs in tall heath, scrub, shrubland, eucalyptus woodland with low shrub understorey, in light brown sandy clay or sand, on sandstone, in lateritic soil, quartzitic or granitic substrates. The type locality, Bethanien, is the first village established by Lutherans in 1842 at the foot of the Barossa Hills in South Australia.

Flowering period. August to October, fruiting in November.

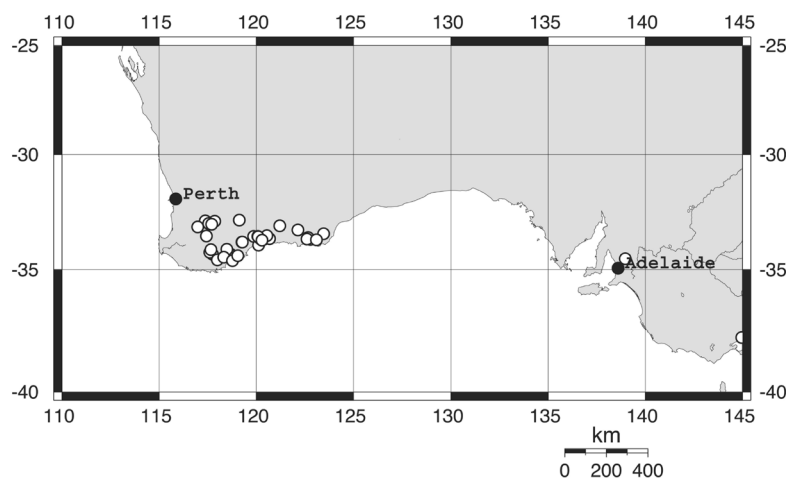


Figure 28. Distribution of *Eutaxia empetrifolia* in southern Australia.

Conservation status. This species is widespread and not considered to be under threat at this time.

Etymology. Alludes to the superficially similar leaves of the genus *Empetrum* L.

Notes. This species differs from *E. microphylla* in having narrowly obovate leaves with a subacute to rounded apex and margins always glabrous, compared with ovate or oblong leaves with an obtuse apex and margins sometimes ciliate. The apex of the branchlets is never pungent as seen in many collections of *E. microphylla*. *Eutaxia empetrifolia* is similar to *E. diffusa* in having obovate leaves, but differs in these being narrow with a rounded to subacute apex instead of acute. Leaves in *E. empetrifolia* are less than 4.5 mm long (mainly 2 mm long) and 1.3 mm wide, compared with (2–) 6–9.7 mm long and up to 2.8 mm wide in *E. diffusa*. Flowers are also mainly smaller.

If *Eutaxia* and *Pultenaea* are combined as *Pultenaea* in the future, it should be noted that the epithet is preoccupied by *P. empetrifolia* Meisn. and the epithet may be changed.

Nicholson included *Eutaxia empetrifolia* Schlecht. in the *Eutaxia* section of *The Illustrated Dictionary of Gardening* 1: 543 (1885) as ‘the correct name for the plant described as *Sclerothamnus empetrifolia*.’ No records have been found for a previous combination for this name.

2.6. *Eutaxia lasiocalyx* Chappill & C.F. Wilkins, *Nuytsia* 17: 476–477 (2007). *Type:* Marvel Loch, Western Australia [precise locality withheld for conservation reasons], 7 November 1984, *B.H. Smith* 543 (*holo:* PERTH 00710237!; *iso:* CANB, MEL).

Shrub spreading, densely branched *c.* 0.15 × 0.6 m. *Stems* red-brown or green with pale red ribs, tubercles, apical growth with sparse to dense, spreading, straight hairs *c.* 0.1 mm long, not spinescent. *Stipules* absent. *Pulvinus* 0.2–0.4 mm long. *Leaves* spreading, alternate, or whorled, internode length shorter than leaf length, *petiole* 0.05–0.15 mm long; *blade* slightly discolourous, mid green, over paler green without purple markings; ovate to oblong, verrucose, 0.5–2.2 × 0.35–0.9 mm; abaxial surface with single prominent rib, apical growth with both surfaces and / or margin, with sparse to medium density, spreading, straight hairs *c.* 0.1 mm long, becoming glabrous, the apex obtuse, straight. *Flowers* axillary, solitary. *Bracts* similar to floral leaves but shorter and thinner-textured, ovate, 0.6–1 × 0.6–1 mm. *Bracteoles* persistent, on the pedicel just below the calyx, red-green, or green, lanceolate, 0.8–1.5 × 0.4–0.6 mm, with sparse, spreading, straight hairs *c.* 0.15 mm long and hairs on margin, the apex acute. *Pedicels* straight, 0.6–1.7 mm long. *Buds* excluding emergent petals 3–3.8 × 1.3–1.8 mm, outer surface and margin of lobes with medium density, spreading, straight hairs 0.2–0.4 mm long. *Hypanthium* *c.* 0.6 mm long. *Calyx* faintly 10-ribbed, mainly red tube with green lobes, without markings, dull; total calyx length 3–3.8 mm; three abaxial lobes fused at base for 1–1.2 mm, symmetrical, 1.8–2.5 × 0.7–0.9 mm; two adaxial lobes fused at base for 1.5–1.7 mm, narrowly ovate, straight, 1.4–1.6 × 0.7–0.75 mm, the apex acute. *Standard* claw 1–1.3 × 0.4 mm; lamina base slightly cordate, not auriculate; lamina yellow without markings, broadly ovate or broadly elliptic, 3.5–4.1 × 4.7–6.1 mm, emarginate indent *c.* 0.3 mm. *Wings* claw 1.1–1.2 mm long; lamina adaxial spur straight, *c.* 0.3 × 0.4 mm; lamina yellow, straight, oblong, 3.6 × 1.1–1.5 mm, the apex rounded. *Keel* claw 1.2–1.4 mm long; lamina yellow, oblong, straight, 3–3.7 × 1.4–1.8 mm, glabrous; the apex rounded. *Stamen filaments* 2.2–3.3 × 0.15–0.2 mm; *anthers* cream, 0.5–0.6 × 0.3–0.35 mm. *Gynoecium* stipe 0.15–0.3 mm long; *ovary* 1.3–1.5 × 0.5–0.7 mm long, with evenly distributed dense, spreading, straight hairs, *c.* 0.8 mm long; *style* curved, *c.* 2.7 × 0.1 mm, base with sparse, spreading, straight hairs, *c.* 0.2 mm, remainder glabrous; *stigma* simple. *Fruit* and *seeds* not seen.

Chromosome number. Unknown.

Selected specimens. WESTERN AUSTRALIA: [localities withheld] Nov. 1971, *W.H. Butler s.n.* (PERTH); 16 Sep. 1994, *N. Gibson & M. Lyons* 1997 (PERTH); 14 Oct. 2003, *V. Yeomans* 17 (PERTH).

Distribution and habitat. *Eutaxia lasiocalyx* is known from the Parker Range, Mt Holland, Forrestania and Lake Barker (Figure 29). It occurs in woodland or mallee on lateritic or quartzitic substrates.

Flowering period. September to November.

Conservation status. Listed as Priority Two under DEC Conservation Codes for Western Australian Flora (Smith 2010) as it is only known from a few locations, but occurs within a conservation reserve.

Etymology. From the Greek *lasios* (= woolly, hairy) and *calyx* in reference to the hairy calyx present in this species.

Notes. This species differs from *Eutaxia lasiophylla* in having a hairy calyx, from *E. andocada* and *E. acanthoclada* in the hairy leaves and calyx and from *E. rubricarina* in the yellow keel and the standard lamina without markings. It differs from *E. hirsuta* in having a fine style with the apex that is curved compared with a wider style with hooked apex.

Some specimens of this species held at PERTH have been determined as *Eutaxia* sp. Mt Holland (*B.H. Smith* 543) but this has not been recorded on *FloraBase*.

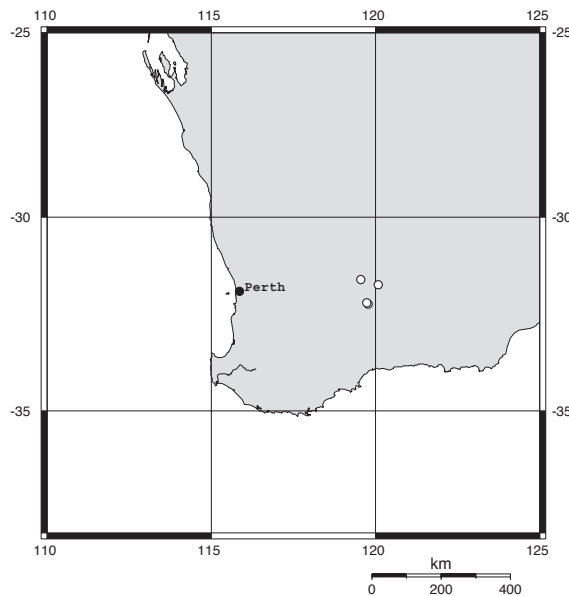


Figure 29. Distribution of *Eutaxia lasiocalyx* in Western Australia.

2.7. Eutaxia leptophylla Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 26: 268 (1853). *Type citation*: 'Drum. IV. n. 35.' [Western Australia, 1844–1847, *J. Drummond* 4: 35] (*holo*: KW; *iso*: BM550735!, CGE, G!, K (image !), MEL, P!, W).

Shrub erect or spreading, densely branched 0.3–1 × 0.5–1 m. *Stems* green with cream or pale red ribs, or red-brown with pale red ribs, without tubercles, glabrous, not spinescent. *Stipules* absent or mid-brown, 0.05–0.1 × 0.05–0.1 mm. *Pulvinus* 0.2–0.3 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length, *petiole* 0.05–0.1 mm long; *blade* concolorous grey-green, or discolorous with abaxial surface darker and sometimes reddish purple on the veins, linear, narrowly elliptic, or rarely ovate to obovate, not verrucose, 0.8–2.8 × 0.3–0.6 mm, abaxial surface with obscure or 1 visible rib, blade glabrous; the apex acute or rounded with an uncinat apiculus *c.* 0.1 mm long. *Flowers* axillary, solitary. *Bracts* absent with flower in the axil of a vegetative leaf, or the flower subtended by a shorter and often broader and thinner textured floral leaf, 1–2.5 × 0.7 mm. *Bracteoles* on the pedicel just below the calyx, red-brown, ovate-lanceolate, 1.1–3 × 0.6–1.2 mm, glabrous, the apex acute and uncinat. *Pedicels* straight, (0.6–)1.1–1.3(–1.8) mm long. *Buds* excluding emergent petals, 2.9–4.5 × 1.5–2 mm, glabrous except for margin of lobes. *Hypanthium* 0.3–0.5 mm long. *Calyx* inconspicuously 5–8-ribbed, green with red markings at base, or at base and centre of lobes, glossy or dull; three abaxial lobes fused at base for 1.1–1.3 mm, symmetrical, 1.8–2.6 × 0.9–1.1 mm; two adaxial lobes fused at base for 1.5–2.4 mm, ovate, straight, 1.1–1.6 × 0.9–1.1 mm, the apex acute. *Standard* claw 1.4–2.5 × 0.35–0.5 mm; lamina base rounded or slightly cordate, with or without auricles; lamina yellow-orange with red veins on back, with a small, pale yellow, triangular eye bordered with bright red markings; lamina broadly elliptic, or broadly ovate, 3.8–5.3 × 5–7 mm; emarginate indent 0.3–0.5 mm. *Wings* claw 1.4–2.1 mm long; lamina adaxial spur straight, 0.3–0.5 × 0.4–0.5 mm; lamina base red, towards the apex yellow-orange, straight, oblong, or slightly obovate, 3.5–5.5 × 1.4–1.7 mm, the apex rounded. *Keel* claw 1.2–2 mm long; lamina red, fading towards base, straight, oblong, or obovate, 3.3–5.5 × 1.8–2.5 mm, glabrous; the apex rounded. *Stamen filaments* 2.7–5.7 × 0.15–0.25 mm; *anthers* yellow, 0.3–0.5 × 0.25–0.3 mm. *Gynoecium* stipe 0.6–0.8 mm long; *ovary* *c.* 1.5 × 0.5 mm, with evenly distributed, dense, spreading, straight hairs, 0.6–0.7 mm long; *style* curved, 3–3.1 × 0.15 mm, glabrous or base with scattered, spreading, straight hairs *c.* 0.5 mm long and apical 2/3 glabrous; *stigma* simple. *Fruit* inflated, globose, both margins strongly curved, 3.5–5 × 2.8–3.5 mm, with dense hairs. *Seeds* brown, ellipsoid, *c.* 1.8 × 1.2 mm; aril white, elliptical, *c.* 0.8 × 0.4 mm.

Chromosome number. $2n = 16$ voucher Sands 639.1.4, cited as *E. virgata* in Sands (1975).

Selected specimens. WESTERN AUSTRALIA: N of Daniell rail crossing, S of Norseman Post Office along the Coolgardie–Esperance Hwy, 30 Oct. 1999, *B. Archer* 1447 (MEL, PERTH); N of Muntadgin, Sep. 1947, *E.T. Bailey* 250 (PERTH); E of Coorow, on Coorow–Wadder Road, 24 July 1977, *C. Chapman* 56046.6 (PERTH); W of Doodlakine, 10 Oct. 2000, *R. Davis* WW 14–45 (PERTH); Ridge NW of W Forest Hill on Barokee, Coorow Shire, 23 Aug. 1996, *F. Falconer* 60 (PERTH); Day Street opposite Andersons, N from Kulin, 16 Sep. 2000, *J.P. Francis* 57 (CANB, MEL, NSW, PERTH); Oak Park Shire Reserve at the junction of Oak Park Road and Botherling East Road, NNE of the town of Goomalling, 18 Sep. 1999, *A.G. Guinness et al. s.n.* (PERTH); S of Elsewhere Road on Cunderdin Road, SE of Bonnie Rock Siding, 8 Sep. 1996, *T.R. Lally & B.J. Lepschi* 1202 (AD, CANB, MEL, PERTH); 9 Mile Rock, ENE of Southern Cross, 16 Sep. 1981, *K. Newbey* 8817 (PERTH); N of 3 Mile Rock, 3 Sep. 1963, *V.E. Sands* 639.1.4 (PERTH, SYD); N of Boorabbin, 16 Sep. 1999, *B.H. Smith* 1952 (MEL, NSW, PERTH); Barnong Station, 2 July 1993, *S. Van Vreeswyk* 3637 (PERTH).

Distribution and habitat. *Eutaxia leptophylla* is widespread in inland south-western Western Australia from Barnong Station, east of Mullewa to Lort River, west of Esperance (Figure 30). It occurs in open woodland over shrubland, in red sand or brown loamy sand over clay, or red clayey loam on lateritic and granitic substrates, or occasionally in stony, saline areas.

Flowering period. July to October.

Conservation status. *Eutaxia leptophylla* is widespread with no special requirements for conservation at this time.

Etymology. From the Greek *leptos* (= narrow) and *phylon* (= leaf) in reference to the narrow leaves present in this species.

Notes. *Eutaxia leptophylla* is distinguished from all other species of *Eutaxia* that share the features of a curved fine style and simple stigma, in having an uncinatate apex of leaves and bracteoles.

Leaves of populations from Wongan Hills (*Gardner 2722*) and (*Gardner & Blackall 806*) have the apex uncinatate, but are unusual in being broader and obovate, sometimes with hairy margins or with both leaf surfaces hairy. In addition the keel is yellow orange instead of red. Further study of these populations is required.

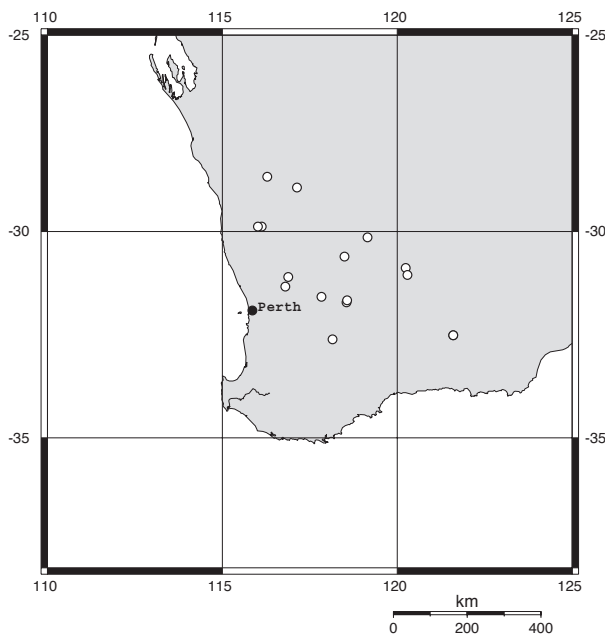


Figure 30. Distribution of *Eutaxia leptophylla* in Western Australia.

2.8. Eutaxia microphylla (R.Br.) C.H.Wright & Dewar, *Johnson's Gardener's Dictionary*: 1052 (1894). *Sclerothamnus microphyllus* R.Br., in Aiton, *Hortus Kewensis* ed. 2, 3: 16 (Oct.–Nov. 1811). *Type citation*: 'Nat. of the South coast of New Holland. Robert Brown, Esq. Introd. 1803, by Mr. Peter Good.' *Lecto, here designated*: Island 8, South Coast [Thistle Island is anchorage 8 in S. Australia, (Chapman *et. al* 2010)], *R. Brown* Bennett No. 4090 (BM 550733!); *isolecto*: K (image!). ?*Paralecto*: Kew Gardens 1807, from seed sent from the South Coast of new Holland [by Peter Good?] (BM 550734!).

Erect, densely branched *shrub* 30–40 cm high. *Stems* green with cream ribs, glabrous, without tubercles, mainly spinescent. *Stipules* absent or cream, 0.1–0.2 × 0.1–0.15 mm. *Pulvinus* 0.2–0.8 mm long. *Leaves* spreading, opposite and decussate, internode length shorter than leaf length, *petiole* 0–0.2 mm long; blade concolorous grey-green; narrowly oblong, narrowly ovate or ovate, not tuberculate, 2.3–4 × 0.6–0.9 mm, with mid-vein obscure, both surfaces glabrous, margin glabrous or ciliate on new growth; the apex obtuse. *Flowers* axillary, solitary. *Bracts* absent, flowers in the axil of vegetative leaf. *Bracteoles* persistent, on the pedicel just below the calyx, ovate, elliptic, 1–1.8 × 0.8–1.2 mm, green or red-brown, glabrous, the apex obtuse. *Pedicels* recurved or straight, 1.8–3.5 mm long. *Buds* excluding emergent petals, 3.5–4 × 1.8–2 mm, glabrous, except for hairs on margins of calyx lobes. *Hypanthium* 0.3–0.5 mm long. *Calyx* not ribbed or with 5 faint ribs; mainly green and red on tube, red lobes with red spots on lobe or red markings, dull; total calyx length 2.7–4 mm long, three abaxial lobes imbricate, fused at base for 1.2–1.5 mm, equal length, 1–2.2 × 1–1.3 mm; two adaxial lobes valvate, fused at base for 2–3.8 mm, ovate, straight, 0.5–2.2 × 0.9–1.1 mm, the apex acute. *Standard* claw 2–2.8 × 0.4–0.5 mm; lamina base strongly or slightly cordate, without auricles; lamina yellow-orange, with a small, yellow, ovate eye bordered with deep red markings conspicuous on rear; lamina broadly ovate, 4.5–6 × 6–7 mm, emarginate indent 0.3–0.4 mm. *Wings* claw 1.3–2.3 mm long; adaxial spur straight, 0.3–0.5 × 0.3–0.5 mm long; lamina yellow-orange, straight, oblong, 5.5–8 × 1.1–2 mm, the apex rounded. *Keel* claw 1.5–2.3 mm long; lamina dark red, straight, oblong, 5.8–7.5 × 1.9–2.5 mm, glabrous; the apex rounded. *Stamen filaments* 3.7–7.8 × 0.1–0.15 mm; *anthers* yellow, 0.5–0.6 × 0.35–0.45 mm. *Gynoeceium* stipe 0.7–1.3 mm; *ovary* 1.8–2.3 × 0.5–0.6 mm, with evenly distributed, dense, spreading, straight hairs, *c.* 0.4 mm long; *style* curved, 2.4–3.2 × 0.15 mm, base glabrous or with scattered, spreading, straight hairs *c.* 0.4 mm and remainder glabrous; *stigma* simple. *Fruit* inflated, ellipsoid, both margins strongly curved, *c.* 5.5 × 3.2 mm, outer surface with moderately dense hairs. *Seed* ellipsoid, *c.* 2.5 × 1.8 mm, black without markings; aril ellipsoid, *c.* 1.3 × 1 mm, white.

Chromosome number. $2n = 16$ (vouchers *Sands* 649.1.1, *Sands* 649.1.4, *Sands* 649.2.3; in *Sands* 1975).

Selected specimens. NEW SOUTH WALES: Wyalong, 22 Sep. 1906, *J.L. Boorman s.n.* (G, NSW *n.v.*, MEL *n.v.*, P); W of Gubbata on the Naradhan Road, 28 Nov. 1984, *R. Coveny & P. Hind* 12036 (CANB, K, NSW, PERTH); Tamara, Oct. 1917, *J.W. Dwyer s.n.* (G); Koraleigh, S of Balranald, 14 Oct. 1949, *J. Vickery* 10,252 (BM, K). VICTORIA: Murrayville, Oct. 1928, *H.B. Williams s.n.* (G); Western Wimmera, Sep. 1889, *C. French s.n.* (P); Little Desert Area S of Kiata, 11 Oct. 1992, *G.P. Lewis & S. Tan* 2135 (K); W of Kaniva, 15 Sep. 1952, *R. Melville* 881 (K); Werribee, 1863, *F. von Mueller s.n.* (P); Western Wimmera, Sep. 1888, *F. von Mueller s.n.* (P); Western Highway, NW of Stawell, 30 Sep. 1962, *T.B. Muir* 2589 (BM, MEL *n.v.*); 90 mile desert, *s. dat.*, *C. Walter s.n.* (MEL *n.v.*, P); Chinkapook, 19 Aug. 1918, *A.B. Williamson s.n.* (K, MEL *n.v.*). SOUTH AUSTRALIA: Kulpara, NW of Adelaide, Northern Yorke Peninsula, 4 Sep. 1966, *B.J. Blaylock* 131 (AD, G); W of Scorpion Spring, Scorpion National Park, S of Pinnaroo, 21 Oct. 1973, *J. Carrick* 3432 (BM, K); Southern Flinders Ranges, Mount Remarkable National Park, at Melrose, 10 Oct. 1973, *K. Czornij*

644 (AD, G); WSW of Kimba, 12 Sep. 1973, *N.N. Donner* 4679 (AD, G); Lower Mount Lofty Range, McLaren Flat, 1 Nov. 1964, *D.N. Kraehenbuehl* 1321 (AD, K); Port Lincoln, *s.dat.*, *F. von Mueller* 18 (P); W of Tuckey, 20 Sep. 1965, *M.E. Phillips* SA/65 477 (CANB, K); N of the Arno Bay turnoff, Eyre Peninsula, 31 Aug. 1964, *V.E. Sands* 649.1.1 (PERTH, SYD); Eyre Peninsula, 31 Aug. 1964, *V.E. Sands* 649.1.4 (PERTH, SYD); Port Lincoln, St Andrews Tce, 1 Sep. 1964, *V.E. Sands* 649.2.3 (PERTH); N of Port Lincoln, 13 Sep. 1970, *M.D. Tindale* 488 (AD, NSW, K); W of Cape Donington, Spalding Cove, 8 Oct. 1958, *P.G. Wilson* 313 (AD, K). TASMANIA: North east: Flinders Island. Specimens not viewed by first author, however, *Flora of Tasmania* describes ovate leaves and pungent branchlets for *E. microphylla*.

Distribution and habitat. *Eutaxia microphylla* occurs in Victoria and New South Wales west of the Great Dividing Range, in north east Tasmania and in southern South Australia (Figure 31). It has been collected from heathland, shrubland and open forest and is commonly found amongst *Acacia*, *Eucalyptus* and *Eremophila*. The recorded habitat is red-brown sand.

Flowering period. July to October.

Conservation status. Conservation requirements unknown. This species does not occur in Western Australia but from old collections appears to be abundant in South Australia.

Etymology. From the Greek *micro-* (= small) and *phyllon* (= leaf) in reference to the small leaves present in this species.

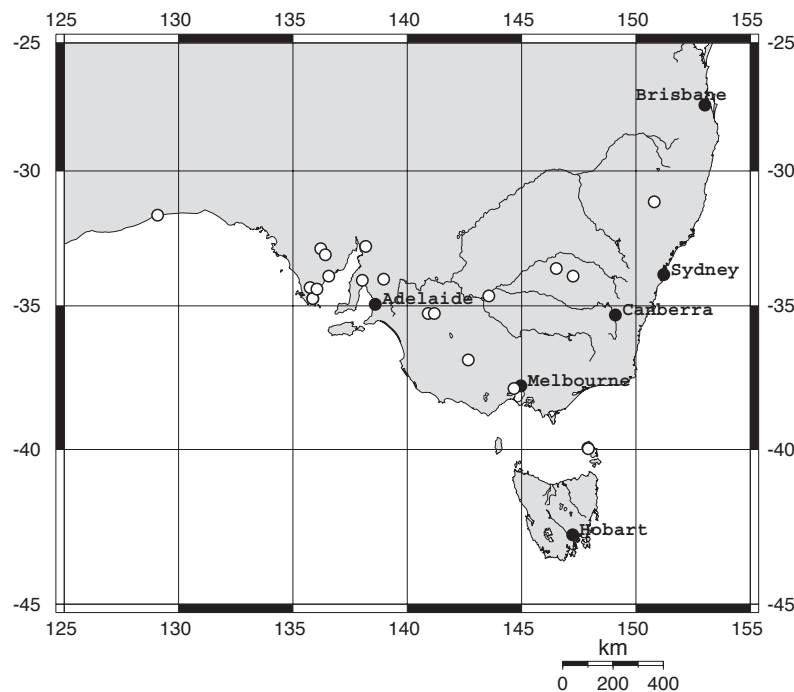


Figure 31. Distribution of *Eutaxia microphylla* in southern Australia.

Notes. *Eutaxia microphylla* can be distinguished from *E. empetrifolia* and *E. diffusa* by its leaves being ovate to oblong with an obtuse apex and more truncate base, rather than being obovate with a subacute to acute apex and more tapered base. *Eutaxia microphylla* displays some resemblance to *E. acanthoclada* and *E. parvifolia*; however, it can be distinguished from *E. parvifolia* by the filiform, elongate style and simple stigma as opposed to the thick, hooked style and capitate stigma of that species. *Eutaxia acanthoclada* can be differentiated by its alternate, rather than having opposite leaves, and its all-yellow flower petals rather than being red-keeled. Further research may show *E. nanophylla* to be a subspecies of *E. microphylla* as they vary only in the former having smaller leaves, hairs always present on the leaf margins and branchlets never pungent, compared with marginal leaf hairs occasionally present and branchlets frequently pungent in *E. microphylla*.

There are two unusual Geneva herbarium specimens. The first Eichler 19412 from Elliston, South Australia, resembles *E. microphylla* but has broader, grey leaves and broader calyx lobes. It requires further collection to establish if it represents a new species.

The second, F.M. Reader s.n. from Dimboolah, closely resembles *E. microphylla*, but it has moderately dense hairs on the outer calyx compared with being glabrous.

The BM specimen has been chosen as the lectotype as it is annotated as a Brown collection from the south coast of Australia, is a good quality specimen and matches the species description. The first author has viewed a Kew photo of a duplicate of the Brown collection, Bennett no. 4090, that is a probable isolectotype, collected from 'Ins[ula no.] 8'.

2.9. *Eutaxia nanophylla* Chappill & C.F. Wilkins, *Nuytsia* 17: 478–840 (2007). *Type:* north-west of Lake Cronin, Western Australia [precise locality withheld for conservation reasons], 13 September 1981, K.R. Newbey 8800 (*holo:* PERTH 00627445!; *iso:* CANB).

Shrub spreading or rounded, sparsely branched, 0.15–0.35 × 0.3–0.55 m. *Stems* red-brown, faintly ribbed, without tubercles, young stems with scattered to medium density, spreading, straight hairs 0.15–0.2 mm long, becoming glabrous, not spinescent. *Stipules* absent. *Pulvinus* 0.2–3 mm long. *Leaves* appressed or spreading, opposite and decussate, or alternate, internode length shorter than leaf length; *petiole* 0.05–0.1 mm long; *blade* concolourous, green or grey-green, without markings; ovate, 0.5–2.7 × 0.5–0.8 mm; abaxial surface with veins indistinct or one, slightly verrucose; mainly both surfaces glabrous, or scattered hairs on adaxial, or abaxial or both surfaces, margins ciliate; the apex obtuse, straight. *Flowers* axillary, solitary. *Bracts* absent, flowers in axil of vegetative leaf. *Bracteoles* on the pedicel just below the calyx, red-green, lanceolate, 1.3–1.7 × 0.5–1 mm, glabrous, or with scattered, spreading, straight hairs c. 0.1 mm long on margin. *Pedicels* straight, 0.8–1.3 mm long. *Buds* excluding emergent petals, 2.5–4 × 1.5–1.8 mm, glabrous except for margins of lobes. *Hypanthium* 0.35–0.6 mm long. *Calyx* faintly 6-ribbed, red-brown or green with dark red markings, dull; three abaxial lobes fused at base for 0.9–1.4 mm, 1.4–2.4 × 0.65–1 mm, symmetrical; two adaxial lobes fused at base for 1.4–1.8 mm, 0.95–1.3 × 0.6–0.9 mm, ovate, straight, the apex acute. *Standard* claw 1.2–1.6 × 0.3–0.5 mm; lamina base truncate or slightly cordate, not or only slightly auriculate; lamina yellow-orange with a pale yellow, triangular eye, bordered with bright red veins; lamina broadly ovate, 3.3–4 × 4.4–6.1 mm, emarginate indent c. 0.3 mm long. *Wings* claw 1.2–1.5 mm long; adaxial spur c. 0.4 × 0.5 mm, straight; lamina yellow, straight, oblong, or slightly obovate, 3.1–3.5 × 1.2–1.8 mm, the apex rounded. *Keel* claw 1.1–1.5 mm long; lamina red, straight, oblong, or rounded on abaxial margin, 3–3.7 × 1.5–2.4 mm, glabrous; the apex rounded. *Stamen filaments*, 1.8–4.7 × 0.25–0.3 mm; *anthers* yellow, 0.3–0.5 × 0.25–0.35 mm. *Gynoecium stipe* 0.5–0.7 mm long; *ovary* 1.5–1.9 × 0.5–0.8 mm, with evenly distributed, dense, spreading, straight hairs, 0.4–0.6 mm long;

style curved, $2\text{--}2.7 \times 0.1\text{--}0.15$ mm, base with scattered, spreading, straight hairs *c.* 0.15, remainder glabrous; *stigma* simple. *Fruit* and *seed* not seen.

Chromosome number. Unknown.

Selected specimens. WESTERNAUSTRALIA: [localities withheld] 11 Sep. 1947, *N.T. Burbidge* 2422 (CANB); 2 Nov. 1998, *A.M. Coates* 4458 (NEW, NSW, PERTH); 26 Oct. 1993, *V. Crowley* DKN 321 (PERTH); 1 Oct. 1928, *C.A. Gardner* 2088 (K, PERTH); 3 Oct. 1979, *K.R. Newbey* 6202 (PERTH); 7 Oct. 1981, *K.R. Newbey* 9240 (PERTH); 25 June 1990, *H. Pringle* 2846 (PERTH); 10 Sep. 1982, *P.S. Short* 1676 (AD, CANB, HO, MEL, NSW, PERTH).

Distribution and habitat. *Eutaxia nanophylla* occurs in Western Australia from Riverina Station to the northern Stirling Ranges, with a westernmost collection from Duranillin (Figure 32). It occurs in woodland, shrubland or rarely open herbland, on sand over clay, stony, clay loam, or red clay.

Flowering period. September to November.

Conservation status. This species is known from seven localities; however, its presence at early collection sites has not been recently confirmed. Listed as Priority Three under DEC Conservation Codes for Western Australia (Smith 2010).

Etymology. From the Greek *nanos* (= dwarf) and *phyllon* (= leaves) in reference to its very small leaves.



Figure 32. Distribution of *Eutaxia nanophylla* in Western Australia.

Notes. This species may be synonymous with *E. microphylla*, but differs in the stem apex not being spinous, stems hairy not glabrous and leaf margins always ciliate compared with only sometimes. It differs from *E. lasiocalyx* in having a glabrous calyx and red compared with a yellow-orange keel.

Specimens of this species held at PERTH have been determined as *Eutaxia* sp. Lake Cronin (K.R. Newbey 8800) but this has name not been recorded on FloraBase.

2.10. *Eutaxia rubricarina* Chappill & C.F. Wilkins, *Nuytsia* 17: 480–482 (2007). *Type:* near Kokeby, Western Australia [precise locality withheld for conservation reasons], 16 August 2002, *T. Watson* 225 (*holo:* PERTH 06358616!; *iso:* CANB, MEL).

Shrub erect, spreading or prostrate, straggling, sparsely branched, 0.02–0.5 × 0.5 m. *Stems* brown or green with cream ribs, without tubercles, with dense, spreading, curled hairs *c.* 0.2 mm long, not spinescent. *Stipules* absent. *Pulvinus* *c.* 0.4 mm long. *Leaves* spreading, alternate or opposite, internode length shorter than leaf length, *petiole* 0.05–0.1 mm long; blade concolourous, grey-green or red-green, or discolourous with abaxial surface with purple markings; ovate to linear, 0.5–3.3 × 0.4–1.3 mm, abaxial surface distinctly 1- or 3-ribbed and verrucose, margin and both surfaces with scattered, spreading, straight hairs *c.* 0.15 mm long, the apex obtuse and straight. *Flowers* axillary, solitary. *Bracts* absent, flowers in axil of vegetative leaf. *Bracteoles* persistent just below the calyx, grey-green or red-green, ovate-lanceolate, 1.3–2.3 × 0.7–1 mm, both surfaces and margin with scattered, spreading, straight hairs *c.* 0.15 mm long. *Pedicels* straight, 0.4–1.1 mm long. *Buds* excluding emergent petals 2.5–3.8 × 1.7–2 mm, outer surface and margin of calyx lobes with scattered to medium density, spreading, straight or wavy, hairs 0.15–0.3 mm long. *Hypanthium* *c.* 0.5 mm long. *Calyx* not ribbed, green with dark red blotches and stripes, with or without red spots at junction of lobes, dull; total calyx length 4–6 mm long, three abaxial lobes fused at base for 1.3–1.4 mm, middle abaxial lobe 1.9–2.4 × 1.3–1.4 mm, lateral lobes 2.1–2.3 × 1.1–1.4 mm; two adaxial lobes fused at base for 1.9–3 mm, ovate, straight, 0.5–1.3 × 0.5–1.1 mm, the apex acute. *Standard* claw 1.5–2.1 × 0.35–0.7 mm; lamina base truncate or cordate, not auriculate; lamina yellow-orange, with a small, paler yellow, ovate to triangular eye bordered with deep red vein markings, broadly ovate, 4.5–5.6 × 7–7.8 mm, emarginate indent 0.5–0.7 mm. *Wings* claw 1.7–2 mm long; adaxial spur *c.* 0.6 × 0.5 mm, straight; lamina yellow-orange, straight, oblong, to slightly obovate, 4.9–5.9 × 1.8–2.1 mm, the apex rounded. *Keel* claw 1.3–1.8 mm long; lamina dark red, obovate, straight, 4.8–5.1 × 2.8–3 mm, glabrous; the apex rounded. *Stamen filaments* 3.5–5.2 × 0.15–0.3 mm; *anthers* cream to grey-brown, 0.5 × 0.35–0.4 mm. *Gynoecium* stipe 0.7–1 mm; *ovary* 1.2–1.7 × 0.7 mm, with evenly distributed dense, spreading, straight hairs, 0.7–1 mm long; *style* curved, 3.3–4.3 × 0.15–0.2 mm, base with scattered, spreading, straight hairs 0.2 mm long, remainder glabrous; *stigma* simple. *Fruit* and *seed* not seen.

Selected specimens. WESTERN AUSTRALIA: [localities withheld] 5 Oct. 1933, *W.E. Blackall* 3276 (PERTH); 7 Oct. 1986, *T. Macfarlane* 1691 (PERTH); 23 Aug. 1979, *K.R. Newbey* 5802 (PERTH); 18 Sep. 2000, *M. Ochtman & D. Lynch* 6 (BELY, PERTH); 31 July 1988, *B.H. Smith* 1056 (BRI, CANB, MEL); 3 Oct. 2002, *T. Watson & P. Clynk* 370 (BELY, PERTH).

Distribution and habitat. *Eutaxia rubricarina* is known from the south-west of Western Australia from Manmanning to Quairading and east from Yellowdine to Lake Cronin (Figure 33). It grows in open woodland on grey, gravelly sand, red loam or pinkish-white, sandy clay with gravel.

Flowering period. July to October.

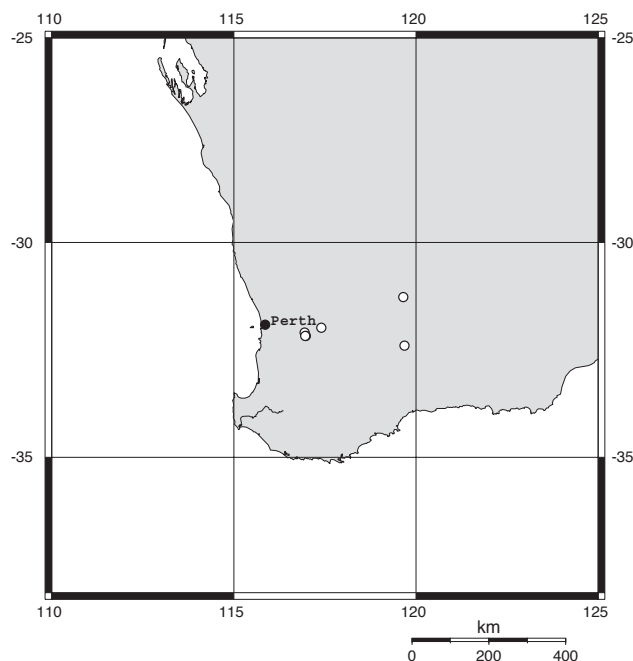


Figure 33. Distribution of *Eutaxia rubricarina* in Western Australia.

Conservation status. Listed as Priority Three under DEC Conservation Codes for Western Australian Flora (Smith 2010) as it is only known from a few locations.

Etymology. From the Latin *rubro-* (= red-) and *carina* (= keel) in reference to the red keel present in this species.

Notes. *Eutaxia rubricarina* is characterised by its hairy calyx and verrucose leaves that are ovate and hairy on the adaxial surface. It is distinguished from *E. lasiocalyx* by having a red rather than a yellow keel.

Some specimens of this species held at PERTH have been determined as *Eutaxia* sp. Kokeby (T. Watson & P. Clynk 370) but this name has not been recorded on *FloraBase*.

Excluded names

Eutaxia divaricata Turcz. = *Dillwynia divaricata* (Turcz.) Benth.

Eutaxia patula F. Muell. ex Sond. = *Dillwynia uncinata* (Turcz.) J.Black

Eutaxia punctata Turcz. = *Gastrolobium punctatum* (Turcz.) G.Chandler & Crisp

Eutaxia pungens Sweet = *Dillwynia pungens* (Sweet)Lodd.

Eutaxia reticulata Meisn. in Lehm. = *Gastrolobium reticulatum* (Meisn.) Benth.

Eutaxia sparsifolia F. Muell. = *Dillwynia uncinata* (Turcz.) J.Black

Eutaxia strangeana Turcz. = *Dillwynia retorta* (Wendl.) Druce

Eutaxia uncinata Turcz. = *Dillwynia uncinata* (Turcz.) J.Black

Acknowledgements

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Index of scientific names

Bold italics are currently accepted taxa in *Eutaxia*.

Taxon Name	Taxon Number
<i>Eutaxia</i> R.Br. = <i>Eutaxia</i> R.Br. sect. <i>Eutaxia</i>	
<i>Sclerothamnus</i> R.Br. = <i>Eutaxia</i> R.Br. sect. <i>Sclerothamnus</i>	
<i>Dillwynia incerta</i> Domin = <i>E. myrtifolia</i>	
<i>Dillwynia myrtifolia</i> Sm. = <i>E. myrtifolia</i>	
<i>Dillwynia obovata</i> Labill. = <i>E. myrtifolia</i>	
<i>Eutaxia acanthoclada</i> G.R.Hend. & Chappill	2.1
<i>Eutaxia actinophylla</i> Chappill & C.F.Wilkins	2.2

<i>Eutaxia andocada</i> Chappill & C.F.Wilkins	2.3
<i>Eutaxia alternifolia</i> Chappill ms = <i>E. andocada</i>	
<i>Eutaxia baxteri</i> Knowles & Westc. = <i>E myrtifolia</i>	
<i>Eutaxia cuneata</i> Meisn.	1.1
<i>Eutaxia densifolia</i> Turcz. = <i>E. parvifolia</i> Benth.	
<i>Eutaxia diffusa</i> F.Muell.	2.4
<i>Eutaxia dillwynioides</i> Meisn. = <i>E. parvifolia</i>	
<i>Eutaxia divaricata</i> Turcz. = <i>Dillwynia divaricata</i> (Turcz.) Benth.	
<i>Eutaxia empetrifolia</i> Schldtl.	2.5
<i>Eutaxia epacridoides</i> Meisn.	1.2
<i>Eutaxia epacridoides</i> Meisn. subsp. <i>sparsifolia</i> G.R.Henderson ms = <i>E. exilis</i>	
<i>Eutaxia ericoides</i> Meisn. var. <i>ericoides</i> = <i>E. virgata</i>	
<i>Eutaxia ericoides</i> var. <i>filicaulis</i> Meisn. = <i>E. virgata</i>	
<i>Eutaxia exilis</i> C.F.Wilkins & G.R.Hend.	1.3
<i>Eutaxia hirsuta</i> C.F.Wilkins & Chappill	1.4
<i>Eutaxia inuncta</i> C.F.Wilkins & Chappill	1.5
<i>Eutaxia lasiocalyx</i> Chappill & C.F.Wilkins	2.6
<i>Eutaxia lasiophylla</i> G.R.Hend.	1.6
<i>Eutaxia leptophylla</i> Turcz.	2.7
<i>Eutaxia lutea</i> Chappill & G.R.Hend.	1.7
<i>Eutaxia major</i> (Benth.) C.F.Wilkins & Chappill	1.8
<i>Eutaxia microphylla</i> (R.Br.) C.H.Wright & Dewar	2.8
<i>Eutaxia microphylla</i> (R.Br.) C.H.Wright & Dewar var. <i>microphylla</i> = <i>E. microphylla</i>	
<i>Eutaxia microphylla</i> (R.Br.) C.H.Wright & Dewar var. <i>diffusa</i> (F.Muell.) Court = <i>E. diffusa</i>	
<i>Eutaxia myrtifolia</i> (Sm.) R.Br	1.9
<i>Eutaxia myrtifolia</i> var. <i>angustifolia</i> Meisn. = <i>E. myrtifolia</i>	
<i>Eutaxia nanophylla</i> Chappill & C.F.Wilkins	2.9
<i>Eutaxia neurocalyx</i> (Turcz.) Chappill & G.R.Hend.	1.10
<i>Eutaxia neurocalyx</i> (Turcz.) Chappill & G.R.Hend. subsp. <i>neurocalyx</i>	1.10a
<i>Eutaxia neurocalyx</i> (Turcz.) Chappill & G.R.Hend. subsp. <i>nacta</i> C.F.Wilkins	10b
<i>Eutaxia neurocalyx</i> (Turcz.) Chappill & G.R.Hend. subsp. <i>papillosa</i> C.F.Wilkins	1.10c
<i>Eutaxia neurocalyx</i> (Turcz.) Chappill & G.R.Hend. subsp. <i>hirsuta</i> ms = <i>E. hirsuta</i>	
<i>Eutaxia neurocalyx</i> (Turcz.) Chappill & G.R.Hend. subsp. <i>major</i> ms = <i>E. inuncta</i>	
<i>Eutaxia neurocalyx</i> (Turcz.) Chappill & G.R.Hend. subsp. <i>leptophylla</i> ms = <i>E. major</i>	

Eutaxia obovata (Labill.) C.A.Gardner = ***E. myrtifolia***

Eutaxia obovata Turcz. = ***E. parvifolia***

Eutaxia parvifolia Benth.

1.11

Eutaxia patula D.Dietr. = *Dillwynia patula* F. Muell.

Eutaxia punctata Turcz. = *Gastrolobium punctatum* (Turcz.) G.Chandler & Crisp.

Eutaxia pungens Sweet = *Dillwynia pungens* (Sweet) Mackay ex Lodd.

Eutaxia reticulata Meisn. = *Gastrolobium reticulatum* (Meisn.) Benth.

Eutaxia rubricarina Chappill & C.F.Wilkins

2.10

Eutaxia sp. Hatter Hill (K.R. Newbey 6532) = ***E. acanthoclada***

Eutaxia sp. Kokeby (T. Watson & P. Clynk 370) = ***E. rubricarina***

Eutaxia sp. Lake Cronin (K.R. Newbey 8800) = ***E. nanophylla***

Eutaxia sp. Mt Holland (B.H. Smith 543) = ***E. lasiocalyx***

Eutaxia sp. Norseman (Archer 1387) = ***E. actinophylla***

Eutaxia sp. Peak Eleanora (M.A. Burgman 3862) = ***E. andocada***

Eutaxia sparsifolia F.Muell. = *Dillwynia uncinata* (Turcz.) J.M.Black

Eutaxia strangeana Turcz. = *Dillwynia retorta*?

Eutaxia uncinata Turcz. = *Dillwynia uncinata* (Turcz.) J.M.Black

Eutaxia verticillata Chappill & C.F.Wilkins ms = ***E. actinophylla***

Eutaxia virgata Benth.

1.12

Eutaxia virgata var. *diffusa* Regel = ***E. diffusa***?

Pultenaea neurocalyx Turcz. = ***E. neurocalyx***

Pultenaea neurocalyx Turcz. var. *major* Benth. = ***E. inuncta***

Sclerothamnus microphyllus R.Br. = ***E. microphylla*** (R.Br.) C.H.Wright & Dewar

