Taxonomic notes on the family Rutaceae, principally of Western Australia

By P. G. Wilson

Abstract

Taxonomic and nomenclatural notes are made on the Rutaceae of Western Australia. A new monotypic genus, **Rhadinothamnus**, is created for the species previously known as *Nematolepis euphemiae* F. Muell. The genus *Drummondita* is recognised as being distinct from *Philotheca* and the necessary new combinations are made. The name *Urocarpus* is found to antedate its synonym *Asterolasia* and new combinations have been made for the Western Australian and South Australian species. One new series is described in the genus *Boronia*. Fourteen new specific or infraspecific taxa are described in the genera *Diplolaena*, *Boronia*, *Eriostemon*, and *Drummondita*. Thirteen new specific or infraspecific combinations are made in the genera *Rhadinothamnus*, *Boronia*, *Drummondita*, and *Urocarpus*. Lectotypes have been chosen for some of the names involved.

Introduction

This paper has been prepared in order to avoid the publication of new names or new combinations in the 'Rutaceae' portion of a projected 'Flora of Western Australia'. The notes are intentionally brief since much of the data will be repeated, or elaborated on, in the 'Flora' itself.

Some of the taxonomic decisions have a bearing on the nomenclature of plants found in the Eastern States. However, name changes have generally been confined to those taxa which occur in Western Australia, as it is with these that the present study has been mainly concerned.

RUTACEAE

Tribe Boronieae

Rhadinothamnus P. G. Wilson gen. nov.
(rhadinos = slender, thamnos = shrub)

Fruticulus omnibus partibus argenteo-lepidotus. Folia alterna simplicia. Flores axillares, solitarii, breviter pedicellati, bibracteolati, pentameri. Calyx lobatus extus lepidotus. Petala libera, valvata, extus lepidota. Stamina 10, libera; filamentum ligula brevi, villosa, supra basim inserta; antherae versatiles, breviter apiculatae; pollinis granum orbiculatum, tetracolporatum. Discus integer. Carpella 5, libera, placentione ut in Boronia; stylus tenuis infra apices carpellorum insertus; stigma parvum. Fructus ut in Boronia. Semen anguste reniforme; testa externa tenuis, interna (sclerotesta) laevis; hilum ellipticum, filo cartilagineo circumcinctum.

Type: R. euphemiae (F. Muell.) P. G. Wilson.

Undershrub ± covered with a silvery lepidote indumentum. Leaves small, alternate, simple. Flowers, solitary, axillary, shortly pedicellate, bibracteolate, pentamerous. Calyx lobed, lepidote outside. Petals free, valvate, lepidote outside. Stamens 10, free; filaments with a short villous ligule above the base; anthers versatile, shortly apiculate, dehiscence introrse; pollen orbicular, tetracolporate; carpels free but compact, placentation as in Boronia; style slender, inserted below the apex of the carpels, stigma small. Seed narrow-reniform, outer testa thin, inner (sclerotesta) smooth, hilum elliptic surrounded by a narrow cartilaginous rim, raphe minute, chalaza towards base on adaxial margin.

Only species:

R. euphemiae (F. Muell.) P. G. Wilson comb. nov.

Nematolepis euphemiae F. Muell., Fragm. 3:149 t. 25 (Apr. 1863).—*Phebalium euphemiae* (F. Muell.) C. A. Gardn., Enum. Pl. Austral. Occid. 70 (1931).—*Type:* Near Cape Arid, *Maxwell* (iso. K, photo seen).

P. baxteri Benth., Fl. Austral. 1:345 (30 May 1863).—*N. baxteri* (Benth.) Engler in Engler et Prantl, Nat. Pflanzenfam. 3/4:145 (1896).—*Type:* W. Australia, south coast, *Baxter* (holo.:K, photo seen).

Distribution: Found near the south coast of Western Australia from the Eyre Range east to Mt. Ragged.

This species was placed in the genus *Nematolepis* by Mueller because it has ligulate stamens and because he thought (incorrectly) that the petals were united. The seed, anther, and other floral characters link it with *Phebalium* sect. *Gonioclados*—which section includes *P. rude* and *P. anceps*. It is also closely related to the genus *Chorilaena*. All these taxa have the hilum surrounded by a ligament-like border, a character not found elsewhere in the tribe Boronieae. *Rhadinothamunus* is unique in the family Rutaceae in having sub-orbicular tetracolporate pollen grains, whereas in all other genera they are ellipsoidal and tricolporate.

DIPLOLAENA R. Br.

Diplolaena ferruginea P. G. Wilson sp. nov.

Folia late elliptica ca 2 x 1 cm, supra levia, glanduloso-punctata, glabra vel glabrescentia, subtus pallida velutina. Capitula ca. 2 cm lata; bracteae ferrugineo-tomentosae, externae anguste-triangulares, ca. 12 mm longae, internae lineari-acuminatae; petala bracteis paulo breviora, linearia, tomento denso, pallido-ferrugineo.

Type: C. A. Gardner 8459, shrub 2 ft., styles crimson; eastern gullies, Mt. Lesueur, 16.x. 1946 (holo.:PERTH, iso.:K).

Spreading shrub to 50 cm high. Leaves broadly elliptic, ca. 2 x 1 cm; upper surface smooth, glandular-punctate, glabrous or glabrescent; lower surface cream to ferruginous velutinous. Flower heads ca. 2 cm wide; outer bracts narrow-triangular, ca. 12 mm long, ferruginous-tomentose; inner bracts linear-acuminate; petals linear, slightly shorter than outer bracts, with a dense, pale ferruginous tomentum.

Distribution: Western Australia, near Jurien Bay on the west coast.

Cockleshell Gully, *C. A. Gardner*, 8429; 15 mi NW of Badgingarra, spreading shrub to 50 cm, on laterite slope, *A. S. George* 6764.

In foliage this species resembles *D. dampieri* and *D. grandiflora*. It differs markedly from these in having involucral bracts which are narrowly triangular and petals which are densely ferruginous-tomentose.

Diplolaena microcephala Bartl. var. **velutina** P. G. Wilson var. nov.

Folia anguste oblongo-obcuneata, dense velutina, ca. 15 x 3 mm, margine leviter recurvo. Involucri bracteae externae dense ferrugineo-velutinae, ca. 6 mm longae; stamina bracteis internis paulo longiora.

Type: T. E. H. Aplin 509, 2 mi N of Wyalkatchem, 30.vi. 1959 (holo.:PERTH, iso.:K, MEL).

Leaves narrowly oblong-obcuneate with a thick velutinous indumentum, ca. 15 x 3 mm, margin sometimes slightly recurved, apex rounded, base narrow-cuneate grading into a short petiole. Outer involucral bracts densely ferruginous-velutinous, ca. 6 mm long; inner bracts pale brown to ferruginous velutinous. Stamens shortly exceeding inner bracts.

Distribution: Western Australia, in the area between Coorow and Kellerberrin.

West of Coorow, *W. E. Blackall* 3963; Watheroo, flowers pink, erect bushy shrub 2–3 ft., *R. D. Royce* 4953; Wongan Hills, *C. A. Gardner*, 5.ix. 1924; 1 mi E of Moonijin, *K. Newbey* 1991; Wyalkatchem, *B. Rosier*, July 1959; Yorkrakine, *C. A. Gardner*, Aug. 1922; Kellerberrin, *A. E. Lankester*, Sept. 1897; 15 mi N of Jitarning, *K. Newbey* 2485.

The distribution of the species *D. microcephala* is from the south coast as far north as the Murchison River. Over this wide area the species exhibits numerous different forms, but for only the most distinct of these does it appear practicable to create infraspecific categories. One of these is for the variety described above. Another is for var. *drummondii* Benth. which is found between Mundaring and Muntadgin; it has thin, flat leaves and very long stamens. In the type form of var. *microcephala* the leaves are broadly elliptic to obovoid, ca. 2 cm long, and densely tomentose beneath.

BORONIA Sm.

Sect. **Heterandrae** (Benth.) Engler

Boronia clavata P. G. Wilson sp. nov.

Ramuli puberuli. Folia pinnata, 3–7 foliolata, glabra vel glabrescentia; articuli rhachidis ca. 3 mm longi; foliola linearia vel linearia-obcuneata, obtusa, 7–15 mm longa. Flores solitarii, axillares; pedicelli anguste-turbinati, ca. 3 mm longi, bibracteolati. Sepala ovata vel anguste deltoidea, 2–3 mm longa, subapicaliter apiculata, puberula. Petala imbricata, obovata, ca. 8 mm longa. subapicaliter apiculata, glabra, pallide flavo-viridia. Stamina dimorpha, basi pilosa; filamenta sepalina crassa, clavata, ca. 2·5 mm longa; filamenta petalina attenuata, ca. 1·8 mm longa, apice inflexa, verrucosa; antherae ovatae, acutae, ca. 1·2 mm longae, antisepalinis sterilibus. Discus breviter columnaris, glaber. Ovarium sparse pilosum; stylus et stigma magnum, clavatum, longitudinaliter sulcatum, ca. 4 mm longum, glabrum.

Type: K. Newbey 2876, Bremer River ca. 10 mi from mouth, 15.ix. 1969 (holo.:PERTH, iso.:K, MEL).

Subshrub 1-1.5 (2) m high. Branchlets slender, puberulous. Leaves subsessile, pinnate, 3-7 foliolate, glabrous or glabrescent; rhachis articles linear, ca. 3 mm long; leaflets linear to linear-obcuneate, obtuse, 10-20 mm long. Flowers erect, solitary, axillary, pedicels narrowly turbinate, ca. 3 mm long, medially bibracteolate (or with two pairs of bracteoles, the lower then ± compound), minutely puberulous. Sepals ovate to narrowly triangular, 2-3 mm long, fleshy with scarious margins, subapically apiculate, puberulous. Petals imbricate, obovate, ca. 8 mm long, subapically apiculate, glabrous or glabrescent, pale yellow-green. Stamens dimorphic, pilose near base; sepaline filaments thick, clavate ca. 2.5 mm long; petaline filaments terete, attenuate and ca. 1.8 mm long, apex verrucose and inflexed; anthers ovate, acute, ca. 1·2 mm long, the antisepalous sterile or almost so. Disc fleshy, shortly columnar, glabrous. Ovary sparsely pilose; style and stigma massive, clavately columnar and longitudinally grooved, ca. 4 mm long, glabrous. Fruit shortly stipitate, cocci ca. 4 mm long with rounded apices.

Distribution: Western Australia, south west region near Bremer River.

Gairdner River, *K. Newbey* 2883 (PERTH); Bremer River, *A. Gray* (PERTH).

This species appears to be restricted in its distribution to a small area near the south coast of Western Australia. It is peculiar in that the ovary is raised on a gynandrophore, covered by a fleshy disc to which the stamens are laterally attached. The antisepalous anthers are similar in size and shape to the antipetalous but are sterile (or sometimes a few pollen grains are present).

Mr. K. Newbey has provided the following notes on the living plant from his personal observations:

"Upright to spreading slightly open shrub usually about 4 feet high but may reach 7 feet. Confined almost entirely to narrow alluvial floodflats which are 3 to 6 feet above the usual river level."

Boronia octandra P. G. Wilson sp. nov.

Fruticulus ca. 0–3 m altus; ramuli teretes, puberuli. Folia subsesssilia, ternata, glabra, foliolis teretiusculis, ca. 5 mm longis apicem versus incrassatis. Flores axillares, solitarii; pedicellus cernuus, ca. 2 mm longus, apice incrassato. Sepala ovata ca. 3 mm longa glabra vel glabriuscula; petala late elliptica, ca. 8 mm longa, glabriuscula. Stamina omnia fertilia;

filamenta incurva, pilosula, sepalinis teretiusculis, ca. 2 mm longis, globulo magno verrucoso terminatis, petalinis brevioribus, teretiusculis, ca. 1.2 mm longis; antherae ± aequales, ca. 0.8 mm longae, breviter apiculatae. Discus puberulus, albus, in massas 4 pulviniformes petalinas divisus. Ovarium humile, dense pilosulum; stigma sessile quadrilobum, ca. 6 mm latum, album.

Type: P. G. Wilson 7108, 28 km W of Ravensthorpe and 12 km N of Ravensthorpe-Ongerup Road, 14.vii. 1968 (holo.:PERTH, iso.:K, MEL).

Undershrub ca. 0·3 m high; branchlets minutely puberulous in two opposite lines. Leaves subsessile, ternate, glabrous; leaflets subterete to subclavate, ca. 5 mm long. Flowers axillary, solitary, pendulous. Pedicel turbinate, ca. 2 mm long, conspicuously bibracteolate. Sepals ovate, ca. 3 mm long, glabrescent. Petals broadly elliptic, ca. 8 mm long, glabrescent, greenish-cream to reddish-brown. Stamens all fertile; filaments incurved, pilosulose, the antisepalous sub-terete, ca. 2 mm long, with a large, abaxial muricate swelling at the apex, the antipetalous shorter, sub-terete, ca. 1·2 mm long, with no apical swelling; anthers cordate, ca. 0·8 mm long, shortly white-apiculate. Disc puberulous to glabrous, pale green, divided into four antipetalous cushion-shaped masses. Ovary densely pubescent, equal to disc in height; stigma sessile, hemispherical ca. 0·6 mm wide, with four rounded lobes, papillose, pale green.

Distribution: Western Australia, south-west region, from Gnowangerup east to the West River.

Gnowangerup, *C. A. Gardner* 2094; 10 mi N of Borden, *Mr. Janes*, 10.ix. 1960; 15 mi W of Ongerup. *K. Newbey* 352; 3 mi N of Ongerup, *K. Newbey* 2443, 2444; 55 km N of Bremer Bay, *P. G. Wilson* 5402; 4 mi E of West River, *F. Lullfitz* 5399.

Boronia octandra has externally an appearance similar to *B.crassifolia*. It differs from that species in having almost terete leaflets, large sepaline stamens which have a massive apical swelling, a divided disc, and a small stigma. It also has the anthers consistently similar and fertile (a character approached by some forms of *B.crassifolia*). A divided disc is found in the two heterandrous species *B. tetrandra* and *B. purdieana*, but in these the disc masses are opposite to the sepals whereas in *B. octandra* they are alternate to them.

Boronia sect. **Cyanothamnus** (Lindl.) F. Muell.

Boronia coerulescens F. Muell. subsp. **spicata** P. G. Wilson subsp. nov.

Ramuli erecti, dense pilosuli. Folia erecta vel leviter divaricata, anguste-oblonga usque anguste-cuneata vel elliptica, integra, 5–10 mm longa, obtusa, pilosula, supra concava. Flores in racemo spiciformi folioso aggregati. Pedicelli ca. 2 mm longi, pilosuli, bracteolis parvis basalibus ornati. Sepala anguste-ovata, ca. 4 mm longa, prominenter glanduloso-punctata, pilosula. Ovarium pilosulum.

Type: J. W. Green 1500, 2 mi S of Wubin, erect shrub 50 cm high, petals white tinged blue on dorsal side, yellow sand, 22.viii. 1957 (holo.:PERTH).

Branches erect, densely pilosulose. Leaves erect or slightly spreading, narrow-oblong to narrow-cuneate or elliptic, entire, 5-10 mm long, obtuse, pilosulose, upper surface concave. Flowers in dense leafy, spike-like racemes. Pedicels ca. 2 mm long, pilosulose, with a pair of small basal bracteoles. Sepals narrow ovate, ca. 4 mm long, prominently glandular punctate, pilosulose. Ovary pilosulose.

Distribution: Western Australia, between Wubin and Muntadgin.

6 mi S of Wubin, *T. E. H. Aplin* 565; Between Mollerin and Koorda, *W. E. Blackall* 3452; Muntadgin, *E. T. Bailey* 727.

Boronia coerulescens F. Muell. subsp. **spinescens** (Benth.) P. G. Wilson comb. et stat. nov.

B. spinescens Benth., Fl. Austral. 1:319 (1863).—*Type:* "*Drummond* 78" (holo. K "no. 87", photo seen).

The species *B. coerulescens* is extremely variable in Western Australia. To the south and south-east of Lake Grace is found a form of subsp. *coerulescens* which is almost identical to the form found in South Australia and Victoria. North-west of Lake Grace, as far as the Murchison River, are found subsp. *spinescens* and subsp. *spicata*. The former is distinguished, most obviously, by its spike-like inflorescence and the latter by its spreading branchlets which are frequently pungent. There is however, no sharp separation between any of them and their areas of distribution overlap.

Boronia ramosa (Lindl.) Benth. subsp. **anethifolia** (Bartl.) P. G. Wilson stat. nov.
Cyanothamnus anethifolius Bartl. in Lehm., Pl. Preiss. 1:170 (1844).—
B. ramosa var. *anethifolia* (Bartl.) Benth., Fl. Austral. 1:320 (1863).—
Type: "prope Spitesbrook ad fluvium Canning", *Preiss* 2035.

C. tridactylites Bartl., l.c. 2:227 (1848).—*Type: Preiss* 2628.

B. subcoerulea F.Muell., Fragm. 2:100 (1860).—*Type:* Murchison R., *Oldfield;* Champion Bay, *Walcott*.

This taxon requires recognition as a subspecies. It has pedicels shorter than the leaves, and anthers which are minutely white-apiculate. In the typical subspecies the pedicels are longer than the leaves and the anthers are prominently apiculate.

Boronia sect. **Valvatae** (Benth.) Engler

Boronia ternata Endl. var. **foliosa** (S. Moore) P. G. Wilson comb. et stat. nov.
B. foliosa S. Moore, J. Linn. Soc. Bot. 45:165 (1920).—*Type:* Bruce Rock *Stoward* 334 (isosyn. MEL).

B. ternata Engl. var. **elongata** P. G. Wilson var. nov.

Folia simplicia, oblonga usque obovata, 5–10 mm longa, glabra. Pedicelli graciles, 4–10 mm longi. Sepala ca. 2 mm longa; petala ca. 7 mm longa, erubescentia.

Type: P. G. Wilson 6932, N side of Mt. Short which is 14 km NNW of Ravensthorpe, straggly undershrub 1·3 m high, flower pink, 8. viii. 1968 (holo.:PERTH, iso.:B, K, MEL).

Leaves simple, oblong to obovate, 5-10 mm long, glabrous. Pedicels slender, 4-10 mm long. Sepals ca. 2 mm long; petals ca. 7 mm long, pink.

Distribution: Western Australia, near Ravensthorpe.

1 mi E of Elverdton Mine, Ravensthorpe, *K. Newbey* 2602; Ravensthorpe Range, *A. S. George* 1620.

The species of *Boronia* in the sect. *Valvatae* (apart from *B. alata*) appear to be closely related and to exhibit a multiplicity of different forms. Some of these forms, such as the one described above, warrant recognition, but it is not possible to demarcate clearly the limits of the various taxa.

Boronia revoluta P. G. Wilson, sp. nov.

Fruticulus 50–80 cm altus. Rami sparse pilosi. Folia parum congesta ternata; petiolus ca. 1·5 mm longus; foliola valde revoluta subteretia 4–8 mm longa glabrescentia. Flores axillares solitarii; pedicellus 3–5 mm longus glaber ruber, apice turbinato, bracteolis 2 vel 4 anguste triangularibus ca. 2·5 mm longis supra basin insertis. Sepala ovata acuminata ca. 3 mm longa rubra sparsissime stellato-pilosa. Petala valvata ovata ca. 7 mm longa acuta pallide rosea, extra stellato-pilosa, intra praeter apicem versus pilosum glabra, costa prominenti. Stamina 2·5–3 mm longa; filamenta subteretia apice aliquantum tumido, sparse stellato-hirsuta; anthera cordata ca. 1 mm longa, apice rotundato cum acumine recurvo ca. 0·2 mm longo. Discus integer pallido ruber glaber. Ovarium hemisphaericum, glabrum; stylus brevis teres ca. 0·2 mm longus glaber; stigma capitata.

Type: K. Newbey 2388, South Ironcap (ca. 45 km NNE of Lake King township), Lat. 32°42′S, Long. 119°40′E; rocky sand, plant 18 in–30 in, 4.ix.1970 (holo.:PERTH, iso.:K).

Subshrub 50-80 cm high. Branches sparsely pilose. Leaves somewhat congested, ternate; petiole ca 1·5 mm long; leaflets strongly revolute and subterete, 4-8 mm long, glabrescent on upper (outer) surface, stellate pilose below (within). Flowers solitary, axillary; pedicel glabrous, red, turbinate beneath

calyx; bracteoles 2 or 4, narrowly triangular, ca 2·5 mm long. Sepals ovate-acuminate, ca 3 mm long, very sparsely stellate-pilose, red. Petals valvate, ovate, ca 7 mm long (enlarging slightly in fruit), acute, loosely stellate-pilose outside, glabrous within except near apex, pale pink, midrib prominent. Stamens 2·5-3 mm long (the antisepalous slightly longer than the antipetalous); filaments subterete, somewhat swollen and verrucose at apex, sparsely stellate-hirsute; anthers cordate, ca. 1 mm long, apex rounded with an acuminate and recurved apiculum ca ¼ length of loculi; pollen orange. Disc entire, pale red, glabrous. Ovary hemispherical, glabrous; style short, terete, ca. 0·2 mm long, glabrous; stigma capitate. Seed reniform, 3·5 mm long; outer testa membranous, dull; placental endocarp persistent, thick; raphe insignificant; chalaza near base on adaxial margin.

Distribution: Western Australia, between Lake King and the Johnston Lakes.

Hatters Hill (40 km NE of Lake King township), Oct. 1929, *H. Steedman* 32 (in fruit).

This plant is similar to *B. ericifolia*, a species found much farther north between Moora and the Wongan Hills. *B. revoluta* differs most noticeably in having much longer hairs on stem and petals, a petiolate (not sessile) leaf, and larger flowers. Since the collections seen have both been made on ironstone hills it would appear probable that *B. revoluta* is restricted to this type of habitat. *B. ericifolia* grows on yellow sand or loam.

Boronia sect. **Boronia**

Boronia oxyantha Turcz. var. **brevicalyx** (Benth.) P. G. Wilson comb. nov.

B. lanuginosa Endl. var. *brevicalyx* Benth., Fl. Austral. 1:317 (1863).—*Type:* "Phillips River, Herb. Mueller", (iso.:MEL).

The type of *Boronia lanuginosa* was thought by Endlicher to have come from King George Sound on the south-west coast of Western Australia. Bentham, who had not seen the type specimen, assumed that the short original description applied to a *Boronia* which had been collected by Robert Brown in the same area. Reference to the type of *B. lanuginosa* (*Ferd. Bauer*, Naturhistorisches Museum, Wien) shows that it belongs in fact to a species found along the north coast of Australia and which received the later name of *B. artemisiifolia* F. Muell. The correct name for the species Bentham had in mind, which came from the south coast, is *B. stricta* Bartl. Bentham's variety "*brevicalyx*" is not, however, closely related to this species nor to *B. lanuginosa*, but to *B. oxyantha*. Although conspecific with the latter it differs sufficiently to warrant varietal recognition; in var. *oxyantha* the branches are puberulous and the sepals ca. 5 mm long and acuminate, while in var. *brevicalyx* the branches are hirtellous and the sepals are acute and ca. 2 mm long. The variability within var. *brevicalyx* suggests that it may grade into the typical variety but for this to be confirmed further collecting is necessary in the Ravensthorpe-Fitzgerald R. area where both are found.

Boronia capitata Benth. subsp. **clavata** P. G. Wilson subsp. nov.

Folia carnosa saepe sub-clavata, basim versus sparse ciliata aliter glabra. Bracteolae naviculiformes, latae. Sepala manifeste ciliata, aliter glabra, apice incrassata; petala glabra. *Type:* 17.5 mi W of Lake Grace, *A. S. George* 348, 3.ix. 1959 (holo.:PERTH, iso.:K).

Leaves fleshy, often sub-clavate, sparsely ciliate towards base, otherwise glabrous. Bracteoles naviculiform, broad. Sepals prominently ciliate otherwise glabrous, apex thickened. Petals glabrous.

Distribution: Western Australia, south-west. Corrigin-Nyabing district.

1 mi W of Corrigin, *K. Newbey* 2610; Kulin, *A. Ashby* 43; Tarin Rock, *C. A. Gardner* 1745; 2 mi N of Nyabing, *K. Newbey* 439.

Boronia capitata Benth. subsp. **gracilis** P. G. Wilson subsp. nov.

Ramuli graciles, in lineis decurrentibus pilosi. Folia gracilia, sub-teretia, supra concava, basim versus sparse ciliata, aliter glabra. Flores in capitulum parvum aggregati; sepala anguste triangularia, glabra, eciliata, rubra, minute apiculata; petala glabra.

Type: R. D. Royce 4571, Black Swamp, Metricup, 3.x. 1953 (holo.:PERTH, iso.:K).

Branches slender, pilose in raised lines decurrent from either side of leaf base. Flowers in small terminal clusters. Sepals narrowly triangular, glabrous, red, eciliate, minutely apiculate. Petals glabrous.

Distribution: Western Australia, south-west. Between Busselton and Margaret River.

Jindong, *R. D. Royce* 4599.

The three subspecies into which *B. capitata* is divided are distinct in appearance and have separate areas of distribution. The typical subspecies is only known from a small area near Pingelly; it differs from the other two in having pubescent leaves and branches, and narrowly triangular pubescent sepals.

Boronia virgata P. G. Wilson sp. nov.

Rami graciles, in statu juvenili sparse puberuli. Folia trifoliolata vel pinnatim 5 (7)—foliolata, ca. 1·5 cm. longa, glabra; petiolus rachisque semiteretes, uterque 3 mm longi; folioli anguste elliptici vel anguste oblongi, 5–10 mm longi, plani vel supra concavi, ± integri, acuti, ± coriacei. Flores solitarii axillares; pedicellus gracilis 6–14 mm longus, infra medium breviter bibracteolatus. Sepala anguste triangulares 2–3 mm longa glabra rubra. Petala imbricata, ovata ca. 7 mm longa, intra puberula, extra marginis puberulis aliter glabra, rubra; apex obtusus vel acutus cum apiculo acuminato. Staminum filamenta semiteretia ca. 3 mm longa (antisepalina parum longiora), infra medium sparse ciliata, apice tumido verrucoso; anthera cordata ca. 1 mm longa, minutissime apiculata. Discus glaber integer pallido-ruber. Ovarium hemisphaericum, glabrum; stylus et stigma continuum, anguste clavatum ca. 1 mm longum, in medio hirsutum.

Type: P. G. Wilson 10219, ca. 19 mi W of Denmark on road to Walpole; growing in waterlogged soil; loose perennial to 1 m high, flowers pink; 7.x.1970 (holo.:PERTH, iso.:CANB, K, MEL).

Flowers solitary axillary; pedicel slender, 6–14 mm long, glabrous, shortly bibracteolate below the middle. Sepals very narrowly triangular, 2–3 mm long, glabrous, red. Petals ovate, ca. 7 mm long, obtuse to acute with a terminal or subterminal setaceous apiculum, puberulous within and towards margins outside. Stamens erect; filaments semiterete, 3 mm long (the antisepalous slightly longer than the antipetalous), sparsely ciliate in lower half, apex somewhat swollen and verrucose; anther cordate, ca. 1 mm long, very minutely apiculate. Disc glabrous, undivided, pink. Ovary hemispherical, glabrous; style and stigma continuous, narrowly clavate, ca. 1 mm long, hirsute in medial portion. Seed elliptically lenticular, 2–5 mm long; outer testa glossy; hilum along adaxial margin, linear; raphe basal with a thin crustaceous covering.

Distribution: Western Australia, near the south coast between Denmark and Nornalup.

5 mi W of Denmark near coast, 9.iv.1965, *W. H. Butler;* 11 mi W of Denmark, grey swampy sand, straggly shrublet 3 ft., 17.ix.1966, *E. M. Scrymgeour* 1156; 12 mi W of Denmark, roadside swamp, shrub 4 ft., 12.x.1962, *A. R. Fairall* 629; 4 mi E of Nornalup, 4.ix.1947, *J. H. Willis* (MEL).

While the collections of *Boronia virgata* have all been made along or to the south of the Denmark-Nornalup road it presumably occurs also some distance to the north and may once have formed part of a cline involving *B. pulchella*, a species now practically restricted to the Stirling Range. It differs from the latter in having usually fewer leaflets, narrowly attenuate calyx lobes, a glabrous ovary and a longer style.

Boronia coriacea P. G. Wilson, sp. nov.

Fruticulus ericoideus ca. 50 cm altus. Ramuli leviter glanduloso-verrucosi. Folia ternato-trifoliolata vel pinnatim 5-foliolata, ca. 1·5 cm longa, coriacea, glabra; foliola anguste obcuneata, ca. 12 x 1·5 mm, apice obtusa vel rotundata. Flores glabri, in cymis brevibus termin-

alibus aggregati. Sepala imbricata, late ovata vel semi-orbicularia, ca. 1 mm longa, rosea, apice obtusa, indistincte subterminaliter apiculata. Stamina erecta; filamenta clavata, aliquantum verrucosa; antherae cordatae acute apiculatae, ca. 1 mm longae. Discus planus, simplex. Ovarium hemisphericum; stylus breviter cylindricus, ca. 1 mm longus; stigma subcapitatum, 4-sulcatum.

Type: About 20 mi S of Mt. Ragged on road to Israelite Bay, growing on limestone rubble, plant 50 cm high, petals pink, 3.x.1970, *P. G. Wilson* 10083 (holo.:PERTH, iso.:K).

Small ericoid shrub ca. 50 cm high. Branchlets faintly glandular-verrucose, minutely puberulous in two opposite sunken grooves, otherwise glabrous. Leaves ternately trifoliolate or pinnately 5-foliolate, ca. 1–5 cm long, coriaceous, glandular-verrucose (when dry), glabrous; petiole semiterete, 2–4 mm long; leaflets narrowly obcuneate, ca. 12 x 1–5 mm, apex obtuse to rounded. Flowers completely glabrous, in small terminal clusters not exceeding the leaves. Pedicel ca. 3 mm long, glabrescent, medially minutely bibracteolate. Sepals imbricate, broadly ovate to semi-orbicular, ca. 1 mm long, thick. Petals imbricate, broadly ovate, ca. 5 mm long, pink; apex obtuse, indistinctly subterminally apiculate. Stamens erect, the antisepalous slightly exceeding the stigma; filaments clavate, somewhat verrucose; anthers cordate, acutely apiculate, ca. 1 mm long. Disc flat, simple. Ovary hemispherical; style shortly cylindrical, ca. 1 mm long; stigma sub-capitate, 4-grooved. Fruit not seen.

This species has only been recorded from the type locality in the south-east of Western Australia. It is found on thin limestone soil both in sand-heath and in mallee vegetation.

Between Mt. Ragged and Israelite Bay, mallee on limestone, 28.x.1967, *J. S. Beard* 5301 (KINGS PARK, PERTH) .

Boronia crenulata Sm. var. **gracilis** (Benth.) P. G. Wilson comb. nov.

B. viminea var. *gracilis* Benth., Fl. Austral. 1:325 (1863).—*Type: Drummond* 1848 colln. no. 92 (holo.:K, photo seen).

This taxon is convarietal with *B. viminea* Lindl., *B. tenuifolia* Bartl., and *B. machardiana* F. Muell. It differs from the typical variety most conspicuously in the floral characters; in var. *crenulata* the pedicels are short, often thick, and the sepals ciliate, whereas in var. *gracilis* the pedicels are slender and the sepals eciliate.

Boronia sect. **Imbricatae** Engl.

Engler, Nat. Pflanzenfam. 3/4:136 (1896). *Lectotype: B. cymosa* Endl.

This section consists of three series which may be distinguished by the following key:—

Sepals persistent.

Staminal-filament apex not swollen; funicle expanding into an aril in centre of adaxial surface of seed ser. **Imbricatae**

Staminal-filament apex swollen; funicle slender, no aril present ser. **Ovatae**

Sepals falling in fruit; funicle slender ser. **Pedunculatae**

Series **Imbricatae**

Only species: *B. cymosa* Endl.

Series **Ovatae** P. G. Wilson ser. nov.

Sepala persistentia. Filamenta staminum ± teretia, ciliata, apice gibbosa, muricata; antherae albo-apiculatae; stylus cylindricus (vel basim versus tumidus). Semen ellipsoidialiter lenticulare; endocarpus placentae tenuis, caducus; hilum parvum, ellipticum ad centrum marginis adaxialis; testa exterior membranacea laevis.

Type: B. ovata Lindl.

Sepals persistent. Staminal filaments ± terete, ciliate with a swollen muricate apex; anthers white-apiculate, affixed to sub-apical portion of filament. Seed ellipsoidally lenticular; placental endocarp thin, caducous; hilum small, elliptical; outer testa membranous, smooth.

The only other species in this series is *B. scabra* Lindl.

Series **Pedunculatae** Benth.

Benth., Fl. Austral. 1:326 (1863). *Lectotype: B. spathulata* Lindl.

Also included in this series are *B. juncea* Bartl., *B. denticulata* Sm., *B. fastigiata* Bartl., and *B. dichotoma* Lindl. The species in this series are exceptional in the genus *Boronia* in having flowers in which the sepals are caducous.

ERIOSTEMON
Sect. **Nigrostipulae** P. G. Wilson

Eriostemon cymbiformis P. G. Wilson sp. nov.

Fruticulus ca. 50 cm altus, glaucescens. Rami glabri, epidermide integra (foliis nec decurrentibus). Folia crassa, anguste elliptica, 6–10 mm longa, supra concava, glabra. Flores terminales, plerumque solitarii. Pedicellus crassus, obconicus, glaber. Sepala triangularia 1·5–2 mm longa crassa minute ciliata cetero glabra. Petala ovata ca. 6 mm longa alba, extra glabra, intra puberula. Stamina erecta, corolla paulo breviora; filamenta dimidio inferiore linearia et dense lanata, dimidio superiore teretia et dense pilosa; anthera cordata ca. 1 mm longa, minutissime apiculata. Discus angustus, atropurpureus. Ovarium late pyramidale, glabrum; stylus teres ca. 2·5 mm longus pilosus, staminibus paulo brevior; stigma subcapitata.

Type: P. G. Wilson 10176, Fitzgerald River Reserve, ca. 27 km SW of the Jerramungup-Ravensthorpe Rd. along Rabbit Proof Fence, Lat. 34°8′S, Long. 119°18′E, 7.x.1970 (holo.: PERTH, iso.:K)

Subshrub ca. 50 cm high, slightly glaucous, glabrous, without obvious leaf decurrencies. Leaves thick, narrow elliptic, 6–10 mm long, concave above, glandular verrucose below when dry, glabrous; stipules absent. Flowers terminal and usually solitary, surrounded by a few leaves. Pedicel thick, obconical, ca. 1·5 mm long, glabrous, with several small imbricate basal bracteoles. Sepals triangular, 1·5–2 mm long, thick, minutely ciliolate otherwise glabrous. Petals ovate, ca. 6 mm long, glabrous outside and puberulous within, white with reddish brown medial strip outside; apex obtuse, thickened and slightly inflexed. Stamens erect, slightly shorter than petals; filaments linear and densely woolly in lower half, terete and acuminate with pilose hairs in upper half; anthers cordate, ca. 1 mm long, very minutely apiculate; pollen very pale yellow. Disc narrow, dark purple. Ovary broadly pyramidal, glabrous, style terete ca. 2·5 mm long (slightly shorter than the stamens), pilose; stigma subcapitate. Seed not seen.

Distribution: Western Australia, between Bremer Bay and Hopetoun. Known only from the Fitzgerald River Reserve.

Mount Bland (ca. 34°12′S, 119°28′E), growing on sand, spreading shrub 40 cm high, 14.x.1967, *K. Newbey* 2649.

Eriostemon cymbiformis is closely related to *E. glaber* P. G. Wilson, a species found much further north in the Mullewa-Cowcowing area of Western Australia. It may be distinguished from the latter by the absence of any decurrent bands of tissue on the branches, by the triangular (not rounded) sepals, and by the anthers which are only minutely apiculate.

The specific epithet refers to the leaves which, at least when dry, are somewhat boat-shaped.

DRUMMONDITA Harvey

Harvey, J. Bot. Kew Misc. 7:53 (1855).

Although the name *Drummondita* was placed in synonymy under *Philotheca* by Mueller in 1869 (and subsequently by all other botanists) the two genera

are clearly distinct. In *Philotheca* the petals are soft, the stamens are all fertile with versatile anthers, and the carpels have a terminal sterile portion which is produced in fruit as a short beak. In *Drummondita* the petals are glumaceous, only the antipetalous stamens bear anthers (and these are dorsifixed), and the ovary and fruit are rounded at the apex.

The following four species are known:—

1. **Drummondita ericoides** Harvey, l.c.

   Philotheca ericoides (Harv.) F. Muell., Fragm. 7:21 (1869).—*Type:* "Near the summit of the White Peak, a detached hill near Moresby's Range" (iso.:K, photo seen).

2. **Drummondita miniata** (C. A. Gardn.) P. G. Wilson comb. nov.

   Philotheca miniata C. A. Gardn., J. Roy. Soc. W. Aust. 14:79 (1928).—*Type:* near Cue, C. A. Gardner Jul. 1927; east of Cue, W. D. Campbell June 1902 (syn.:PERTH), (lecto.:July 1927 colln. PERTH).

3. **Drummondita hassellii** (F. Muell.) P. G. Wilson comb. nov.

   Philotheca hassellii F. Muell., South. Sci. Rec. 3:3 (1883).—*Type:* "North-east of Janamonjup", *A. Y. Hassell* (holo.:MEL).

This species is very variable in flower and leaf size but one form appears to warrant varietal recognition. The two infraspecific taxa may be recognised by the following key:

Leaves semi-terete to obovoid, 3–12 mm long, smooth	var. **hassellii**
Leaves slender-terete, ca. 17 mm long, rugulose	var. **longifolia**

Var. **longifolia** P. G. Wilson var. nov.

Folia leviter divaricata, anguste-teretia, ca. 17 (20) x 1 mm, rugulosa (statu sicco), nitida. Flores usque 25 mm longi; petala filamentaque rubra.

Type: C. A. Gardner, 15.vi. 1929, Peak Charles, in granite crevices, 1300 feet alt. (holo.: PERTH, iso.:K).

Leaves somewhat spreading, slender-terete, ca. 17 (20) x 1 mm, rugulose (when dry), glossy. Flowers to 25 mm long, petals and filaments red.

Distribution: Western Australia. Known only from the type locality ca. 40 km W of Dowak, which is between Norseman and Esperance.

4. **Drummondita calida** (F. Muell.) P. G. Wilson comb. nov.

   Philotheca calida F. Muell., Fragm. 7:21 (1869).—*Type:* "In montibus ad flumen Gilbert's River", *R. Daintree* (holo.:MEL).

Distribution: Northern Queensland.

UROCARPUS Drumm. ex Harv.

Urocarpus Drumm. ex Harv., J. Bot. Kew Misc. 7:54 (Feb. or Mar. 1855).—*Type: U. phebalioides* Drumm. ex Harv.

Asterolasia sect. *Urocarpus* (Harv.) Benth., Fl. Austral. 1:362 (1863).

Asterolasia F. Muell., Trans. Phil. Soc. Vict. 1:10 (Sept.-Nov. 1855).—*Lectotype* (Baillon, 1872): *A. trymalioides* F. Muell.

Pleurandropsis Baill., Adansonia 10:305 (1872).—*Type: P.phebalioides* (F. Muell.) Baill.

Note: F. Mueller, (1855) in the same paper described two species in the genus *Asterolasia*, *A. trymalioides* and *A. phebalioides*. The latter was removed by Baillon who placed it in his monotypic genus *Pleurandropsis;* thus the former species became the lectotype of *Asterolasia*.

The correct generic name for the Western Australian species is *Urocarpus*, this being the earliest of the three generic synonyms cited above. The species of New South Wales and Victoria could be considered sectionally or generically

distinct for they have a consistently 5-carpellary ovary (as against 2–3 carpellary in the Western Australian species) and, according to Smith-White (1954), differ in chromosome number. The latter was reported for only two species, *Asterolasia correifolia* (A. Juss.) Benth. n=14 (eastern states) and *Asterolasia pallida* Benth. n = 13 (Western Australia). Morphological characters (other than carpel number) suggest that the Australian taxa are congeneric.

The following species all belong to *Urocarpus* s.str., i.e. they have a carpel number of 2–3. Nomenclature changes for the species found in the eastern states must await a taxonomic study.

1. **Urocarpus squamuligerus** (Hook.) P. G. Wilson comb. nov.
   Phebalium squamuligerum Hook., Ic. Pl. 8:t727 (1848).—*Eriostemon hookeri* F. Muell., Fragm. 1:104 (1859), based on above.—*Asterolasia squamuligera* (Hook.) Benth., Fl. Austral. 1:352 (1863)— *Type*: Swan River, *Drummond* (holo.:K, photo seen). Western Australia.

2. **Urocarpus phebalioides** Drumm. ex Harv., l.c. 55.
   Eriostemon drummondii F. Muell., Fragm. 1:105 (1859), based on above. *Asterolasia phebalioides* (Harv.) Benth., Fl. Austral. 1:352 (1863) nom. illeg. non F. Muell. (1855).—*A. drummondii* Blackall & Grieve, How to know W. Austral. Wildfl. 256 (1954), nom. inval.—"*Pleurandropsis phebalioides* (Drumm.) Baill." ex C. A. Gardn. Enum. Pl. Austral. Occ. 70 (1931), non *P. phebalioides* (F. Muell.) Baill. (1872).—*Type:* Mt. Lesueur, *Drummond* 84 (iso.:K, photo seen). Western Australia.

3. **Urocarpus pallidus** (Benth.) P. G. Wilson comb. nov.
   Asterolasia pallida Benth., Fl. Austral. 1:352 (1863).—*Eriostemon pallidus* (Benth.) F. Muell., Fragm. 7:22 (1869).—*Type:* Swan River, *Drummond* 42 and 112 (syn.:K, photo seen, MEL).
   A. dielsii C. A. Gardn., J. Roy. Soc. W. Austral. 19:84 (1933).—*Type:* near Glen Forrest, *C. A. Gardner* 819A (holo.:PERTH). Western Australia.

4. **Urocarpus grandiflorus** (Hook.) P. G. Wilson comb. nov.
   Phebalium grandiflorum Hook., Ic. Pl. 8:t 724 (1848).—*Eriostemon grandiflorus* (Hook.) F. Muell., Fragm. 1:105 (1859).—*Asterolasia grandiflora* (Hook.) Benth., Fl. Austral. 1:352 (1863).—*Type:* Swan River, *J. Drummond* 1st Coll. n. 12 (holo.:K, photo seen). Western Australia.

5. **Urocarpus muricatus** (Black) P. G. Wilson comb. nov.
   Asterolasia muricata Black, Trans. Roy. Soc. S. Austral. 36:22 (1912).—*Type:* Nr. Mt. Thisbe, Kangaroo Is., *H. H. Griffith*, Oct. 1908 (holo.:AD). South Australia.

The dates of publication for *Urocarpus* and *Asterolasia* are taken from a manuscript by Dr. N. T. Burbidge. I am grateful to Dr. Burbidge for allowing me to read her paper.