

# A Revision of the *Brachyscome linearifolia* Group (Asteraceae: Astereae) from South-eastern Australia

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## Introduction

When presenting a treatment of *Brachyscome* s. lat. for the *Flora of Victoria* (Short 1999) I attempted to indicate species relationships by referring to informally named species groups or complexes. One of these was the *B. angustifolia* group, a name which, following examination of syntype specimens of the name *B. angustifolia* DC. (Candolle 1836) in the Candolle Herbarium in Geneva (G-DC) has proved to be an unfortunate choice, albeit in-line with the revision of Australian species of *Brachyscome* by Davis (1948). It transpires that both syntype specimens are of *Brachyscome graminea* (Labill.) F.Muell., and so the group is here referred to as the *B. linearifolia* group, the name *B. linearifolia* DC. being the correct name for most of the specimens from New South Wales which Davis referred to as *B. angustifolia*, and along with the name *B. sieberi* DC., the oldest name available for members of this group. Until Davis's revision (Davis 1948), the name *B. linearifolia* was also well-ensconced in the history of the Australian flora, having been described by Candolle (1836), included in Bentham's *Flora australiensis* (Bentham 1867), and maintained in Moore (1893) and Maiden & Betche (1916).

All members of the *B. linearifolia* group are perennial, mostly rhizomatous herbs with often fleshy and somewhat cylindrical roots, have anthers with well-defined terminal appendages, and have monomorphic, laterally compressed cypselas which have two longitudinal ridges internal to the two vascular ribs and which extend the length of a commonly tuberculate body. All are confined to eastern, mostly montane, mainland Australia and floral attributes, including pollen:ovule ratios which are presented below for all but two species, indicate that all are commonly, if not obligatory, out-crossing species.

Having attempted to define the group, it must be admitted that it is partly one of historical circumscription as much as one based on morphological distinctiveness. What I have tried to do is delineate the various taxa which have been previously and erroneously included under the name *B. angustifolia* by Davis (1948) and Willis (1972) and to account for taxa such as *B. formosa* P.S.Short which have close affinities. Morphologically, if one ignores the longitudinal ridges on the lateral

## Abstract

Taxonomic accounts are provided for ten species which are here recognised as comprising the *Brachyscome linearifolia* DC. group. Five of these, *B. brownii* P.S.Short, *B. kaputarensis* P.S.Short, *B. mittagongensis* P.S.Short, *B. salkiniae* P.S.Short and *B. willisi* P.S.Short are described as new, the names *B. formosa* P.S.Short, *B. petrophila* G.L.R.Davis and *B. procumbens* G.L.R.Davis are maintained, while the names *B. sieberi* DC. and *B. linearifolia* DC. are reinstated. The name *B. angustifolia* A.Cunn. ex DC., for many years associated with this group, is a synonym of *B. graminea* (Labill.) Cass. ex Less. An infraspecific taxon, *B. procumbens* subsp. *wombelongensis* P.S.Short is also described as new. Nomenclatural notes, including the choosing of a new lectotype for the name *B. heterophylla* Benth., are provided.

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faces of the cypselas, then members of the *B. linearifolia* group are not far removed from other eastern species such as *B. microcarpa* F.Muell. and *B. nova-anglica* G.L.R.Davis – themselves part of a perplexing complex with undescribed taxa – and others such as *B. aculeata* (Labill.) Cass. ex Less. and *B. riparia* G.L.R.Davis. Similarly, the basally tufted, divided leaves and little more seems to exclude *B. dissectifolia* G.L.R.Davis and *B. stuartii* Benth. from the group. Just how all these species relate to each other is yet to be satisfactorily resolved.

In recent years only four, formally-named species and one variety have been recognised as belonging to the *B. linearifolia* group, these being the misapplied name *B. angustifolia* A.Cunn. ex DC. (Candolle 1836), *B. angustifolia* var. *heterophylla* (Benth.) G.L.R.Davis (Davis 1948), *B. formosa* P.S.Short (Short 1988), *B. petrophila* G.R.L.Davis (Davis 1949) and *B. procumbens* G.R.L.Davis (Davis, 1948). To this list can be added *B. sp. aff. angustifolia* (Watanabe et al. 1996), *B. aff. formosa* Entity 1 and *B. aff. formosa* Entity 2 (Salkin et al. 1995), the last two treated under *B. petrophila* by Short (1999). Unnamed forms were also referred to by Salkin et al. under *B. angustifolia*, *B. angustifolia* var. *heterophylla* and *B. procumbens*.

In sorting the complex it soon became evident that all or most of the entities informally alluded to, plus several others which have until now been unrecognised, are indeed taxa deserving of formal recognition. As they present consistent morphological differences and have discrete distributions, I have opted to consider all but one of them as distinct species. In total, I now recognise ten species within the group, five of which are here described and named for the first time, while two earlier names, *B. linearifolia* DC. and *B. sieberi* DC., have been reinstated.

## Taxonomy

In the following key and descriptions cypselas are described as having ribs. In all species there are just two ribs and internally each rib has a vascular bundle which runs the length of the fruit. In some species the ribs are simply the outermost margins of the fruit and they may be smooth or have some tubercles distributed along their length. In several taxa the vascular portion of the rib is internal to a non-vascular wing or wing-like extension that forms the margin of the fruit.

Both stalked glandular hairs and elongate, septate eglandular hairs are found on the branches, leaves and bracts of most species. Cypselas may have a few shortly stalked glandular hairs, particularly when immature, but taxonomically it is the structure of the eglandular hairs which occur on the fruit that is important. These hairs are not septic but are the typical ‘twin hairs’ found on the fruit of many species of daisy; such hairs may be straight, variably curved, or have very slightly inrolled apices; apically the two cells may be of the same or different lengths and in the latter case may be distinctly bifid.

### **1. *Brachyscome brownii* P.S.Short, sp. nov.**

[*Brachyscome heterophylla* auct. non Benth. (1837): Benth., *Fl. austral.* 3: 515 (1867), p.p., see below.]

[*Brachyscome angustifolia* var. *heterophylla* auct. non (Benth.) G.L.R.Davis: G.L.R.Davis, *Proc. Linn. Soc. New South Wales* 73: 162 (1948), p.p., as to Cambage specimen from Pokolbin.]

*B. formosae*, *B. petrophilae*, *B. sieberi*, *B. willisii similis* cypselis alas destitutis; a *B. petrophila* foliis plerumque petiolorum similibus differt; a *B. sieberi* et *B. willisii* pilis niveis septatis eglandulosis in folia et in ramos destitutis differt; a *B. formosa* indumento prominenti pilorum petioliis glandulosorum sub capitula, foliis integris vel saepe trifidus ad apicem, nullo modo lus quam lobis marginalibus tribus differt.

Similar to *B. formosa*, *B. petrophila*, *B. sieberi* and *B. willisii* in the cypselas lacking wings; differs from *B. petrophila* in having leaves which mostly have petiole-like bases; differs among other things from *B. sieberi* and *B. willisii* in lacking whitish septic eglandular hairs on branches and leaves; differs from *B. formosa* in having a prominent indumentum of stalked glandular hairs below the capitula and in the leaves being entire or often apically trifid and with never more than 3 lateral lobes on each margin.

**Type:** NEW SOUTH WALES. Pokolbin, Apr. 1906, R.H. Cambage (holotype NSW 15175).

Perennial herb with ascending to erect branches to c. 30 cm long, branches with stalked glandular hairs usually forming a prominent indumentum immediately beneath the capitula and on immature leaves and shoots, otherwise mostly few and scattered and mature leaves appearing glabrous to the naked eye; eglandular

**Key to the *Brachyscome linearifolia* Group (Asteraceae: Astereae) from South-eastern Australia**

- 1 Largest lower and mid-cauline leaves not tapering towards a petiole-like base but manifestly sessile and often subamplexicaul, their apices usually truncate and 3-dentate, the teeth small and of about equal size, the leaves usually otherwise entire but sometimes 1 or both margins with 1 or 2 additional narrow lateral teeth or lobes present ..... **5. *B. mittagongensis***
- 1: Largest lower and mid-cauline leaves commonly tapering towards the base and forming a petiole-like base, if not forming a petiole-like base then their apices not both truncate and 3-dentate although they may be apically 3-lobed, but if 3-lobed then either additional marginal lobes present on at least some leaves or most leaves entire ..... **2**
- 2 Basal and cauline leaves mostly entire, sublinear to linear-ob lanceolate or linear-spathulate and frequently and markedly contracting to a petiole like base, rarely 1–several leaves with 1–5 lobes; cypselas with narrow but definite wings 0.1–0.4 mm wide ..... **4. *B. linearifolia***
- 2: Basal to mid-cauline leaves all, or mostly all, with teeth or lobes, or if most or all basal and mid-cauline leaves entire (at least as in some plants of *B. kaputarensis*) the leaves somewhat linear or linear-ob lanceolate and lacking a distinctive contraction to form a petiole-like base and the cypselas lacking wings ..... **3**
- 3 Cypselas bearing wings, their margins divided or entire and with eglandular hairs along their length ..... **4**
- 3: Cypselas lacking wings but the margins of the ribs may have tubercles (includes *B. willisii* in which the prominent tuberculate margins may be interpreted as wings) ..... **6**
- 4 Cypselas body smooth or with inconspicuous tubercles, brown or dark greenish brown or greenish black and darker than the wings, the longitudinal ridges on the lateral surfaces often poorly developed; cypselas wings 0.2–0.8 mm wide, entire or notched ..... **7. *B. procumbens***
- 4: Cypselas body with well-developed tubercles, yellow-brown or brown and apically sometimes purplish but not manifestly darker than the wings, the longitudinal ridges on the lateral surfaces distinct and sometimes flange-like; cypselas wings barely 0.1 mm wide or up to 0.5 mm wide ..... **5**
- 5 Leaves with 1–5, usually apically acute lobes, most often with only 3 apical lobes of which the terminal lobe is usually manifestly larger than the lateral lobes ..... **4. *B. linearifolia***
- 5: Leaves sometimes trifid but mostly with a total of 5–14 teeth or lobes ..... **8. *B. salkiniae***
- 6 Mid- to upper cauline leaves entire and somewhat linear or linear-ob lanceolate or with 1–6 lateral lobes, the divisions extending more than 1/2 way and sometimes almost reaching the midrib and the terminal lobes somewhat linear; branches and leaves lacking eglandular hairs ..... **3. *B. kaputarensis***
- 6: Mid- to upper cauline leaves shallowly lobed or at least the lobes never long and somewhat linear; branches and leaves with or without eglandular hairs ..... **7**
- 7 Leaves only sometimes with a petiole-like base, sometimes subamplexicaul, at least in the larger leaves the segments present along most of the length of the leaf (Victoria) ..... **6. *B. petrophila***
- 7: Leaves commonly with a petiole-like base, lateral segments usually in the distal 1/2 of the leaf (but distal 3/4 in *B. sieberi* from N.S.W.) ..... **8**
- 8 Whitish, septate eglandular hairs absent from branches and leaves ..... **9**
- 8: Whitish, septate eglandular hairs on branches and leaves (may be sparse on mature parts) ..... **10**
- 9 Stalked glandular hairs usually forming a prominent indumentum beneath the capitula; mid-cauline leaves entire or with 6 or fewer segments ..... **1. *B. brownii***
- 9: Stalked glandular hairs absent or only occasional throughout the plant; mid-cauline leaves with 5–19 segments ..... **2. *B. formosa***
- 10 Mid-cauline and upper leaves often apically 3-lobed but up to 9 marginal lobes formed from divisions extending to c. 1/2 the distance to the midrib, lobes entire and apically acute ..... **9. *B. sieberi***
- 10: Mid-cauline and upper leaves with 3–11 primary marginal lobes formed from divisions extending c. 1/4 to 3/4 the distance to the midrib, the resultant lobes obtuse to acute and each often with 1 or 2 lateral teeth ..... **10. *B. willisii***

hairs apparently absent. Leaves basal and cauline, alternate, thickish, green, the basal and some mid-cauline leaves tapering to distinct, petiole-like bases which may be up to c. 20 mm long but most leaves merely tapering basally and lacking obvious petiole-like bases; basal and lower-cauline and sometimes mid-cauline leaves spatulate or linear-ob lanceolate in outline, 12–40 mm long, 4–13 mm wide, with 1 or 2, rarely 3, lateral teeth or lobes on each margin or occasionally with just a single lateral lobe, the lobes mostly prominent and the leaf division extending to c. 1/2 way to the midrib, the lobes and teeth acute and erect to slightly recurved; mid-cauline leaves obovate to linear-ob lanceolate in outline, 12–22 mm long, 3–10 mm wide, entire or more usually with 1 or 2 (3) lateral lobes on each margin, commonly trifid and with a large central lobe and 2 smaller lateral lobes in the upper c. 1/4 of the leaf; upper-cauline leaves similar to mid-cauline leaves but tending to be smaller. *Capitula* c. 4.5–6 mm diam., on scapes exceeding the upper-cauline leaves. *Bracts* c. 12–20 in 1 or 2 ill-defined rows, mostly obovate to ob lanceolate but also narrowly elliptic, 2.1–3 mm long, 0.35–1.1 mm wide, thinly herbaceous but with whitish hyaline margins and apex, c. upper 2/3 of margin shortly laciniate, apices obtuse to subacute, the outer surface with scattered, stalked glandular hairs. *Receptacle* subconical, somewhat honeycomb-like (areolate), glabrous. *Ray florets* about 12–20, possibly more; corolla 6.3–7.8 mm long, 0.6–1.3 mm wide, veins 4, apically entire or minutely 2-toothed, colour not recorded. *Disc florets* not counted; corolla with tube 1.5–2.15 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, veins extending into and joining at the apex of the lobes. *Stamens* 5; filament collar straight in outline or barely dilating towards the base but not or barely wider than the filament; anthers 1.21–1.38 mm long, microsporangia 1.0–1.15 mm long, apical appendages 0.18–0.23 mm long and somewhat triangular in outline. *Styles* c. 2.7 mm long, arms c. 0.85 mm long, stigmatic part 0.38–0.45 mm long, appendages somewhat triangular in outline, 0.4–0.45 mm long, shorter or longer than the stigmatic part. *Cypselas* flat, obovate, straight or slightly curved, 1.7–2.55 mm long, 0.8–1.1 mm broad, with two, non-swollen ridges on each lateral surface, uniformly brown or greenish brown except for paler carpopodium; lateral surfaces

of cypsela body with 14–46 tubercles, each tubercle usually obvious and prominent at full maturity and usually terminating in an apically incurved biserrate eglandular hair 0.15–0.24 mm long, occasionally some hairs straight or slightly curved and with the paired upper cells appearing to be equal in length; ribs smooth or slightly uneven and sometimes 1 or 2 small tubercles present, wings absent; carpopodium a very narrow rim 0.025–0.03 mm wide, pale yellow-brown. *Pappus* a ring of uneven, erect, whitish or very pale yellow bristles joined at the base, 0.27–0.46 mm long. *Chromosome number:* ?  $n = 5$  or 7 (see below). Fig. 1.

**Additional specimens examined: NEW SOUTH WALES.** 40–50 miles N of Windsor on Windsor–Singleton road, 1 Dec. 1960, D. Blaxell (NSW 55748); Port Jackson, banks of the River Hawkesbury below the 1<sup>st</sup> branch, Jan. 1805, R. Brown (CANB 279082); The Gulph [presumably Growee Gulph], Bylong/Rylstone Rd, s.dat., S. Smith-White 713 (SYD); no locality, ?Smith-White 3211 (SYD); Pokolbin, 6 Feb. 1925, M.B. Welch (NSW 229871).

**Distribution:** New South Wales, extending from about Windsor north to Cessnock and north-west to Bylong, with all specimens east of c. 150° E (Fig. 2).

**Habitat:** Habitat notes are generally lacking on specimens, the only record being 'sandy soil in sclerophyll woodland' (Blaxall, NSW 55748).

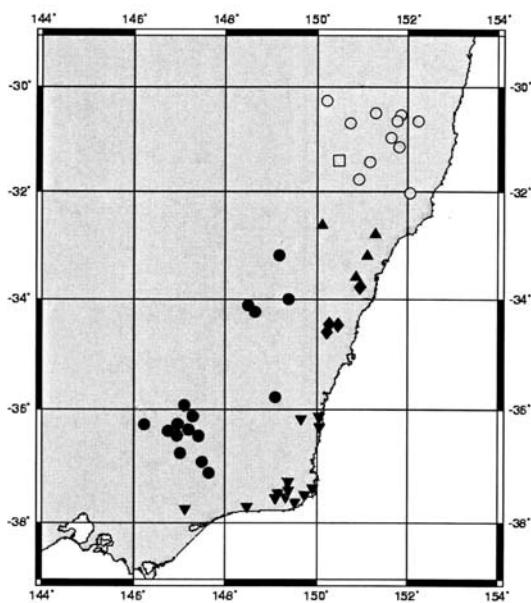
**Phenology:** The few specimens, all flowering and fruiting, have been collected from December to April.

**Cytology:** Smith-White *et al.* (1970, as *B. multifida* DC. var. *multifida*), recorded  $n = 7$  for a specimen from Bylong. The only specimen at SYD which is attributed to Smith-White or one of his colleagues and is labelled as coming from Bylong, is Smith-White 713 and it is of *B. brownii*. However, the specimen is simply named 'Brachycome' and, unlike many of their chromosome number determinations for other species, the number is not recorded on the specimen label and the full locality is stated to be 'The Gulph, Bylong Rylstone Rd', facts suggesting the published record for Bylong relates to another taxon. Indeed, there is a further specimen in SYD which is also of this species and is annotated as having  $n = 5$ . The specimen is undoubtedly attributable to Smith-White or one of his colleagues, is numbered 3211, and is simply labelled as 'B. sp.'. Unfortunately, no locality is recorded on the label.

**Etymology:** Vallance *et al.* (2001) noted that Robert Brown used the manuscript name 'Micropogon' for



Figure 1. *Brachyscome brownii* (holo: R.H. Cambage s.n., NSW 15175).



**Figure 2.** Distribution of *B. brownii* (▲), *B. mittagongensis* (♦), *B. procumbens* subsp. *procumbens* (○), *B. procumbens* subsp. *wombolongensis* (□), *B. salkiniae* (▼) and *B. willisii* (●).

a number of specimens of *Brachyscome*. Brown also had specific epithets for some species, including this one. He clearly regarded it as a distinct species and I recognise this by naming it after him.

**Notes:** A poorly collected species, a fact suggesting it is rare, and one which means that the above description lacks some detail in regard to floret numbers and measurements of ray florets, bract number, etc.

Bentham (1867), under his description of *B. heterophylla* in *Flora Australiensis*, only made reference to Port Jackson specimens collected by Robert Brown, of which he noted 'The specimens are numerous, and show two distinct varieties in foliage, one with broad thin leaves with broad but very acute lobes, the other with narrower, smaller, almost pinnatifid lobes. Both may be varieties of *B. linearifolia*, but the leaves are all toothed and lobed' (Bentham 1867, p. 515). As evident from both the description and Brown's specimens from Port Jackson, the form with the narrower and almost pinnatifid lobes is of what I here describe as *B. brownii*, while the entity with the broader leaves and acute lobes is *B. heterophylla* Benth. (1837) as lectotypified below under the treatment of *B. linearifolia*.

## 2. *Brachyscome formosa* P.S.Short, *Muelleria* 6(6): 390, figs 1 & 2 (1988)

J.Everett in G.Harden, *Fl. N.S.W.* 3: 167 (1992); E.Salkin et al., *Austral. brachyscomes* 112, illustration 113 (1995), excluding Entities 1 & 2. **Type citation:** 'Holotype: Short 2425, New South Wales. c. 3.5 km north-west of Coonabarabran, along road to Baradine. 31° 14'S., 149° 14'E. Open forest of *Eucalyptus* (White Gum, Stringybark and Box). Sparse shrub understorey of epacrid shrubs and *Davesia latifolia*. Very sandy loam. 3.x.1984 (MEL 1529338). Isotype: AD, BRI, CANB, K, NSW.'

*Brachyscome superspecies basaltica* species no. 5: Smith-White et al., *Austral. J. Bot.* 18: 103 (1970).

*Brachyscome* species (Pilliga), 'with affinity to *B. melanocarpa*': R.Elliott & D.L.Jones, *Encyc. Austral. pl.* 2: 374 (1982).

*Brachyscome* 'Pilliga Posy', *Brachyscome formosa* 'Pilliga Posy' and *Brachyscome* 'Tinker Bell', nursery industry (see Short 1988).

[*Brachyscome angustifolia* var. *heterophylla* auct. non (Benth.) G.L.R.Davis: G.L.R.Davis, *Proc. Linn. Soc. New South Wales* 73: 162 (1948), p.p., as to cited specimens collected by Boorman (Timor Rock & Coonabarabran) and Forsyth (Warrumbungle Ranges).]

Perennial, rhizomatous herb with prostrate to ascending branches to c. 20 cm long, branches glabrous or with occasional stalked glandular hairs; roots at least occasionally long-cylindrical and somewhat fleshy when fresh (Short 3935). Leaves cauline and alternate but often restricted to or near to the base, green or somewhat purplish and especially so on the lower surface, glabrous or with an occasional stalked glandular hair; petiole-like base usually distinct and forming a major part of the leaf and c. 3–55 mm long, rarely not formed or only barely formed on upper leaves (e.g. Dunlop 743); leaves widely spatulate or oblanceolate in outline, 13–90 mm long, 4.5–33 mm wide, with 3–11 shallow lobes formed from primary divisions mostly extending no more than c. 1/4 the distance to the midrib, the major lobes acute to obtuse and each sometimes with 1 or 2 small teeth, all leaves with 5–19 ultimate segments. Capitula 5–8 mm diam., on scapes manifestly exceeding the upper leaves. Bracts 14–26, overlapping, generally elliptic or obovate but apices subobtuse to acute, 2.6–4.5 mm long, 0.9–2 mm wide, mainly herbaceous but with narrow hyaline

margins and apex, the apex often purplish; stereome divided. *Receptacle* barely subconical to conical, areolate and glabrous when fresh, at least sometimes appearing hemispherical at apparent maturity when the bracts are reflexed and the rudimentary pedicels seemingly more distinct and the raised lines around them less so. *Ray florets* c. 19–40; corolla 9.8–15.8 mm long, 1.8–2.6 mm wide, pink. *Disc florets* 40–83; corolla with tube 2.5–3.6 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, veins extending into and joining at the apex of the lobes. *Stamens* 5; filament collar straight in outline and composed of uniform cells and basally not thicker than the filament; anthers 1.05–1.45 mm long, microsporangia 0.8–1.2 mm long, apical appendages 0.2–0.4 mm long, base obtuse, endothecial tissue radial; pollen grains c. 3,000–5,000 per floret. *Style appendages* widely deltoid and shorter than the stigmatic part. *Cypelas* flat, obovate, straight or slightly curved, 2–3 mm long, 0.9–1.4 mm broad, with two, non-swollen ridges on each lateral surface, uniformly brown except for paler carpodium; lateral surfaces of cypela body with 4–25 conspicuous tubercles, each tubercle with a straight biserrate, eglandular hair c. 0.14–0.2 mm long which may be apically curved or very slightly incurved; ribs smooth or uneven, wings absent; carpodium a narrow rim 0.04–0.12 mm wide, yellow-brown. *Pappus* a ciliate ring of bristles joined at the base, 0.15–0.2 mm long. *Chromosome number*:  $n = 9$ . Fig. 3.

**Selected specimens examined: NEW SOUTH WALES.**

Gulgong, Mar. 1946, Althofer 60 (NSW); Warrumbungle Ranges, Oct. 1907, W. Forsyth (NSW 15181); 3.5 km NW of Coonabarabran, 1 Nov. 1986, P.S. Short 3028 (MEL); Bathurst-Grattai road, 18 Oct. 1953, Tindale & Ingram s.n. (NSW 25648); high mountains near Mudgee, s. dat., W. Woolls s.n. (MEL 1553040).

**Distribution:** New South Wales. Extending from the southern margins of Pilliga Scrub and the Warrumbungle Ranges south to Mudgee (Fig. 4).

**Habitat:** Open sclerophyllous forest dominated by eucalypts and/or *Callitris* Vent. and on uncompacted sandy loam.

**Phenology and reproductive biology:** Flowers from about July to January. An average pollen:ovule ratio of 3,033 (Short 1988) has been determined from the type population. Salkin *et al.* (1995) recorded that 'seed' germinates in 15–30 days.

**Cytology:** The species has a haploid chromosome number of  $n = 9$  (Short 1988, Watanabe *et al.* 1996). An idiogram of somatic metaphase chromosomes was published by Watanabe *et al.* (1999, fig. 30).

**Notes:** In leaf shape *B. formosa* resembles some other taxa in this complex but tends to have no or fewer caudine leaves and the near glabrous nature of the plant is also a good aid to identification. However, for positive identification fruit are highly desirable, if not essential.

I have only seen pink ray corollas. However, several collectors have referred to them as being mauve and deep mauve while Salkin *et al.* (1995) described them as cerise.

**3. *Brachyscome kaputarensis* P.S.Short, sp. nov.**

[*Brachyscome angustifolia* var. *heterophylla* auct. non (Benth.) G.L.R.Davis: G.L.R.Davis, Proc. Linn. Soc. New South Wales 73: 162 (1948), p.p., as to cited specimens collected by Kenny (from Emmaville), Boorman (Howell) and Cambage (Tingha); J.Everett in G.Harden, Fl. N.S.W. 3: 166 (1992), p.p.; ? E.Salkin *et al.*, Austral. Brachyscomes 40 (1995), possibly as to one of the three forms from the Northern Tablelands of N.S.W. but fruit said to be 'cream to golden' and to have a narrow wing.]

*Ab aliis gregis* *B. linearifoliae* *foliis divisis, foliis in medio vel supero caulis lobis uno vel sex, divisionibus ad dimidium extensis vel costam paene attingentibus, lobis terminalibus et interdum lateralibus plus minusve linearibus differt.*

Differs from other members of the *B. linearifolia* group with divided leaves in the mid- to upper caudine leaves having 1–6 lateral lobes, the lobe-forming divisions extending more than 1/2 way to sometimes almost reaching the midrib, and in the terminal and sometimes lateral lobes being somewhat linear.

**Type: NEW SOUTH WALES.** Jokers Spring, Mt Kaputar N.P., [30° 18'S, 150° 10' E], in eucalypt forest below falls, 19 Nov. 1976, R. Coveny 8768 & S.K. Roy (holotype NSW 229966; isotypes: MEL 1589180, NSW (undistributed duplicate accompanying holotype).

Perennial herb with weakly ascending or erect branches to at least 60 cm long, mature branches glabrous or with mostly scattered, stalked glandular hairs, sometimes glandular hairs common beneath mature capitula but never forming a dense

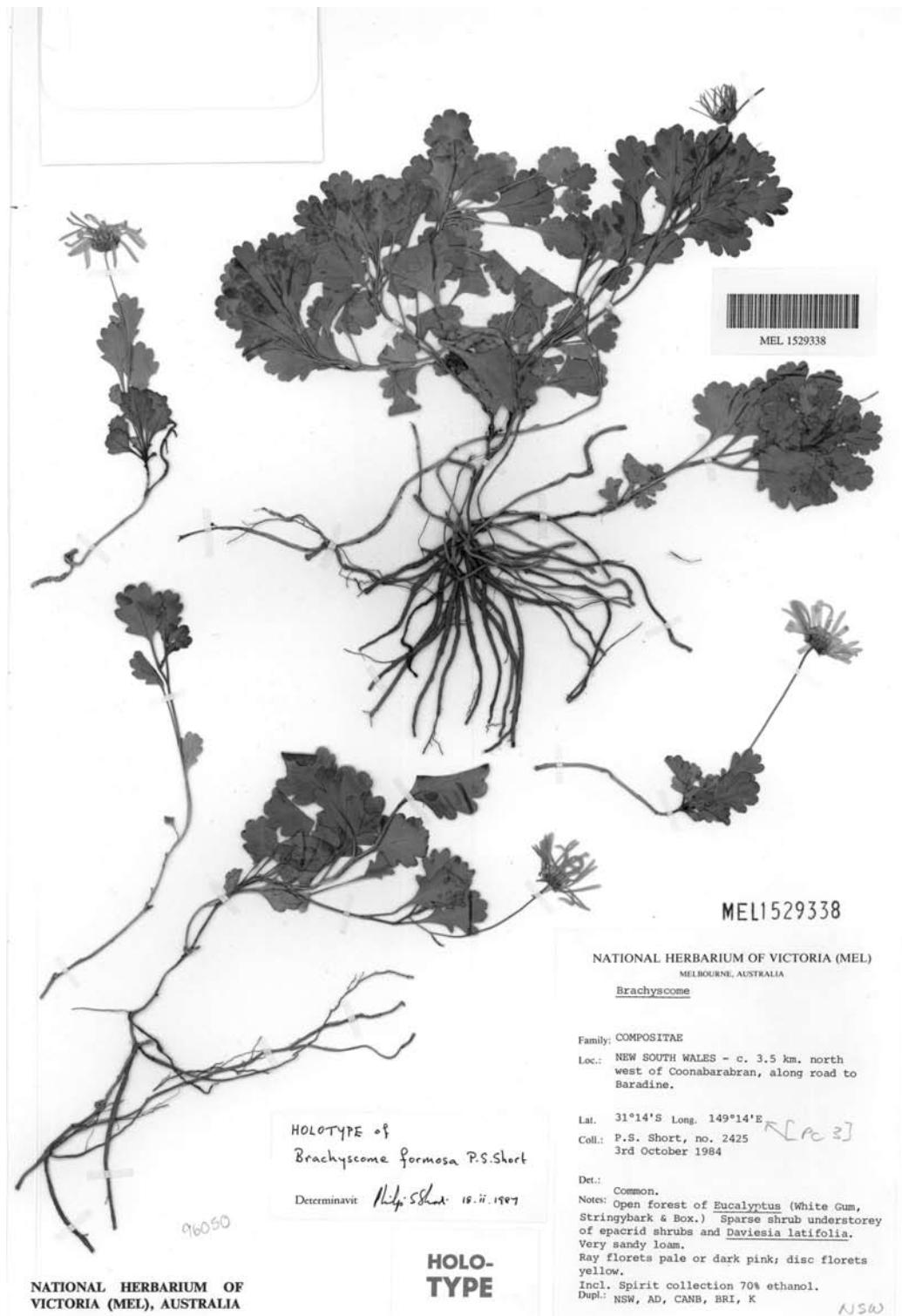
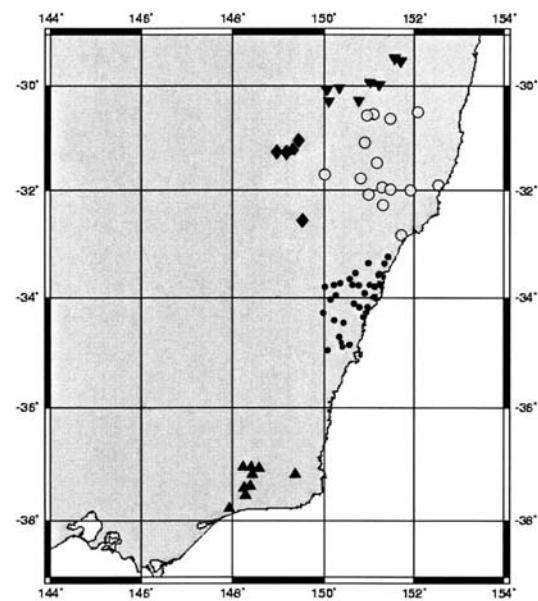


Figure 3. *Brachyscome formosa* (holo: P.S. Short 2425, MEL).

indumentum, eglandular hairs apparently absent. Leaves basal and cauline, alternate, green or flushed purple, basal and some mid-cauline leaves tapering to distinct, petiole-like bases but upper leaves not tapering, all leaves at least at maturity glabrous or with mostly occasional stalked glandular hairs and very rarely with short, seemingly eglandular hairs; basal and lower-cauline and sometimes mid-cauline leaves mostly spatulate or linear-ob lanceolate in outline, 15–55 mm long, 4–14 mm wide, entire or with 1–6 lateral teeth or lobes, the lobes shallow or extending to more than  $\frac{1}{2}$  way to the midrib and the resultant lobes acute; mid-cauline leaves divided and resembling deeply-lobed lower leaves although the lobes may be narrower or resembling upper-cauline leaves; upper-cauline leaves all or mostly entire, linear or linear-ob lanceolate, 4–37 mm long, 0.4–3 mm wide, acute, only rarely with 1 or 2 small lateral teeth or lobes. *Capitula* c. 5.5–8 mm diam., on scapes exceeding the upper leaves. *Bracts* 13–19, in a single row, elliptic to narrowly elliptic, obovate to linear-ob lanceolate or lanceolate, 2.4–3.3 mm long, 0.5–1.1 mm wide, thinly herbaceous but with hyaline margins and apex and reflexing at maturity, with a conspicuous indumentum of stalked glandular hairs c. 0.6–2.8 mm long. *Receptacle* subconical when fresh, seemingly tending to hemispherical when mature, areolate, glabrous. *Ray florets* 13–20; corolla 6.8–10.3 mm long, 1.2–1.8 mm wide, veins 4 (5), apically entire or minutely 2 or 3-toothed, upper surface shades of mauve or pink, lower surface straw-coloured. *Disc florets* 26–32; corolla with tube 1.7–2.5 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, although a single and probably abnormal bifid hair seen on one lobe, veins extending into and joining at the apex of the lobes. *Stamens* 5; filament collar straight in outline or somewhat dilating towards the base but basally not or barely wider than the filament and composed of uniform cells; anthers 1.07–1.45 mm long, microsporangia 0.9–1.24 mm long, apical appendages 0.17–0.32 mm long, base obtuse; endothelial tissue radial; pollen grains c. 3,500–5,000 per floret. *Styles* c. 2.7–3.4 mm long; arms 0.75–0.89 mm long, stigmatic part 0.35–0.57 mm long, appendages somewhat triangular in outline, 0.22–0.49 mm long, shorter to longer than the stigmatic part. *Cypselas* flat, obovate, straight or slightly curved, 2–2.6 mm long, 0.7–1.35 mm broad, with two, non-swollen ridges on



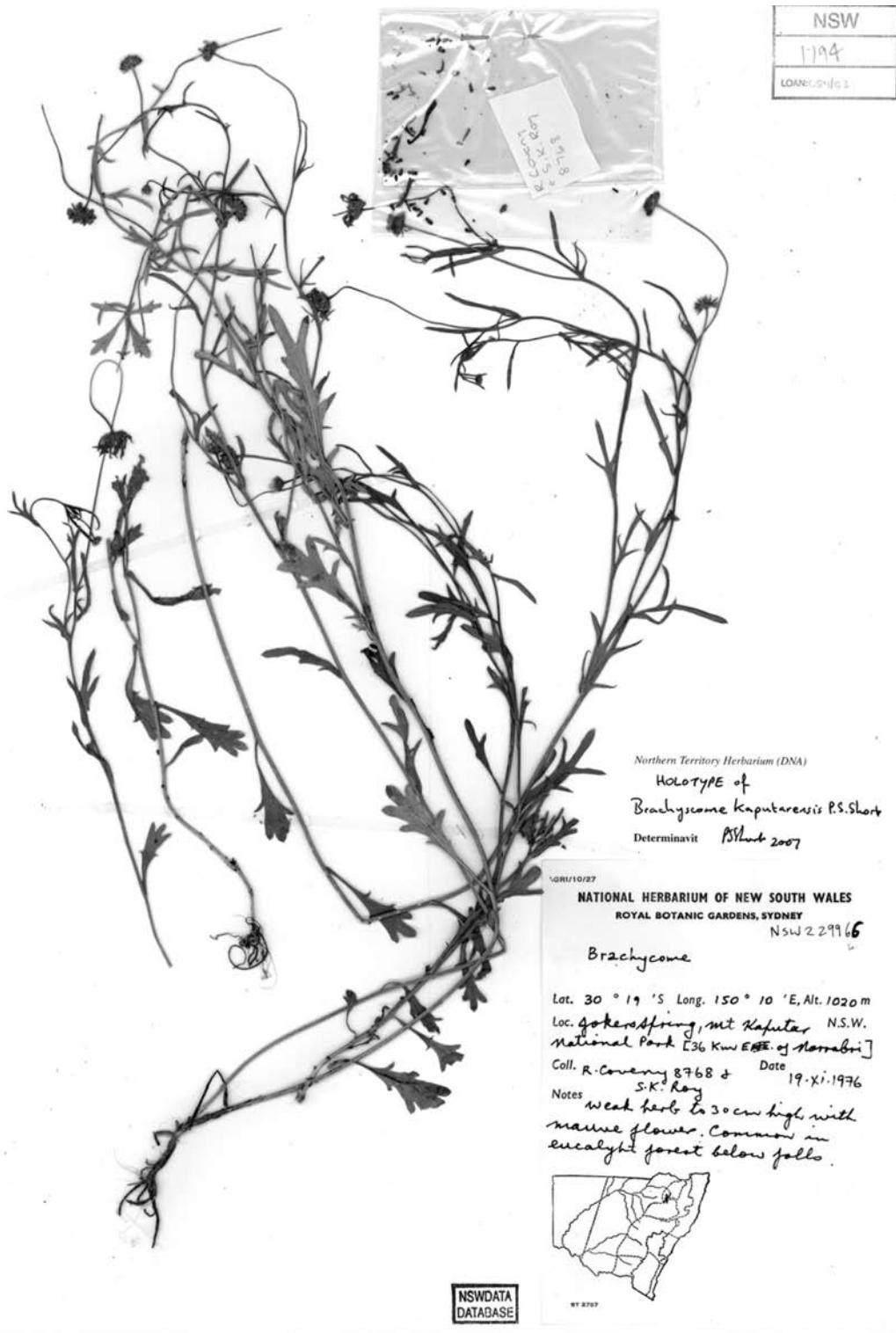
**Figure 4.** Distribution of *B. formosa* (♦), *B. kaputarensis* (▼), *B. linearifolia* (●), *B. petrophila* (▲) and *B. sieberi* (○).

each lateral surface, when immature commonly brown but mature fruit often pale green-black, green-brown or greyish or the margins at least partly brownish and the rest of the fruit mostly green-black, green-brown or greyish; lateral surfaces of cypsela body with 21–53 conspicuous tubercles, each tubercle usually with a short, straight to curved biseriate, non-bifid, eglandular hair 0.7–1.4 mm long; ribs unwinged, smooth or uneven, lacking tubercles and hairs; carpopodium narrow, 0.05–0.1 mm wide, commonly whitish. *Pappus* a crown of whitish or very pale yellowish bristles joined at the base; bristles somewhat uneven in length, the longest 0.1–0.54 mm long. *Chromosome number*:  $n = 5$  (see below). Fig. 5.

**Selected specimens examined: NEW SOUTH WALES.**

Mr Ogilvies Station, Horton River, s. dat., L. Leichhardt (NSW 227585); 38 kms from Narrabri to [wards] Mt Kaputar, 25 Aug. 1973, B. Muffett 173/120 (CBG); Mount Kaputar N.P., above Jokers Springs, 26 Sept. 1993, E. Salkin DSG 131 (MEL); Mt Kaputar N.P., 10 km E of Information Centre, 25 Sept. 1992, K. Watanabe 10 (MEL, TI n.v.).

**Distribution:** Confined to north-eastern New South Wales, with most collections from the Nandewar Range (including Mt Kaputar N.P. and Mt Lindsay) but also from the vicinity of Tingha and Emmaville (Fig. 4).



**Figure 5.** *Brachyscome kaputarensis* (holo: R. Coveny 8768 & S.K. Roy, NSW).

**Habitat:** A species commonly associated with dry sclerophyll forest with recorded dominant species including *Eucalyptus albens* Benth., *E. crebra* F.Muell. and *E. macrorhyncha* F.Muell. ex Benth. but also recorded as growing 'on rocky mountain plateau amongst heath' (Salkin DSG132). It has been recorded as growing in 'stony soil', 'reddish clay', 'grey clayey sand' and 'brown sandy loam'.

**Phenology and reproductive biology:** Flowering & fruiting specimens held in herbaria have been collected from August to February/March and also in June. Pollen: ovule ratios ranging from 2,310–3,145 have been determined from five capitula taken from Short 3946.

**Cytology:** A chromosome number of  $n = 5$  ( $2n = 10$ ) has been determined for this species (Watanabe *et al.* 1996, as *B. sp. aff. angustifolia*, Short 3944).

**Notes:** Leaves with teeth or lobes are sometimes absent, or at least nearly so, from specimens such as Coveny 9015 & Short 3944, with divided leaves seemingly lost as plants mature.

Collectors have variously described the colour of ray corollas as pinkish-mauve, mauve, purple, violet, mauve-pink, deep pink and red. These records probably relate only to the upper surface of the ray corolla as for Short 3944 I recorded that the upper surface is bright pink but the lower surface is straw-coloured.

Salkin (1994) illustrated the leaves of this species from specimens collected along Schutt's Track, Mt Kaputar; other leaf illustrations she presented in her article are of *B. sieberi*.

#### 4. *Brachyscome linearifolia* DC., Prodr. 5: 306

(1–10 Oct. 1836)

Benth., Fl. austral. 3: 515 (1867); C.Moore, Handb. fl. N.S.W. 264 (1893); Maiden & Betche, Census N.S.W. pl. 196 (1916). **Type citation:** 'in Nova Hollandiæ. Omninò refert figurarum sinistram tab. 204. sp.fl. Nov. Holl. Labill. sed achaenia certè pappo priorib[us] simili coronata nec nuda. (v.s. comm. à cl. Lambert. et Thibaud.)'. Lectotype (Davis 1948, p. 162, pl. 7, no. 2): *Lambert s.n.* (G-DC). Remaining syntype: *Thibaud s.n.* (G-DC).

*Brachyscome heterophylla* Benth. in Endlicher *et al.*, Enum. pl. Huegel 60 (Apr. 1837); Benth., Fl. austral. 3: 515 (1867) p.p., excluding *B. brownii*, see note under that species. — *Brachyscome linearifolia* var. *heterophylla*

(Benth.) C.Moore, Handb. fl. N.S.W. 264 (1893); Maiden & Betche, Census N.S.W. pl. 196 (1916), presumably p.p. as cited Bentham (1867). — *Brachyscome angustifolia* var. *heterophylla* (Benth.) G.L.R.Davis, Proc. Linn. Soc. New South Wales 73: 162, fig. 16 (26 Oct. 1948) p.p.; G.L.R.Davis, Proc. Linn. Soc. New South Wales 74: 149 (1949) p.p., as to Joadja specimen (F.A. Rodway); E.Salkin *et al.*, Austral. brachyscomes 40, illustrations p. 41, not as to distribution. Type citation: 'Ferd. Bauer'. Lectotype (Davis 1948, p. 162, fig. 16): *R. Brown* (Bennett no. 2066; MEL 39791). *Lectotype nov.* (here designated): 'Brachycome heterophylla Benth./ Insula van Diemen/ ferd. Bauer, del 43 & 76' (W, excluding *B. mittagongensis*, see notes below). Isolectotype: K (ex Herb. Mus. Vind. 1836, excluding *B. mittagongensis*, see notes below).

*Brachyscome oblongifolia* Benth. in Endlicher *et al.*, Enum. pl. Huegel 60 (Apr. 1837). Type citation: 'Van Diemen's Land. [sic] (Ferd. Bauer.)'. Holotype: W. Isotype: K. (See notes below).

[*Brachyscome angustifolia* auct. non A.Cunn. ex DC. var. *angustifolia*: G.L.R.Davis, Proc. Linn. Soc. New South Wales 73: 161, figs 15, 26, pl. vi, map 7, pl. vii, 2 (26 Oct. 1948) p.p., excluding all non N.S.W. specimens and at least Cunningham's specimen from N.S.W.; G.L.R.Davis, Proc. Linn. Soc. New South Wales 74: 149 (1949); J.Everett in G.Harden, Fl. N.S.W. 3: 166 (1992), not as to distribution; E.Salkin *et al.*, Austral. brachyscomes 38, illustration 39 (1995), not as to distribution.]

*Perennial*, rhizomatous, procumbent to weakly erect herbs; branches to c. 35 cm long, glabrous; roots at least occasionally long-cylindrical and probably somewhat fleshy when fresh. *Leaves* basal and cauline, mostly sublinear to linear-ob lanceolate or linear-spathulate, sometimes obovate in outline, always with a pronounced, petiole-like region, all leaves 7–75 mm long, (0.5) 1–7 (19) mm wide, commonly entire but some specimens with 1–5 lobes, if lobed then most often with 3 apical lobes, the mid-lobe usually manifestly larger than the lateral lobes, all lobes usually apically acute; apex slightly but definitely mucronate; midrib (at least in dried specimens) slightly sunken on upper surface, prominent on lower surface, lateral veins indistinct in narrow leaves but prominent in broad leaves; all leaves glabrous or with very occasional stalked glandular hairs less than c. 0.1 mm long and septate, eglandular hairs and these mostly confined to leaf axils. *Capitula* c. 6–7 mm diam., on scapes manifestly exceeding the upper

leaves. Bracts in 1 row, overlapping, elliptic to narrowly elliptic, narrowly oblanceolate or almost linear, 2.2–2.9 mm long, 0.3–0.9 mm wide, apically subacute to obtuse, mainly thinly herbaceous but with very narrow hyaline margins and apex, glabrous or almost so except for scattered, shortly stalked mostly glandular hairs, margins irregularly and very shortly 'ciliate'; stereome divided. *Receptacle* subconical, glabrous. *Ray florets* c. 21–30 or more; corolla c. 7.0–7.5 mm long, blue, purple, blue-purple, mauve or pink, with (3) 4 veins; veins converging at a seemingly entire apex; style c. 1.5 mm long. *Disc floret* number undetermined; corolla tube 1.2–2.1 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, veins extending into and joining at the apex of the lobes. *Stamens* 5; filament collar almost straight; anthers c. 0.9–1.14 mm long, microsporangia 0.75–0.93 mm long, apical appendages 0.15–0.21 mm long, endothecial tissue radial. *Style* c. 2.5 mm long; arms c. 0.46–0.54 mm long, the triangular appendage c. 0.19–0.23 mm long and shorter than the stigmatic part which is c. 0.23–0.27. *Cypselas* flat, obovate or somewhat obtriangular, 1.7–2.25 mm long, 0.8–1.0 mm wide, uniformly brown or almost so, each lateral surface with two, non-swollen ridges; lateral surfaces of cypsela body conspicuously tuberculate; tubercles c. 15–20 on each surface and each terminating with a short, straight or nearly straight, biseriate eglandular hairs, each of which is entire or shortly bifid; ribs narrow and barely 0.1 mm wide or more pronounced and up to c. 0.4 mm at their widest, uneven and somewhat undulate and with each undulation (or tubercle) with an eglandular hair as on the fruit body; carpopodium annular, narrow, barely 0.05 mm wide. *Pappus* a whitish crown of c. 15 basally united bristles c. 0.2–0.3 mm long. *Chromosome number:*  $n = 9$ . Fig. 6.

**Selected specimens examined: NEW SOUTH WALES.** Port Jackson, R. Brown (CANB 279083, MEL 39791, latter without locality and distributed by Bennett as 2066); Golang Creek, 28 Mar. 1984, D. Benson 1661 (NSW); Jenolan Caves, Oct. 1899, W.F. Blakely (NSW 15171, SYD); Wiseman's Ferry, Apr. 1908, J.L. Boorman (NSW 15153); Woonona, 1 June 1941, C. Davis (AD 97433182, BRI 330540, HO 117511, NSW 15155, PERTH 408913); Beecroft, 1 Feb. 1927, O.D. Evans (SYD); "The Cedar Track", 26 Mar. 1951, L.A.S. Johnson (NSW 15612); between Kurrajong & North Richmond, 18 Mar. 1963, M.E. Phillips (CBG 015042); Grassy Gully, 3 May 1942, F.A. Rodway (BRI 446929, MEL 220877, NSW 151540).

**Distribution:** Endemic to N.S.W. between 33° and 35° S and east of c. 150° E, i.e. within a c. 150 km radius of Sydney (Fig. 4).

The majority of collections predate 1950 and presumably many localities at which *B. linearifolia* was found have been lost through urban growth and farming and grazing. That the species is grazed by sheep and cattle was recorded by W.H. Blakely on a specimen he collected in 1914.

A specimen at SYD of this species is incorrectly labelled, the specimen being attributed to M.J. Collins and stated to have been collected from the Paroo River in 1923.

**Habitat:** The few available habitat notes accompanying collections indicate that *B. linearifolia* commonly grows in open forest dominated by species such as *Angophora costata* (Gaertn.) Britten, *Eucalyptus eugenoides* Sieber ex Spreng., *E. fibrosa* F.Muell., *E. moluccana* Roxb., *Melaleuca decora* (Salisb.) Britten and *M. nodosa* (Sol. ex Gaertn.) Sm., and that it favours humus-rich loam or sandy loam. It has also been recorded from 'shrub dune' near Woonara, and as growing in dense clumps around septic tank outlets in Appin.

**Phenology and reproductive biology:** Flowers throughout the year. A pollen: ovule ratio of 1,886 was determined from a single capitulum (Evans 1 Feb. 1927, SYD) with 15 rays and 30 disc florets.

**Cytology:** Smith-White et al (1970) reported  $n = 9$  for what they referred to as *B. angustifolia* var. *angustifolia*, reporting it from three localities, i.e. Medlow Gap, Colong Trail and Jenolan. I have seen several specimens from SYD which are of this species and are undoubtedly vouchers of specimens examined by Smith-White and his colleagues but none give a locality and only one is clearly labelled as being a voucher for  $n = 9$ . It bears the number '2798' and was collected on 12 Oct. 1968.

**Typification of *B. heterophylla*:** Bentham (1837) made it clear that he based his description of *B. heterophylla* on a specimen collected by Ferdinand Bauer. As such, Davis was incorrect in choosing a specimen attributed to Robert Brown.

Bentham (1837) named seven species of *Brachyscome* s. lat. in *Enum. pl. Hügel.* and in the preface to his *Flora australiensis* stated that 'With regard to the originals of the species described in



**Figure 6.** *Brachyscome linearifolia* (D. Benson 1661 & D. Keith, NSW). Note divided leaves on right-hand side of specimen.

Baron Huegel's 'Enumeratio Plantarum' and other works, published at Vienna, I was enabled to bring over with me specimens of several, especially of those which I had myself described ...' (Bentham 1863, p. 11 of preface), a statement indicating that the principal type, the holotype, should be considered to be in W, with possible duplicates (isotypes) in K. Indeed, for all seven species there is a type specimen in K but, as may be expected from Bentham's statement, the specimens in W are generally much better. In the case of the name *B. heterophylla*, the undoubted type material in both W and K consists of two species, necessitating lectotypification. There is also no doubt that the label accompanying the W specimen is incorrect in regard to the locality, the reference to Tasmania ('Insula van Diemen') being erroneous, while the K specimen bears the label 'Brachyscome heterophylla Benth./ Pl. Hueg. 60/ Australia F. Bauer/ Herb. Mus. Vind. 1836'.

In his original description of *B. heterophylla* Bentham (1837, p. 60), recorded of the leaves: 'foliis oblongis cuneiformibus acutis basi angustatis integerrimus vel saepius apice tridentatis 3–5fidisque'. Mention of the apex of the leaves covers both species but there is no mention of the leaves being sessile, and thus I consider the description to best apply to the elements on both the W and K sheets in which the leaves taper to narrow bases and are deeply divided, not shortly toothed. There are three such elements on the sheet in W and I have chosen them to constitute the new lectotype specimen (*lecto. nov.*) of the name *Brachyscome heterophylla* Benth. The two smaller discordant elements on the W sheet are of *B. mittagongensis*. Note that my determinavit slip placed with the type specimen in July 2005 merely states 'Type of *Brachyscome heterophylla* Benth.' as at the time of my visit I was uncertain as to the circumscription of the taxon. Choice of these elements as constituting the new lectotype specimen of the name *B. heterophylla* happens to be in accord with Davis's erroneously chosen lectotype specimen, with both specimens being of the same taxon.

The isolectotype specimen at K consists of a single branchlet, to the left and right of which are smaller elements of *B. mittagongensis*. Specimens of *B. heterophylla* collected by Brown (Bennett no. 2066) are mounted on the same sheet.

**Type of *B. oblongifolia*:** In his original publication Bentham referred to the type specimen as 'Van Diemen's Land. (Ferd. Bauer.)' and it is presumably because of this that Hooker (1856) included the species in his *Flora of Tasmania*, although he also erroneously recognised both *B. angustifolia* and *B. linearifolia* as occurring there! Not only is the species absent from Tasmania, neither the label attached to the holotype specimen in W or the isotype specimen in K make reference to Van Diemens Land, referring instead to 'Nova Hollandia' and 'Australia' respectively. Note that Bentham (1867) was to subsequently and inexplicably reduce this name to synonymy under *B. stricta* DC., an illegitimate name and synonym of *B. aculeata* (Labill.) Cass. ex Less.

**Distinguishing the species from *B. graminea*:** As noted, Davis (1948) misapplied the name *B. angustifolia* to this species, definite syntype specimens in G-DC being of *B. graminea*. The lectotype specimen which she erroneously chose for the name *B. angustifolia* is also of this species, as are most of the non-New South Wales specimens she cited.

*Brachyscome linearifolia* and *B. graminea* have a similar habit and entire, often linear leaves but even immature cypselas of *B. graminea* usually have obvious glandular hairs which make the apex of the fruit sticky, a feature not found in cypselas of *B. linearifolia*. Furthermore, cypselas of *B. graminea* never have eglandular hairs, let alone the distinctive straight hairs of *B. linearifolia*, and in *B. graminea* the pappus is absent or only consists of a few inconspicuous bristles to c. 0.3 mm long.

**Notes:** Davis (1948) recognised two varieties of *B. angustifolia*, specimens with entire leaves being var. *angustifolia* and those with divided leaves referable to the var. *heterophylla*. The circumscription of the latter was such that it incorporated entities with seemingly identical fruit to var. *angustifolia* but with pinnatisect leaves. Davis considered the var. *heterophylla* to range from the central coastal area of New South Wales north to the Queensland border and recorded that 'variation in the shape of leaves is considerable, and the margins may be irregularly or regularly dissected' (Davis 1948, p. 163). Subsequent to Davis's revision many specimens from the south-east coast of New South Wales and in north-eastern Victoria have also been referred to var. *heterophylla* (e.g. Willis 1973). However, as also previously noted (Short 1988, 1999), both the

circumscription by Davis and the broader one used by Willis encompass a number of distinct taxa which are segregated and formally named in this paper. Sorting of specimens has also convinced me that the name *B. heterophylla* has simply been applied to a minor variant which should be encompassed under *B. linearifolia* without any formal recognition. Of c. 70 specimens referred by me to *B. linearifolia* only eight, including the type specimen of *B. heterophylla*, have lobed leaves. In these specimens leaves are almost invariably deeply 3-lobed in the upper third, only occasionally is there an extra 1 or sometimes 2 lateral lobe present or the leaves have just a single lobe or the lobes are short. On most specimens there are usually entire, oblanceolate or subspathulate leaves also present, for example MEL 39791 which has branchlets with a mix of mostly divided and entire leaves and a branchlet with just entire, comparatively narrow leaves. This specimen was collected by Robert Brown (numbered as *Bennett* 2066, and Davis's erroneously chosen lectotype of *B. heterophylla*) and a duplicate collection at K has branchlets which have only, or mostly deeply divided leaves. Elements comprising the lectotype and isolectotype specimens of *B. heterophylla* are also extremely similar to Robert Brown's collection and it is unsurprising that, when seen alone, these specimens were considered to be representative of a distinct species. However, when viewed along with other specimens, such as Blakely's collections from Jenolan Caves (NSW 15171 and SYD s.n.) – in which most leaves are entire and few leaves divided – I concluded that the aforementioned specimens are representative of minor variation which is not worthy of formal recognition. It may be a quirk of collecting but specimens with some or mostly divided leaves tend to be found on the periphery of the overall distribution of the species.

I have not seen the specimen from Tea Gardens, N.S.W. on which Salkin *et al.* (1995, p. 41 b & ii) have based an illustration of *B. angustifolia* var. *heterophylla* but, as with the specimens with lobed leaves referred to above, I believe – despite it being unusual in seemingly having only divided leaves and particularly prominent ab/adaxial margins on the cypselas – that it too belongs here. As with other specimens with divided leaves, this slightly disjunct population also occurs on the periphery of the distribution of the species, in

this case the northern edge, and indeed just south of the known distribution of the vegetatively variable *B. procumbens*.

Specimens with roots are not commonly collected but, as is evident from A.A. Hamilton (NSW 15167), roots are long-cylindrical and somewhat fleshy when fresh.

There are two specimens (Hamilton from Cronulla Beach, and another from Boudii N.P. collected by Smith-White or one of his colleagues) which have relatively short leaves and reduced branchlets, features which are presumably the result of growing in exposed habitats.

Maiden & Betche (1916, p. 196) recorded, under the name *B. linearifolia*, 'var. *heterophylla* F.v.M. impl. from i Census (*B. heterophylla* Benth.).' In Mueller's (1882)'First Census' *B. linearifolia* is listed but neither of the names *B. heterophylla* or var. *heterophylla* are recorded, so their comment is both erroneous and a mystery, particularly as Moore (1893) had earlier reduced *B. heterophylla* Benth. to varietal rank under *B. linearifolia*.

##### **5. *Brachyscome mittagongensis* P.S.Short, sp. nov.**

*Brachyscome heterophylla* Benth. in Endl. *et al.*, *Enum. pl. Huegel* 60 (Apr. 1837) p.p., the type specimen being a mixed collection of *B. heterophylla* (as lectotypified above) and *B. mittagongensis*.

[*Brachyscomesieberi* auct. non DC.:?Benth., *Fl. austral.* 3: 520 (1867) p.p., seemingly as to description of leaves as 'often stem-clasping' and 'minutely 3-toothed at the end'; C. Moore, *Handb. fl. N.S.W.* 264 (1893), seemingly entirely applied to this species as per description and the single locality 'Port Jackson'.]

*Ab aliis gregis B. linearifoliae foliis maximus in medio et inferno caulis ad bases petiolorum similibus non contractis sed manifesta similibus et saepe amplexicaulibus dum apicibus eorundem plerumque truncatis et tridentatis, dentibus parvis in amplitudine aequalibus differt.*

Differs from other members of the *B. linearifolia* group in having the largest lower and mid-cauline leaves not tapering towards a petiole-like base but being manifestly sessile and often subamplexicaul while their apices are usually truncate and 3-dentate, with the teeth small and of about equal size.

**Type:** NEW SOUTH WALES. Between Marulan and Berrima, in roadside drain and partly cleared grazing land, alt. c. 680 m, 17 Mar. 1969, *B. Briggs* 3038 (holotype NSW 228368).

Perennial, rhizomatous *herb* with prostrate to ascending branches to c. 50 cm long, glabrous except for very occasional multicellular, conical glandular hairs c. 0.1–0.15 mm long. *Leaves* basal and cauline, alternate, lowermost leaves sometimes tapering to a petiole-like base but most leaves manifestly sessile and often subamplexicaul, somewhat narrowly oblong or narrowly elliptic or sometimes ovate-lanceolate to lanceolate or rarely a few oblanceolate, 11–38 mm long, 3.5–11 mm wide, leaf apices usually truncate and 3-dentate, the teeth of about equal length and width, rarely the apex tapering to a single point, leaf margins otherwise entire or sometimes with 1 or 2 additional short, narrow lateral lobes on each margin and these often about ½ way along the length of the lamina, all leaves glabrous or margins with very occasional stalked glandular hairs less than c. 0.1 mm long. *Capitula* c. 6 mm diam., on scapes manifestly exceeding the upper leaves. *Bracts* in 1 row, overlapping, ovate to lanceolate or elliptic to narrowly lanceolate, 2.2–2.5 mm long, 0.7–0.8 mm wide, subobtuse, mainly thinly herbaceous but with very narrow hyaline margins, glabrous or almost so except for scattered, mostly glandular hairs on the margins; stereome divided. *Receptacle* subconical, areolate, glabrous. *Ray florets* c. 40 in largest capitula; corolla c. 8.5 mm long, 1.2–1.3 mm wide, white, with 4 veins converging at the apex; apex unlobed or with 2 or 3 barely discernible lobes; style c. 1.45 mm long. *Disc florets* perhaps c. 80 or more in largest capitula; corolla with tube 2.1–2.45 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, veins extending into and joining at the apex of the lobes. *Stamens* 5; filament collar almost straight or dilating towards the base; anthers 1.25–1.36 mm long, microsporangia 1.04–1.09 mm long, apical appendages 0.2–0.27 mm long, endothelial tissue radial. *Style* c. 2 mm long; arms c. 0.7 mm long, the triangular appendage slightly exceeding the length of the stigmatic part. *Cypselas* flat, obovate, 1.3–1.5 mm long, 0.8–0.9 mm broad, lateral surfaces with two, non-swollen ridges on each lateral surface, uniformly brown; lateral surfaces of cypselae body conspicuously tuberculate, the tubercles with short, straight to apically curved to slightly incurved, biseriate eglandular hairs, multicellular glandular hairs uncommon and only noted on immature fruit; ribs smooth, wings absent; carpopodium seemingly present and annular but

inconspicuous. *Pappus* a whitish crown of c. 20 basally united bristles c. 0.2 mm long. *Chromosome number*: n = 9. Fig. 7.

**Additional specimens examined: NEW SOUTH WALES.**

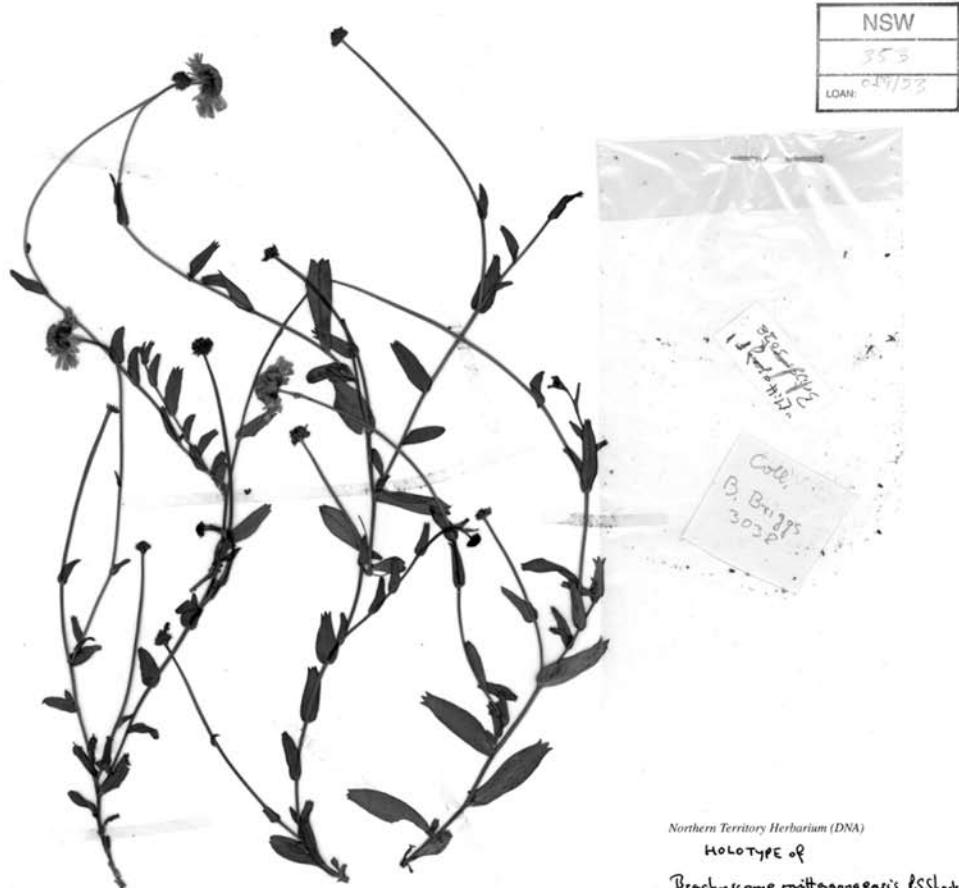
no locality, s. dat., Anon. (MEL 562448 p.p.; has 'Brachycome BB' on an otherwise indecipherable label); Toongabbie, Mar. 1859, Anon. (NSW 228372); Australia, F. Bauer (W p.p. & K p.p., mounted with lecto- and isolectotype respectively of *B. heterophylla*); Shoalhaven, Apr. 1884, W. Bäuerlen 478 (MEL); Stingray Swamp Flora Reserve, river flat near old *Eucalyptus* oil distillery site, 16 May 1984, D. Binns, R. Shiels & R. Allen 84/255 (NSW); Wingecarribee Swamp, c. 10 km ENE of Moss Vale, 27 Feb. 1969, R. Coveny 912 (NSW); Mittagong, W.A. Dixon (NSW 227633); Berrima, 22 Apr. 1889, J.J. Fletcher (NSW 227630); 15 miles S of Mittagong, 24 Feb. 1969, S. Smith-White and/or associates 3856 & 3857 (SYD, 2 sheets); Parramatta, W. Woolls (MEL 692585).

**Distribution:** Confined to New South Wales. There are two specimens from the greater Sydney region (Toongabbie and Parramatta) which were collected in the 1800s. However, specimens collected in the last 40 years are from c. 100 km south-west of Sydney, coming from a small region between Mittagong and the lower reaches of the Shoalhaven River. Importantly, for conservation purposes, it is recorded from Stingray Swamp Flora Reserve and slopes above Wingecarribee Swamp (Fig. 2).

**Habitat:** Of the few herbarium specimens only three have habitat notes: Binns et al 84/255 recorded that plants were growing in a river flat in open forest dominated by *Eucalyptus macarthurii* H.Deane & Maiden and *E. radiata* Sieber ex DC., while for Coveny 912 it was noted to be 'fairly common' on slopes above Wingecarribee Swamp, associated species recorded as being *Solenogyne bellidioides* Cass., *Plantago varia* R.Br., *Dichondra repens* J.R.Forst. & G.Forst., *Hypochaeris radicata* L., and various grasses. Plants forming the type specimen were recorded as growing in a roadside drain and adjoining, partly cleared, grazing land.

**Reproductive biology:** Flowering occurs from about February to May. A pollen: ovule ratio of 2,458 was determined from a single capitulum from a specimen collected by Smith-White and/or his colleagues and numbered as 3856.

**Cytology:** Smith-White et al. (1970), giving the locality as Mittagong and referring the voucher specimen to *B. angustifolia* var. *heterophylla*, recorded



NATIONAL HERBARIUM OF NEW SOUTH WALES  
ROYAL BOTANIC GARDENS, SYDNEY

To be cited as: NSW 228369

*Brachyscome angustifolia*  
var. *heterophylla*  
Loc. Between Marulan & Berrima N.S.W.

Coll. B. Briggs 3038

Date 17. iii. 1969

Notes In roadside drain, & partly cleared  
grazing land. Rays white, disc yellow.  
Alt. c. 680 m.



NSW DATA  
DATABASE

Figure 7. *Brachyscome mittagongensis* (holo: B. Briggs 3038, NSW).

a haploid chromosome number determination of  $n = 9$  for this species.

**Etymology:** The epithet has been chosen as it approximately reflects what appears to be the current distribution of the species.

**6. *Brachyscome petrophila*** G.L.R.Davis, Proc. Linn. Soc. New South Wales 74: 147, figs 6–7, (21 Oct. 1949)

J.H.Willis, *Handb. pl. Victoria* 2: 669, 674 (1973) *p.p.*, excluding specimens of *B. willisii* from 'Omeo and Beechworth ... referred with hesitation to *B. petrophila*'; E.Salkin et al. (1995), *Austral. brachyscomes* 182, illustrations 183 (1995); P.S.Short in N.G.Walsh & Entwistle, *Fl. Victoria* 4: 841, fig. 169e (1999). **Type citation:** 'Holotype: Little River Falls, about five miles N.E. of Wulgulmerang, E. Vic., 'on dripping cliff faces', 16.1.1948, J. H. Willis (MEL). Paratypes: Four, loc. cit (MEL).' Holotype: MEL 1580304 *p.p.* (excluding isotypes). Isotypes: MEL 1580304 *p.p.* (excluding holotype), MEL 1580305, MEL 658089, NSW 15570.

Perennial, weakly ascending to erect, branching, rhizomatous herbs to c. 50 cm tall, branches with a sometimes dense vestiture of stalked glandular hairs, the hairs variable in length, ranging from 0.03–1.4 mm long and the longest hairs with manifestly septate stalks which taper to their apex, in many specimens all hairs are less than c. 0.4 mm long while others exhibit the full range in length. Leaves cauline, mainly obovate to oblanceolate in outline, sometimes narrowly elliptic, 20–87 mm long, 4–24 mm wide, all leaves tapering to the base but only sometimes forming a petiole-like base to c. 15 mm, leaves with subamplexicaul bases sometimes present, all leaves toothed or shortly lobed, with 5–27 ultimate segments and each terminating in a blunt mucro, green or occasionally purplish beneath (*Beaglehole* 67519), glabrous or with scattered stalked glandular hairs resembling those on the branches. *Capitula* c. 5 mm diam., on scapes manifestly exceeding the uppermost leaves. Bracts c. 25, lanceolate, 3–3.8 mm long, 0.5–0.7 mm wide, acute, mainly herbaceous but with narrow hyaline margins, with a prominent and often orange midrib, the entire bract glabrous or with stalked glandular hairs on surface and margins. *Receptacle* short, conical, glabrous. *Ray florets* c. 28–50; corolla 6.5–7.8 mm long, 0.4–1 mm wide,

3- or 4-veined, white or mauve. *Disc florets* c. 60–70; corolla with tube 1.9–2.9 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, veins extending into and joining at the apex of the lobes. *Stamens* 5; anthers c. 1.3–1.4 mm long, microsporangia c. 1–1.1 mm long, apical appendages c. 0.3 mm long. *Style* with the apical appendages triangular and shorter than the stigmatic part. *Cypselas* laterally compressed, ovoid, 1.6–2.3 mm long, 0.75–0.9 mm wide, with two non-swollen and more or less smooth longitudinal ridges on each lateral surface, uniformly brown; lateral surfaces of fruit body with 3–32 small, somewhat conical tubercles, mature cypselas glabrous but with scattered, curved, biseriate hairs evident in immature fruit; ribs, tubercles and hairs absent; pericarp sclerenchyma confined to ribs and lateral ridges; testa of evenly thickened cell walls; carpopodium present. *Pappus* an uneven crown of c. 15 white or pale yellowish, smooth bristles 0.15–0.5 mm long which are joined at the base. *Chromosome number:* possibly  $n = 9$ . Fig. 8.

**Selected specimens examined: NEW SOUTH WALES.**  
Nungatta N.P., 16 Feb. 1984, M.J. Taylor 243 (NSW). **VICTORIA.**  
Snowy River N.P., 10 Sept. 1984, A.C. Beaglehole 76855 (MEL); c. 8 km SE of Buchan, 9 Nov. 1984, J.G. Eichler (MEL 688783); 2 km N of Yalmy Road on Varneys Track, 16 Sep. 1979, S.J. Forbes 176; Mt Seldom Seen, 10 Jan. 1962, K.C. Rogers (MEL 1580306); Snowy River Road, 10.7 km WSW from MacKillops Bridge, 19 Oct. 1986, N.G. Walsh 1622 (MEL); Wulgulmerang, crevices of shaded rhyodacite cliff faces toward lower gorge tract and below 'Bare Rock', 28 Nov. 1962, J.H. Willis (MEL 1580307).

**Distribution:** Possibly endemic to the drainage basin of the Snowy River and the nearby Tambo River in eastern Victoria and with a disjunct distribution in Nungatta N.P., N.S.W. There is a record for this species from Anglers Rest, Victoria – for which chromosome data has been recorded under this name (see below) – but I can find no voucher specimen to confirm the identity of the material (Fig. 4).

**Habitat:** Commonly grows on rocky slopes in open eucalypt forests. The only detailed habitat notes are from Westaway 717, the species recorded as growing in montane forest dominated by *Eucalyptus radiata* Sieber ex DC. and *E. rubida* H.Deane & Maiden.

**Flowering period & reproductive biology:**  
Flowering has been recorded from August to January and also in March and May. A pollen:ovule ratio of 2,942



Figure 8. *Brachyscome petrophila* (K. Rogers s.n., MEL 1580306)

has been determined for a single capitulum of *Walsh* 1622. Salkin *et al.* (1995) recorded that seed germinate in 13–30 days.

**Cytology:** A diploid chromosome number of  $2n = 18$  was reported by Watanabe *et al.* (1996) for a population from Anglers Rest. Watanabe *et al.* (1999, fig. 22) published an idiogram of somatic metaphase chromosomes from the same population. As noted above, in the absence of a voucher specimen this record may be incorrect.

**Notes:** There is considerable variation in the length of the stalked glandular hairs but otherwise this taxon is generally uniform in its morphological attributes.

Salkin *et al.* (1995) noted that the first-formed leaves may be as much as 110 mm long and 35 mm wide but are soon lost.

Vegetatively perhaps most likely to be confused with *B. sieberi*, a species from New South Wales, in that the middle and upper cauline leaves of that species are also sessile and may have lobes in the upper c. 3/4 of the lamina. However, the lower and mid-cauline leaves in that species have definite petiole-like bases – a feature almost invariably absent in *B. petrophila* – and also unlike this species the mature branches of *B. sieberi* only have scattered glandular hairs and whitish, apparently eglandular hairs may also be present.

## 7. *Brachyscome procumbens* G.L.R.Davis, Proc. Linn. Soc. New South Wales 73: 164, figs 18, 28, pl. vi map 8 (26 Oct. 1948)

J.Everett in G.Harden, Fl. N.S.W. 3: 166 (1992); E.Salkin *et al.*, Austral. brachyscomes 184, illustrations 185 (1995). Type: 'Holotype: Blue Hole, near Armidale, 'Rocky situations on steep slopes among boulders', 15.4.1941, Consett Davis (NSW). Paratypes: Two l.c. (MEL BRI). Holotype: NSW 15198. Isotypes: BRI 331299, MEL 220630.

Perennial, rhizomatous *herb* with prostrate to weakly erect branches to c. 45 cm long, branches usually glabrous except for occasional (rarely many) stalked glandular hairs 0.06–0.26 mm long and also uniseriate, septate, whitish eglandular hairs sometimes present near leaf bases, branches green or flushed purple; roots at least occasionally long-cylindrical and probably somewhat fleshy when fresh (Short 3951). Leaves basal and cauline, alternate, tapering to

petiole-like bases, green or flushed purple on under surfaces; somewhat obovate to narrowly obovate or oblanceolate in general outline, 20–80 mm long, 11–35 mm wide, with (3) 4–25 (c. 45) ultimate segments; commonly leaves with primary divisions extending c. 1/4–1/2 way to the midrib and the resulting major lobes erect or sometimes slightly recurved, apically obtuse to acute, entire or with 1–several shallow secondary, often tooth-like segments or sometimes the primary divisions extending to about the midrib and the resultant lobes entire or with short to prominent secondary lobing; all mature leaves glabrous or with scattered stalked glandular hairs and eglandular hairs as found on the branches, immature leaves may have a dense indumentum of glandular hairs. Capitula c. 5–7.5 mm diam., on scapes manifestly exceeding the upper leaves, the scapes usually glabrous but shortly stalked glandular hairs sometimes present but only rarely moderately dense. Bracts in about 1 row, overlapping, obovate to oblanceolate but apices acute to subacute, 2.45–4.5 mm long, 0.4–1.6 mm wide, thinly herbaceous and usually with very narrow hyaline margins and apices, outer surface glabrous or with shortly stalked glandular hairs which may be few and scattered or form a prominent indumentum; stereome divided. Receptacle subconical, areolate, glabrous. Ray florets c. 40, at least in larger capitula; corolla 7–11 mm long, (0.6) 1.1–2.0 mm wide, variously recorded as dark mauve, deep pink, mauve-pink (both surfaces), lavender-pink and blue, with 4 veins converging at the apex; apex not or barely and minutely 1- or 2-lobed; style c. 1.4 mm long. Disc florets c. 80 in largest capitula; corolla with tube 2.2–2.9 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, veins extending into and joining at the apex of the lobes. Stamens 5; filament collar 0.22–0.25 mm long, almost straight or slightly dilating towards the base; anthers c. 1.2–1.35 mm long, microsporangia c. 0.98–1.17 mm long, apical appendages c. 0.15–0.23 mm long, endothelial tissue radial. Style c. 2.65–3.6 mm long; arms c. 0.6–0.9 mm long, the somewhat triangular appendage shorter to slightly longer than the stigmatic part. Cypselas flat, obovate to very widely obovate, 2.1–3.1 mm long (including wings), 1.3–2.4 mm broad (including wings), body of fruit brown, yellow-brown or sometimes dark greenish brown or greenish black (Salkin ADSG 129) and

always darker than the wings; lateral surfaces each with two barely developed to obvious non-swollen ridges, between the ridges the surface smooth or with c. 4–25 small, and sometimes almost inconspicuous tubercles each of which terminates in a straight or curved, whitish eglandular hair; ribs winged, the wings 0.2–0.8 mm wide, about the same width throughout their length or tapering towards the base and sometimes the apex, usually manifestly terminating above the fruit body and forming a distinct apical notch up to 0.6 mm deep but sometimes a notch not developed; wing margins entire or notched, with a total of c. 4–20 teeth, the divisions shallow to deep and sometimes nearly extending to the ribs, each tooth usually terminating in 1–3 straight to curved eglandular hair, wings usually a pale yellow-brown but sometimes (*Salkin l.c.*) a darkish green or grey-green; carpopodium annular, inconspicuous and c. 0.1 mm wide. *Pappus* a pale yellow-brown crown of basally united bristles c. 0.1–0.7 mm long, commonly manifestly shorter than the apical notch formed by the wings of the cypselas, rarely about the same length or longer than the notch. *Chromosome number*:  $n = 9$ . Figs. 9 & 10.

**Distribution:** North-eastern New South Wales, between c. 30° and 32° S and 148° 30' and 152° 30' E. Localities include Kaputar N.P. in the north-west of its range and Mt Mograni on the southern edge of its range, and a disjunct population, referred here to subsp. *wombelongensis*, in the Warrumbungle Range (Fig. 2).

**Habitat:** see under subspecies.

**Phenology and reproductive biology:** Flowering specimens have been collected from September to June.

**Notes:** As defined here, *B. procumbens* is particularly variable in regard to leaf morphology but specimens group together on the basis of their having prominently winged cypselas. I include here the 'form' from Mt Kaputar referred to and illustrated in Salkin *et al.* (1995), although not having seen specimens I cannot be certain of the placement of their Diamond Head 'form'.

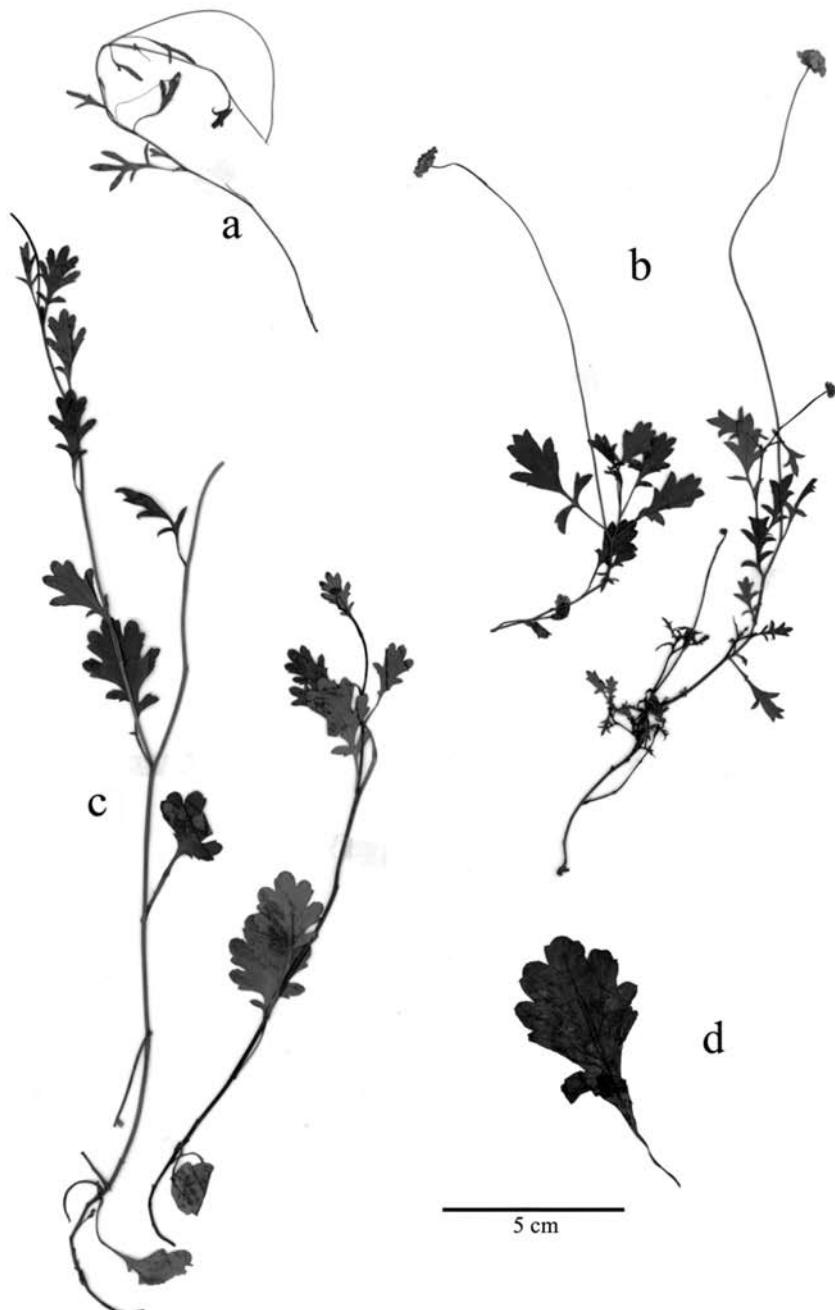
A specimen (*Crawford*, MEL 692580) from Moona Plains is unusual in having a comparatively prominent indumentum of glandular hairs and a slightly larger pappus than normally recorded but otherwise seems to fit within *B. procumbens*. Another specimen, simply

labelled as being a collection of the Sydney Museum (MEL 692582) and coming from N.S.W., has winged cypselas which indicate that it is of this species but it is vegetatively most unusual compared to other specimens, there being many leaves which are deeply 3-lobed or apically 3-lobed with one or two additional lower lobes formed from divisions extending almost to the midrib. However, examination of the range of specimens available showed that such leaves occasionally occur on specimens, e.g. *Telford* 10769, which I otherwise refer to this species, and thus suggests that it too belongs in *B. procumbens*. Other variation in leaves mostly pertains to size and thickness which is perhaps nothing more than a reflection of variation in habitat, some specimens occurring at waterfalls and others in presumably drier forest. The loss of basal leaves in mature plants as indicated by Davis (1948) presumably also explains some of the differences observed between specimens. However, there is one variant which has leaves with deep primary divisions and prominent secondary divisions and I have segregated it as a distinct subspecies, subsp. *wombelongensis*.

- 1 Leaves with primary divisions only or mostly extending c. 1/4–1/2 way to the midrib, if extending further then only so in the formation of the lower-formed primary lobes of a leaf or when the leaves mostly consist of 3 or 5 entire, primary lobes; secondary divisions absent or shallow and confined or mostly so to the upper primary lobes ..... subsp. *procumbens*
- 1: Leaves with most or all primary divisions extending to about the midrib; secondary leaf divisions present on all or most primary lobes and extending up to c. 1/2 the width of the primary lobe ..... subsp. *wombelongensis*

## 7a. subsp. *procumbens*

*Branches* glabrous except for occasional (rarely many) stalked glandular hairs 0.06–0.26 mm long and also uniseriate, septate, whitish eglandular hairs sometimes present near leaf bases. *Leaves* basal and caudine, somewhat obovate to narrowly obovate or oblanceolate in general outline, 20–80 mm long, 11–35 mm wide, with 4–25 ultimate segments; commonly leaves with only primary divisions, the divisions usually extending c. 1/4–1/2 way to the midrib and



**Figure 9.** Some leaf variation in *B. procumbens* subsp. *procumbens* as exhibited by **a**: mid- and upper cauline leaves from a Sydney Museum specimen (MEL 692582) of unrecorded locality in N.S.W.; **b**: near basal to upper leaves from Telford 10769 collected at Dangar Falls; **c**: near basal to upper leaves from Maiden (NSW15197) from Mt Mograni and **d**: basal leaf from C. Davis (BRI 331297) collected at Georges Creek, Macleay River.

the resulting major lobes erect or sometimes slightly recurved, apically obtuse to acute, entire or with 1–several shallow secondary, often tooth-like segments, sometimes (e.g. Crawford, CBG 41236) beneath the major, shallow lobes some leaves also with several entire or shortly-toothed lobes formed from primary divisions which almost extend to the midrib. *Cypselas* obovate to very widely obovate, 2.1–2.65 mm long, 1.3–2.4 mm broad (including wings), body of fruit brown or sometimes dark greenish brown or greenish black (*Salkin ADSG 129*); lateral surfaces each with two barely developed to obvious non-swollen ridges, between the ridges the surface smooth or with c. 4–25 small tubercles each of which terminates in an eglandular hair; wings 0.2–0.8 mm wide, about the same width throughout their length or tapering towards the base, usually manifestly terminating above the fruit body and forming a distinct apical notch up to 0.6 mm deep, margins entire or notched, with a total of c. 4–17 teeth, the divisions shallow to deep and sometimes nearly extending to the ribs, each tooth usually terminating in a short eglandular hair. *Pappus* bristles c. 0.1–0.4 mm long, commonly manifestly shorter than the apical notch formed by the wings of the cypselas, rarely about the same length or longer than the notch. Chromosome number:  $n = 9$ . Fig. 9.

**Selected specimens examined: NEW SOUTH WALES.** Dangars Falls, Apr. 1941, *B. Bassinett* (BRI 331298, MEL 220631, NSW 15202); Huskissons, s. dat., *L. Leichhardt* (MEL 220632); Blandford, 2 Oct. 1944, *H.M. Rupp* (NSW 15201); Tia Falls, 17 Oct. 1994, *E. Salkin ADSG 129* (MEL); Mt Kaputar N.P., 28 Jan. 1993, *P.S. Short 3951* (MEL, NSW, TI).

**Distribution:** North-eastern New South Wales, between c. 30° and 32° S and 150° and 152° 30' E. Localities include Kaputar N.P. in the north-west of its range, Dangar Falls, Blandford, Nundle and Mt Mograni, with the latter locality on the southern edge of its range (Fig. 2).

**Habitat:** Notes are generally lacking on specimens but at Mt Kaputar N.P. *B. procumbens* has been recorded as growing in loam in *Eucalyptus pauciflora* Sieber ex Spreng. open forest and woodland with an understorey dominated by species such as *Kunzea parvifolia* Schauer, *Hibbertia pedunculata* R.Br. ex DC. and *Hakea microcarpa* R.Br. (Fox 87/124), and elsewhere in the Park in deep, uncompacted brown loam in an open eucalypt woodland with scattered shrubs of

*Acacia* and a dominant layer of tussock grass (*Short 3951*). Near Yarrowyck (*Jessup & Gray 2989*) it was noted to be growing in a *Eucalyptus sideroxylon* A.Cunn. ex Woolls association, at Tia Falls (*Salkin ADSG 129*) in crevices between moss-covered rocks, while at Dangar Falls (*Telford 10769*) it was recorded growing in skeletal soils on rocky slopes at the top of the falls in otherwise open eucalypt woodland.

**Phenology and reproductive biology:** A pollen: ovule ratio of 2,442 was determined from a single capitulum of *Short 3951*.

**Cytology:** Chromosome numbers of  $n = 9$  and  $2n = 18$  have been determined by Smith-White *et al.* (1970, figs 11, 20, from Dangar's Falls), and by Watanabe *et al.* (1996, from Mt Kaputar N.P., *Short 3951*). An idiogram of somatic metaphase chromosomes from the latter locality was published by Watanabe *et al.* (1999, fig. 29).

## 7b. *subsp. wombelongensis* P.S. Short, *subsp. nov.*

A *B. procumbens* *subsp. procumbens* *et speciebus ceteris gregis* *B. linearifoliae* *differ, foliis divisionibus secondariis prominentibus, minimum segmentis primariis plerumque ad costam sectis, segmentis inferioribus ab superioribus distantibus.*

Differs from *B. procumbens* *subsp. procumbens* and other members of the *B. linearifolia* group in having leaves with prominent secondary divisions, with at least the primary segments usually cut to the midrib and the lower ones distant from the upper.

**Type: NEW SOUTH WALES.** Mt Wombelong, Warrumbungle Range, in rock crevasses [sic], 5 Dec. 1973, *H. Streimann 538* (CBG 053899, held in CANB). Isotypes: A n.v., L n.v., NSW 224121.

Branches with a scattered indumentum of stalked, glandular hairs and also, particularly in the leaf axils, with eglandular, white, uniseriate, septate hairs 0.5–0.8 mm long. Leaves basal and caudine, 34–60 mm long, 20–35 mm wide, with (3) 20–c. 45 ultimate segments; each leaf with a primary terminal lobe and 4–8 large primary lateral lobes formed by division to about the midrib; primary lobes entire or more commonly divided up to c. 1/2 their width and with 2–5 lobes. *Cypselas* obovate, 2.3–3.1 mm long, 1.7–2.15 mm broad (including winged margins); lateral surfaces each with two, barely developed, non-swollen ridges, between the ridges

the surface smooth or inconspicuously tuberculate and possibly no more than swollen hair bases; wings 0.2–0.55 mm wide, about the same width throughout their length but with some tapering towards the base and apex, not or barely forming an apical notch, margins manifestly divided into c. 17–20 teeth, the divisions sometimes to c. 1/2 the depth of the wing but mostly extending to the ribs, the teeth mostly 0.1–0.2 mm wide and entire or apically 2- or 3-lobed, each tooth terminating in 1–3 eglandular hairs. Pappus bristles c. 0.4–0.7 mm long, manifestly exceeding the wings of the cypselae. Fig. 10.

**Distribution:** Mt Wombelong, Warrumbungle Ranges, N.S.W. (Fig. 2).

**Habitat:** No information is available other than the collector's record that plants were growing in rock crevices.

**Notes:** The almost mature cypselas of this subspecies have ab/adaxial wings with particularly straight-sided teeth. This, together with the poorly formed longitudinal ridges on the lateral surfaces gives them a strong resemblance to cypselas found in some specimens of the *B. dentata* Gaudich. group. Indeed, I have wondered whether, at some stage in their curation, cypselas from another specimen have somehow been incorporated with Streimann 538. However, cypselas in many species of *Brachyscome* may alter considerably as they mature and, having removed several immature fruit from a head and examined them, I have concluded that all cypselas on this sheet are from the holotype specimen.

The more highly divided leaves make for ready identification of this taxon. Although there is variation throughout the species in the toothing of the winged cypselas and the length of the pappus, the combination of the comparatively narrow and many-toothed wings of the cypselas and the pappus which manifestly exceed the cypselas also support the formal recognition of this taxon as a distinct subspecies. Indeed, were it not for the fact that it is only known from one specimen, I may have recognised this taxon as a species.

### 8. *Brachyscome salkiniae* P.S.Short, sp. nov.

*Brachyscome aff. formosa* Entity 1, E.Salkin *et al.* (1995), *Austral. brachyscomes* 114, illustrations 115 (1995); P.S.Short in N.G.Walsh & Entwistle, *Fl. Victoria* 4: 841 (1999).

[*Brachyscome angustifolia* var. *heterophylla* auct. non (Benth.) G.L.R.Davis (1948): G.L.R.Davis, *Proc. Linn. Soc. New South Wales* 74: 149 (1949) p.p., as to Willis specimen; J.H.Willis, *Handb. pl. Victoria* 2: 669, 674 (1973).]

A *B. brownii*, *B. formosa*, *B. petrophila*, *B. sieberi* et *B. willisii* *cypselis alis* differt; *eadem etiam a B. procumbens in cypselis angustioribus* (1.0–1.3 mm latis, non 1.3–2.4 mm latis), *plerumque in paginis lateralibus cristis longitudinalibus, in foliis et caulinis pilis eglandulosis destitutis* differt.

Differs from *B. brownii*, *B. formosa*, *B. petrophila*, *B. sieberi* and *B. willisii* in having cypselas with wings; differs from *B. procumbens* in having narrower cypselas (1.0–1.3 mm wide, not 1.3–2.4 mm wide) with usually flange-like longitudinal ridges on the lateral surfaces, and in its leaves and stems lacking eglandular hairs.

**Type:** VICTORIA. Ivor's Track, 7 km north-west of Genoa, by Genoa River, 37° 20'S, 149° 25' 30"E, In dry open forest 50 m from Genoa River, 8 Nov. 1983, N.G. Walsh 1214 (holotype: MEL 1523514; isotype: CANB 349878).

Perennial, suckering (?rhizomatous) herb with prostrate to weakly ascending or shortly erect branches to c. 30 cm long, glabrous or with very occasional and easily overlooked stalked glandular hairs c. 0.04 mm long; eglandular hairs absent. Leaves basal and cauline or sometimes predominantly in a basal or near-basal cluster, alternate, green, glabrous or with occasional and easily overlooked stalked, glandular hairs 0.04–0.2 mm long and if at all common mainly on younger growth, all (or all but one or two) leaves tapering to distinct, petiole-like bases which may be up to c. 48 mm long in the lowermost leaves but diminishing in size along branches and as little as 5 mm long in the uppermost leaves; basal and at least the lower and mid-cauline leaves spatulate or linear-ob lanceolate to ob lanceolate in outline, 20–80 mm long, 8–21 mm wide, toothed or shortly lobed, sometimes trifid but mostly with a total of 5–14 teeth or lobes and each terminating in a blunt mucro, the largest lobes prominent and mostly extending c. 1/4 to 1/3 of the way to the midrib; upper-cauline leaves mostly similar to mid-cauline leaves but tending to be slightly smaller, only occasionally with an undivided ob lanceolate or linear-ob lanceolate leaf c. 5–30 mm long, 0.8–3.5



**Figure 10.** *Brachyscome procumbens* subsp. *wombelongensis* (holo: H. Streimann 538, CANB).

mm wide present on the flowering branch. *Capitula* c. 5–7 mm diam., on scapes manifestly exceeding the uppermost leaves. *Bracts* 12–25, in 1 or perhaps 2 ill-defined rows and of similar length, somewhat elliptic to narrowly elliptic, obovate or lanceolate, 2–4.7 mm long, 0.5–1.8 mm wide, apically subobtuse to acute, mainly herbaceous but with narrow, hyaline margins and apices, mostly glabrous or with occasional stalked, glandular hairs to c. 0.1 mm long on margins and midrib. *Receptacle* hemispherical to shortly conical, areolate, glabrous. *Ray florets* (12) 17–29; corolla 7.6–11.5 mm long, 0.7–1.7 mm wide, variously described as mauve, lilac or pink. *Disc florets* c. 50–60; corolla with tube 1.55–2 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, veins extending into and joining at the apex of the lobes. *Stamens* 5; filament collar 0.16–0.24 mm long, straight in outline or barely dilating towards the base but not or barely wider than the filament; anthers 1.07–1.4 mm long, microsporangia 0.84–1.14 mm long, apical appendages 0.14–0.34 mm long, obtuse. *Styles* 2.45–3.2 mm long, arms 0.62–0.9 mm long, stigmatic part 0.34–0.49 mm long, appendages somewhat widely triangular in outline, 0.22–0.41 mm long, shorter than the stigmatic part. *Cypselas* flat, obovate to oblanceolate, 2.1–3.4 mm long, 1.0–1.3 mm wide (including wings), with two, non-swollen, but often manifestly flange-like ridges on each lateral surface, the entire fruit mostly uniformly yellow brown although sometimes purplish about the apex and the carpodium usually paler; lateral surface of cypselas body smooth when immature but with 1–18 tubercles, well-developed tubercles somewhat conical, each with 1 (2) straight or very slightly curved, biseriate hairs, the hairs 0.06–0.13 mm long and the upper cells of equal length; ribs winged, the wings 0.1–0.5 mm wide and entire or with 1–5 usually shallow notches and with 20–36 straight or almost straight biseriate hairs (as on fruit body) along the length of each margin; carpodium a narrow rim 0.03–0.04 mm wide, whitish or in colour matching the fruit body. *Pappus* an uneven crown of c. 15–25 white or yellowish-white, basally united bristles 0.1–0.4 mm long, about the length or slightly exceeding the apical notch formed by the wings of the cypselae. *Chromosome number:* unknown. Fig. 11.

**Selected specimens examined: NEW SOUTH WALES.**

Nadgee Nature Reserve, 21 Jan. 1985, D.E. Albrecht 1490 (MEL); 11.5 km NNW of Narooma on the Princes Hwy, 28 Mar. 1975, R. Coveny 6187 (NSW). **VICTORIA.** Windy Ridge Track, Jones Creek area, 31 Jan. 1984, E.A. Chesterfield 64 (MEL); 5 km NE of Mount Drummer, 11 Dec. 1979, S.J. Forbes 512 (MEL); Weelon Creek, 15 Jan. 1953, R. Melville 2895 (K, MEL, NSW); Yambulla Peak Track. 0.5 km SW from the ford of Genoa River, 18 Nov. 1985, N.G. Walsh 1492 (CANB n.v., MEL, NSW, PERTH n.v.).

**Distribution:** Eastern and south-eastern slopes of the Great Dividing Range, from about Narooma in the extreme south-east of New South Wales to the Mallacoota region of eastern Victoria and, in that State, west to about Moe (Fig. 2).

**Habitat:** A species of woodland and forests dominated by species including *Allocasuarina littoralis* (Salisb.) L.A.S.Johnson, *Angophora floribunda* (Sm.) Sweet, *Backhousia myrtifolia* Hook.f. & Harvey, *Banksia serrata* L.f., *Eucalyptus baueriana* Schauer, *E. cypellocarpa* L.A.S.Johnson, *E. elata* Dehnh., *E. longifolia* Link, *E. muelleriana* A.W.Howitt, *E. sieberi* L.A.S.Johnson and *E. tereticornis* Sm. On sand and loam, and often noted to be either on river banks or river flats.

**Flowering period & reproductive biology:** Flowering is recorded for all months, except February, May and June, with the bulk of specimens collected from September to January. A pollen:ovule ratio of 2,845 has been determined for a single capitulum of *Walsh 1214*.

Salkin *et al.* (1995) recorded that 'seed' germinates in 12–40 days and that plants also readily grow from suckers.

**Cytology:** Not recorded.

**Etymology:** The epithet commemorates Esma Salkin, who had a passion for daisies and helped fund my studies of *Brachyscome*. It is only fitting that she be remembered in the name of one of our species.

**Notes:** As recorded by Salkin *et al.* (1995) the purple colouration observed for many of the species in this complex has not been noted for this species.

**9. *Brachyscome sieberi* DC., Prodr. 5: 306 (1836)**

Benth., *Fl. australiensis* 3: 520 (1867) p.p., seemingly excluding specimens from Port Jacksons (*Brown*) and others which the description suggests are of *B. mittagongensis*; ?C.Moore, *Handb. fl. N.S.W.* 264 (1893), in only citing Port Jackson may only refer to *B.*



**Figure 11.** *Brachyscome salkiniae* (holo: N.G. Walsh 1214, MEL).

*mittagongensis*; Maiden & Betche, *Census N.S.W.* pl. 197 (1916), presumably *p.p.* as citing Bentham (1867). **Type citation:** 'in Novâ-Hollandiâ, Sieb.! coll. exs. n. 485. *B. aculeata* Less. syn. [gen. Comp.] 192. excl. syn. Labill.' Lectotype (Davis 1948, p. 186, pl. ix no. 2 *p.p.*): Fl. New Holland, [dated] 1825, Sieber 485 (G-DC, mounted with Gunn 222 & 388 of *B. aculeata*). Isolectotypes: E (ex GL), K, W (4 sheets).

[*Brachyscome angustifolia* var. *heterophylla* auct. non (Benth.) G.L.R.Davis: Davis, *Proc. Linn. Soc. New South Wales* 73: 162 (1948) *p.p.*, as to cited specimens collected by Rupp (from Tamworth), Cambage (Murrurundi), Maiden (Stewarts Brook and Newcastle) and Hamilton (Newcastle); J.Everett in G.Harden, *Fl. N.S.W.* 3: 166 (1992) *p.p.*; E.Salkin et al., *Austral. brachyscomes* 40–43 (1995), *p.p.*, as to Barrington Tops specimens illustrated on p. 43.]

Perennial, rhizomatous *herb* with sprawling to weakly ascending or erect branches to c. 35 cm long, branches green or flushed purple or reddish-purple, mostly glabrous when mature but at least immature shoots may have a sparse to dense indumentum of stalked glandular hairs and septate, whitish, apparently eglandular hairs. Leaves basal and cauline, alternate, green or with reddish or purplish flushing, particularly on the under surfaces, mature leaves glabrous or with sparse, stalked glandular hairs and septate, eglandular hairs as found on the branches but immature leaves may have a pronounced indumentum of hairs; at least basal and usually some near-basal and sometimes a few mid-cauline leaves tapering to manifestly petiole-like bases (e.g. Carter MEL 116019), spatulate or obovate to narrowly obovate in outline, 12–80 mm long, 4–24 mm wide, the smallest entire but usually with a total of 2–9 lateral teeth or shallow obtuse to acute lobes formed by divisions extending to barely c. 1/8 the depth of the lamina; mid-cauline (usually) and upper cauline leaves lacking a petiole-like base, obovate to oblanceolate or somewhat obtriangular to cuneate in outline, 10–48 mm long, 2–22 mm wide, apically often 3-lobed (-dentate) but with a total of up to 9 marginal acute lobes, the lobes to c. 1/2 the depth of the lamina, less than 5mm long, well-spaced along the margins and occurring in c. the upper 3/4 of the lamina, bases decurrent and sometimes subamplexicaul (e.g. Salkin ADSG 75); uppermost cauline leaves lobed and although smaller otherwise resembling the upper leaves or sometimes entire, linear-oblanceolate, c. 8–12

mm long, c. 0.1 mm wide. *Capitula* c. 4–7 mm diam., on scapes manifestly exceeding the upper leaves. *Bracts* 15–27, overlapping, ovate to lanceolate, elliptic to narrowly elliptic or obovate to oblanceolate but apices subobtuse to acute, 2.35–4.3 mm long, 0.6–1.25 mm wide, mainly herbaceous but with hyaline margins and apex, the apex and upper margins sometimes purplish; stereome entire or sometimes divided, glabrous or with few to many stalked glandular hairs 0.03–0.18 mm long. *Receptacle* subconical or hemispherical, smooth except for base of pedicels, glabrous. *Ray florets* c. 18–31; corolla 7.4–11.5 mm long, 1.5–1.9 mm wide, veins 4 (5), apically entire or minutely 2- or 3-toothed, upper surface shades of pink or perhaps mauve-pink, lower surfaces at least sometimes whitish or straw-coloured. *Disc florets* 34–41; corolla with tube 1.7–2.45 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, veins extending into and joining at the apex of the lobes. *Stamens* 5; filament collar straight in outline, 0.23–0.31 mm long, composed of uniform cells and basally not thicker than the filament; anthers 1.01–1.35 mm long, microsporangia 0.9–1.1 mm long, apical appendages 0.19–0.26 mm long, base obtuse, endothelial tissue radial; pollen grains c. 2,300–3,750 per floret. *Styles* c. 2.55–2.9 mm long; arms 0.6–0.77 mm long, stigmatic part 0.33–0.42 mm long, appendages somewhat triangular in outline, 0.24–0.42 mm long, slightly shorter to longer than the stigmatic part. *Cypselas* flat, obovate, straight or slightly curved, 1.8–2.4 mm long, 0.95–1.25 mm wide, with two, non-swollen ridges on each lateral surface, yellow-brown, green-grey or a mixture of both colours; lateral surfaces of cypsela body with 32–56 conspicuous distinct or slightly coalescing tubercles, each tubercle terminating in an eglandular hair, the hairs straight or curved throughout the length or only curving in the upper part, biserrate, apically with one cell slightly exceeding the other, 1–2.2 mm long; ribs unwinged, their margins smooth or slightly uneven, tubercles and hairs absent; carpopodium a narrow rim c. 0.05 mm wide, whitish. *Pappus* a ring of bristles joined at the base and forming a crown 0.25–0.4 mm high. *Chromosome number:*  $n = 5$ . Fig. 12.

**Selected specimens examined: NEW SOUTH WALES.**  
headwaters of Manning River, 6 Apr. 1949, E.J. Reik 16 (CANB 21477); Tamworth, Nov. 1904, H.M. Rupp (NSW 15185); Stewarts

Forest, 1 Feb. 1993, P.S. Short 3979 *et al.* (AD, BRI, CANB, MEL, NSW, TI); foot of Hanging Rock, 6 km ESE of Nundle, 6 Oct. 1973, I.R. Telford 3570A (CBG 050106); track from Polblue Ck to Mt Barrington, Barrington Tops, 11 Feb. 1971, I.R. Telford 2712 (CBG 047288).

**Distribution:** New South Wales, extending from the vicinity of Newcastle north to the Moonbi Range and inland to about Bundulla, *i.e.* between c. 30° and 33° S, and east of 150° E. As localities include Bundulla State Forest, Stewarts Brook State Forest, Moonan State Forest, Warrabah N.P. and Barrington Tops N.P., the species is presumably adequately protected (Fig. 4).

**Habitat:** Predominantly found in wet sclerophyll forest dominated by species such as *Eucalyptus dalrympleana* Maiden and *E. pauciflora* Sieber ex Spreng. and with grass or herbaceous undergrowth. Also recorded (*Salkin 80*) from shrubland dominated by species of *Cassinia* R.Br. and *Callitris* Vent. Grows in sandy and clay loam.

**Phenology and reproductive biology:** Flowering specimens have been collected from August through to April. Pollen:ovule ratios ranging from 1,742–2,426 have been recorded from five plants of *Short 3979*.

**Cytology:** A chromosome number of  $n = 5$  ( $2n = 10$ ) has been determined for this species from a population in Stewart Forest and another at Polblue Picnic site, both in Barrington Tops State Forest (Watanabe *et al.* 1996, as *B. sp. aff. angustifolia*).

Contrary to the record in Watanabe *et al.* (1996) there is no voucher for the Polblue Picnic site population, the cited specimen *Short 3981* being a voucher for a form of *B. diversifolia* with  $n = 18$ .

**Notes:** The name *B. sieberi* was considered by Davis (1948) to be a synonym of *B. aculeata*, while Stace (1981) excluded it from *B. aculeata* and suggested that it may be referable to *B. marginata* Benth. (= *B. dentata* Gaudich.). It is undoubtedly a member of the *B. linearifolia* group and the close relationship was seemingly apparent to Bentham (1867) who, in a note accompanying his account of *B. heterophylla* (= *B. linearifolia*) differentiated two component entities from *B. sieberi*.

The colour of the ray corollas has been variously described by collectors as mauve, pink-mauve, pale purple, purple, mauve to pink and pink. In the field I have recorded them as being pink above and straw-coloured or pinkish below, an observation supported

by *Salkin 80* in which the rays were recorded as being 'bright pink, buff reverse' although the same collector (*Salkin ADSG 75*) also recorded the rays as having a 'cerise upper surface, white lower surface'.

*Salkin* (1994) illustrated the leaves of this species from specimens collected from Barrington Tops and Warrabah N.P.; other leaf illustrations she presented are of *B. kaputarensis*.

## 10. *Brachyscome willisii* P.S.Short, sp. nov.

*Brachyscome aff. formosa* Entity 2, E.Salkin *et al.*, *Austral. brachyscomes* 114, illustrations 116 (1995); P.S.Short in N.G.Walsh & Entwistle, *Fl. Victoria* 4: 841 (1999).

[?]*Brachyscome angustifolia* auct. non DC.: J.H.Willis, *Handb. pl. Victoria* 2: 669 (1973) p.p., as to specimens from 'far north-east at Mt. Granya & Pine Mountain', the original statement ambiguous and perhaps meaning to refer them to *B. angustifolia* var. *heterophylla*.]

[*Brachyscome angustifolia* var. *heterophylla* auct. non (Benth.) G.L.R.Davis: J.Everett in G.Harden, *Fl. N.S.W.* 3: 166 (1992) p.p.]

[*Brachyscome petrophila* auct. non G.L.R. Davis: J.H.Willis, *Handb. pl. Victoria* 2: 671 (1973) p.p., as to specimens from 'Omeo and Beechworth ... referred with hesitation to *B. petrophila*'.]

*B. brownii*, *B. formosae*, *B. petrophilae* et *B. sieberi similis cypselis alis destitutis*, sed a *B. petrophila* differt *foliis plerumque basibus petiolos simulantibus*; *eadem* a *B. brownii* et *B. formosa* differt in *ramis* et *foliis pilis albidis septatis eglandulosis*; *eadem* a *B. sieberi* differt *foliis superis* et *eis in medio caulis divisionibus primariis tribus ad undecim 1/4–7/8 ad costam distantiae extensis, lobis consequentibus obtusis ad acutis minimum aliquot lobis primariis vel dente uno vel dentibus duobus*.

Similar to *B. brownii*, *B. formosa*, *B. petrophila* and *B. sieberi* in the cypelas lacking ab/adaxial wings; differs from *B. petrophila* in having leaves which mostly have petiole-like bases; differs from *B. brownii* and *B. formosa* in having whitish septiculate eglandular hairs on branches and leaves; differs from *B. sieberi* in having mid-cauline and upper leaves with 3–11 primary divisions extending c. 1/4 to 7/8 the distance to the midrib, the resultant lobes obtuse to acute and at least some primary (major) lobes with 1 or 2 lateral teeth.

**Type: VICTORIA.** Mt Granya, 35 km east of Wodonga, mountain forest on S. slope of summit, 18



**Figure 12.** *Brachyscome sieberi* (P.S. Short 3979 et al., MEL).

Nov. 1964, J.H. Willis (holotype: MEL 502478; isotypes: CANB 467949, MEL 239735, NSW 229916).

Perennial rhizomatous *herb*, weakly ascending to erect, major branches to c. 25 cm long, with a sparse to conspicuous vestiture of whitish eglandular and glandular septate hairs c. 0.3–0.5 mm long; roots at least occasionally long-cylindrical and somewhat fleshy when fresh. Leaves cauline or mostly in a near-basal rosette, obovate to oblanceolate or spatulate in outline, 20–70 mm long, 8–20 mm wide, at least the basal leaves usually with petiole-like bases although tending to dilate towards the base in at least the upper leaves and the base sometimes subamplexicaul; all leaves with 3–11 primary divisions extending c. 1/4 to 7/8 the distance to the midrib, the resultant lobes obtuse to acute; the major lobes entire or with 1 or 2 lateral teeth, all leaves with 3–25 ultimate segments; all leaves green and with a sparse to dense vestiture of septate eglandular and glandular hairs 0.2–0.7 mm long. *Capitula* c. 5–8 mm diam., on scapes usually manifestly exceeding the uppermost leaves but sometimes at flowering about the length of the upper leaf (e.g. Beaglehole 88575). *Bracts* 15–25, in c. 1 row and of similar length, obovate to oblanceolate in outline and 3.3–5.2 mm long, 1.1–1.7 mm wide but apices acute to acuminate, mainly herbaceous but with narrow, often purplish, hyaline margins, glabrous or with scattered septate glandular hairs. *Receptacle* hemispherical to shortly conical, areolate, glabrous. *Ray florets* 18–35; corolla 6.7–7.5 mm long, 0.85–1.5 mm wide, white or variously described as lilac, mauve, purplish or pink, apically entire or barely and minutely 2-lobed, veins usually 4, sometimes with 1 or 2 additional veins but these not extending to and uniting apically with other veins. *Disc florets* c. 40 or more in larger capitula; corolla 1.85–2.3 mm long, externally with scattered, long, glandular hairs, 5-lobed, yellow, lobes lacking apical hairs, veins extending into and joining at the apex of the lobes. *Stamens* 5; filament collar 0.23–0.27 mm long, straight in outline and not wider than the filament; anthers 1.12–1.35 mm long, microsporangia 0.89–1.0 mm long, apical appendages c. 0.35 mm long. *Styles* 2.8–3.2 mm long, arms c. 0.85 mm long, stigmatic part 0.52–0.6 mm long, appendages somewhat triangular in outline, 0.26–0.34 mm long, shorter than the stigmatic part. *Cypselas* flat, straight or slightly curved along their length, obovate to oblanceolate, 2.1–2.4 mm long, 0.7–1.3 mm wide,

with two, non-swollen, sometimes distinctly flange-like ridges on each lateral surface, uniformly pale brown; lateral surface of cypselas body with 9–24 tubercles, mature tubercles somewhat conical and usually distinct but sometimes several basally united, each tubercle with a straight or slightly curved biseriate hair, the hairs 0.06–0.09 mm long and the upper cells of equal length; stalked glandular hairs, several only, observed near the base of some immature fruit; longitudinal ridges and ribs smooth to somewhat tuberculate; carpopodium a pale yellowish brown narrow rim c. 0.04 mm wide. *Pappus* an uneven crown of c. 10–15 white, smooth bristles 0.18–0.44 mm long which are barely united in a basal ring. *Chromosome number*:  $n = 18$  (see note below). Fig. 13.

**Selected specimens examined: NEW SOUTH WALES.** Top Creek property, c. 27.5 km NNW of Boorowa, 30 Oct. 1985, P. Beesley 476 (MEL); Abercrombie Caves, 22 March 1955, E.F. Constable (NSW 31212); Mt Costigan, 22 Oct. 1958, E.F. Constable (MEL 2035492, NSW 55987); Milepost 21 m [iles from] Cowra, 23 m [iles from] Young, 27 Aug. 1969, S. Smith-White & C. Carter 5375–5380 (SYD). **AUSTRALIAN CAPITAL TERRITORY.** Namadgi N.P., Naas River, 6 km SSE of Booth's Hill, 26 Jan. 1989, P. Gilmour 7010 (CBG, MEL, NSW). **VICTORIA.** Bundara River crossing of the Omeo-Tallangatta road, 2.7 km by road from Anglers Rest, 1 Oct. 1985, D.E. Albrecht 1985 (MEL); Jarvis Creek Plateau Regional Park, 29 Oct. 1987, A.C. Beaglehole 89806 (MEL); Boweya, 15 Oct. 1980, A. Halls (MEL 595565); 17 km NW from Wangaratta in Killawarra Forest, 3 Nov. 1986, A.D.J. Piesse 798 (MEL).

**Distribution:** From about Orange in New South Wales south along the Great Dividing Range, through the Australian Capital Territory, to the lower hills of the Omeo district in Victoria, and in that State, as far west as the Wangaratta area, including the Killawarra Forest (Fig. 2).

**Habitat:** A species of eucalypt woodland and forest, often with a grassy understorey. Dominant trees include *Eucalyptus bridgesiana* R.T.Baker, *E. dalrympleana* Maiden, *E. dives* Schauer, *E. goniocalyx* F.Muell., *E. macrorhyncha* F.Muell. ex Benth., *E. mannifera* Mudie, *E. pauciflora* Sieber ex Spreng. and *E. rubida* H.Deane & Maiden.

**Phenology and reproductive biology:** Recorded as flowering from September to November in the wild. Salkin *et al.* (1995, p. 114) recorded that cultivated specimens 'need a mycorrhizal association to reach their full potential' and that the flowering period is



**Figure 13.** *Brachyscome willisii* (holo: J.H. Willis s.n., MEL 502478).

short. A pollen:ovule ratio of 2,626 was recorded for a single capitulum taken from an isotype specimen (CANB 467949).

Salkin *et al.* (1995) recorded that germination takes 12–45 days.

**Cytology:** As evident from annotations on voucher specimens, Smith-White or one of his colleagues determined a haploid number of  $n = 18$  (including multivalents) for this taxon. The vouchers are *Smith-White & Carter 5376 & 5377* (SYD) and were collected between Cowra and Young. The determination does not seem to have been published.

**Etymology:** Named after renowned Victorian botanist, Dr James Hamlyn Willis (1910–1995). Jim corresponded with Gwenda Davis about the identity of specimens of this species, copies of letters being attached to MEL 220872–MEL 220874. I have little doubt that he believed it to be a distinct species, albeit referring it to *B. angustifolia* in his *A Handbook to Plants in Victoria* (Willis 1973). Jim was also of great assistance to Davis in regard to the recognition and original description of other species of *Brachyscome* (Davis 1955).

**Notes:** This species is the taxon referred to by Salkin *et al.* (1995) as *Brachyscome* aff. *formosa* Entity 2. I have not seen a specimen cited by them as coming from Neville, N.S.W. and on which one of the illustrations of fruit in that work is based. In general morphology it seems a good match for this species but several of the hairs seem to be apically incurled, not straight. They may, perhaps, be stalked glandular hairs, not eglandular hairs, but these are generally absent from mature fruit.

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