

The classification of Australian species currently included in *Helipterum* (Asteraceae: Gnaphalieae): Part 2 *Leucochrysum*

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Abstract

Wilson, Paul G. The classification of Australian species currently included in *Helipterum* (Asteraceae: Gnaphalieae): Part 2 *Leucochrysum*. Nuytsia 8(3): 439-446 (1992). A new endemic Australian genus, *Leucochrysum* (DC.) Paul G. Wilson, is described to accommodate *Helipterum stipitatum*, *H. fitzgibbonii*, and most of the taxa previously referred to the *H. albicans* group. New combinations are effected to accommodate the five species and five infraspecific taxa.

Introduction

The application of the name *Helipterum* DC. was discussed in a previous paper (Wilson 1989), while the fact that it is an unnatural genus as currently circumscribed has been indicated by a number of workers in the group (e.g. Hilliard & Burt 1981, Anderberg 1989, 1991, Wilson 1989). In this paper I have segregated from *Helipterum* some species that are closely related to each other and that I consider to be clearly generically distinct from other species currently included in *Helipterum* or *Helichrysum*, or in any of the genera recently separated from them. Since this paper is a precursor to a treatment in the Flora of Australia, and since only new combinations are involved, descriptions are not provided for the specific or infraspecific taxa.

Historical

When discussing the rationale for accepting the as then unpublished name *Helipterum*, that had been proposed in litt. by Augustin de Candolle, Bentham (1837) suggested that *Helichrysum cotula* Benth., *H. anthemoides* Spreng., and possibly *H. incanum* Hook., should be placed in *Helipterum*, either treating it as a section of *Helichrysum* or as a new genus. De Candolle (1838) subsequently published the name *Helipterum* as a genus and partly followed Bentham's suggestion of species affinities by placing *H. incanum* and *H. cotula* in his new section *Leucochrysum* along with two other species that are now recognised (Wilson 1960) as being conspecific with *H. incanum*. Bentham (1867) placed these species and a number of others, including *H. stipitatum*, in *Helipterum* sect. *Euhelipterum*. Subsequent Australian botanists have included in *Helipterum*, without reference to a

section, all the species here placed in *Leucochrysum*. Recently Anderberg (1991) noted that most of the Australian species of *Helipterum* should be placed in *Rhodanthe* Lindley but he indicated that 'a group of five species including *H. fitzgibbonii*, *H. albicans*, *H. stipitatum*, *H. molle*, and *H. saxatile* share a number of apomorphic features with the genus *Waitzia*' and 'deserve to be considered in an overall study of the species of the *Waitzia* generic group.' I agree with Anderberg's assessment of relationships (except that I exclude *H. saxatile*) and recognise the close affinity between *Waitzia* and *Leucochrysum*.

Generic affinities

The genus *Leucochrysum* differs from other Australian species-groups in *Helipterum* in having stipe-like claws to the involucre bracts (Figure 1A), a glabrous, translucent two-layered pericarp (Short *et al.* 1989, Figures 7b, 11c), a firm testa that is distinct from the pericarp, straight firm anther tails, and a broad deltoid or broad ovoid style apex with a thick vascular strand that forms a club-shaped mass in the tip (Figure 1G). Short *et al.* (1989) in a discussion on the fruit anatomy of various members of the Australian Gnaphalieae noted that the achene anatomy of *Helipterum albicans* differed from other members of *Helipterum* that had been studied and suggested that it and its close relatives should be recognised as a distinct genus.

The capitula of the *Leucochrysum* species resemble those found in a number of Australian species currently placed in *Helichrysum*, such as *Helichrysum elatum* DC., *H. boormanii* Maiden & Betche, and *H. collinum* DC. that form part of the section *Blepharolepis*. These species also have a terete claw to the involucre bracts; however, the species differ in having a pericarp with paired myxogenic cells that are formed by a periclinal division (anticlinal in other species-groups), a thin smooth testa with narrow-oblong thin-walled cells, a rounded to long-acuminate style apex with a slender vascular strand that terminates below the apex, an anther appendage with thick-walled cells, barbellate pappus bristles (shortly plumose in *Leucochrysum*), and undivided stereome to the involucre bracts.

The indumentum, involucre, corolla, anthers, and style of *Leucochrysum* (see below) are morphologically similar to those found in *Waitzia* and it is to this genus that *Leucochrysum* is most closely related, as has been recognised by Anderberg (see above).

The species of *Waitzia s.str.* (Wilson 1992) differ in having an elongated neck to the achene, 2-celled achenial papillae in which the lower cell overtops the upper, and pappus bristles that are barbellate and are shed as a unit from the achene. They also have branched stems with the capitula terminating the lateral branches.

In a treatment of the *Helipterum albicans* group (Wilson 1960) the superficially similar species *Helipterum saxatile* was described. It is not here included in the *Helipterum albicans* group since it differs in having concavo-convex claws to the involucre bracts, a slender cylindrical corolla with strongly undulate thickened cell walls of the inner epidermis and vascular strands extending to the apex of the lobes, a pericarp with papillose paired (by anticlinal division) slime cells, a small rounded style apex, and lanceolate anther appendages with thick cell walls. It is apparently related to *Helichrysum podolepidium* F. Muell. [*Chrysocephalum podolepidium* (F. Muell.) Anderberg] whose taxonomic position in relation to genera in the *Helipterum* complex will be discussed in a separate paper.

Taxonomic treatment

Leucochrysum (DC.) Paul G. Wilson, gen. et comb. nov.

Helipterum sect. *Leucochrysum* DC., Prod. 6:215(1838). *Lectotype* (here chosen): *Helipterum albicans* (Cunn.) DC. (see below).

Annual or perennial erect herbs branching at or above the base, sparsely to densely glandular stipitate on branches and leaves, frequently woolly. Leaves alternate, simple, entire, slender terete to oblong or obovate. Capitula solitary on slender leafless peduncles arising from apex of branches. Involucre hemispherical; intermediate bracts with terete glandular stipe-like claws and petaloid laminae; innermost two series with linear $\pm$ flat claws and very small laminae; the outer bracts in some species sessile. Receptacle flat, epaleate. Florets bisexual, actinomorphic. Corolla tubular below, narrowly turbinate or narrowly cup-shaped above, shortly 5-lobed, very sparsely puberulous; vascular strand terminating below lobes. Anther appendage ovate, cells narrow-oblong, walls somewhat thickened; marginal cells differentiated; anther tails firm, slightly branched at ends. Style apex deltoid or broad-ovate, the vascular strand thick and clavate in the apex. Achene ellipsoidal; surface prominently undulate or plane; carpopodium very short, 1 cell high; pericarp thick, 2-layered, glabrous, translucent, cells linear, vascular strands laterally placed with respect to cotyledons; testa free from pericarp, somewhat thick, epidermal cells $\pm$ equilateral or oblong, with straight walls; vascular strand laterally placed terminating in tip of seed. Pappus bristles equal to corolla, broad and weakly connate at base, shortly plumose with acute cilia, eventually breaking shortly above base.

Five species endemic to temperate Australia. For distribution notes on taxa other than *L. stipitatum* see Wilson (1960).

Note 1. DeCandolle included the following species in his section *Leucochrysum*: *Helipterum incanum* (Hook.) DC., *H. bicolorum* DC., *H. albicans* (Cunn.) DC., and *H. cotula* (Benth.) DC. The first three taxa are now considered to be conspecific and are referred here to *Leucochrysum albicans* while *H. cotula* is now (Wilson 1989) treated as a member of the genus *Hyalosperma*. In the sectional description de Candolle stated that the involucre bracts were stipitate: this is correct for *H. albicans* but not for *H. cotula* and for this reason it would be inappropriate to designate the latter as lectotype.

Note 2. The concept that Bentham (1837) validly published the name *Helichrysum* sect. *Helipterum*, basing it on *Helichrysum cotula* Benth., *H. anthemoides* Spreng., and (with doubt) *H. incanum* Hook. is discussed by Wilson (1989) but not accepted.

Key to species

1. Stem much branched, the lateral branches terminating in capitula; outer bracts dark reddish brown, not needle-like *L. fitzgibbonii*
1. Stem branched only near base; peduncles long and arising from near base of plant; outer bracts pale or needle-like
 2. Outer involucre bracts needle-like *L. stipitatum*
 2. Outer involucre bracts with an obvious flattened lamina

- 3. Leaves filiform, tightly revolute, congested, glabrescent *L. graminifolium*
- 3. Leaves oblong or obovate or, if filiform, not tightly revolute, congested or loosely arranged along stem, woolly
 - 4. Plant annual; lamina of intermediate involucre bracts broad-ovate to suborbicular, pale yellow; leaves linear to narrow-oblong or narrow-obovate *L. molle*
 - 4. Plant perennial; lamina of intermediate involucre bracts very narrow-obovate to obovate, if deltate then with red streaks *L. albicans*

Leucochrysum albicans (Cunn.) Paul G. Wilson, comb. nov.

Helichrysum albicans Cunn. in Field, Geog. Mem. New South Wales 359(1825) '*Elichrysum*'. - *Helipterum albicans* (Cunn.) DC., Prod. 6:215(1838). - *Argyrocome albicans* (Cunn.) Kuntze, Revis. Gen. Pl. 1:308(1891). - *Roccardia albicans* (Cunn.) Voss, Vilm. Blumeng. ed. 3, 1:532(1895). *Lectotype*: Forest Land, Cox's River, 9 Oct.1822, A. Cunningham 71 (K, ?iso: MEL) *fide* Wilson (1960).

Helichrysum incanum Hook., Bot. Mag. t.2881(1829). - *Aphelexis incana* (Hook.) G. Don in Sweet, Hort. Brit. ed.3, 379(1839). *Lectotype*: *op. cit.* t. 2881, *fide* Wilson (1960).

Helipterum incanum DC., Prod. 6:215(1838). *Type*: Van diemen, R.C. Gunn 108, comm. Lindley in 1834 (holo: G-DC, photo seen), *nom. superfl.*

Helipterum bicolorum Cunn. ex DC., Prod. 6:215(1838). *Lectotype*: Hills of the Lachlan River, 31 July 1817 (holo: G-DC, photo seen) *fide* Wilson (1960).

Key to infraspecific taxa

- 1. Leaves obovate, densely woolly subsp. *alpinum*
- 1. Leaves filiform to narrow-oblong or narrow-obovate, thin, moderately woolly subsp. *albicans*
- 2. Inner involucre bracts white var. *tricolor*
- 2. Inner involucre bracts yellow
 - 3. Intermediate involucre bracts ovate to oblong, obtuse to acute var. *albicans*
 - 3. Intermediate involucre bracts broadly ovate to deltate or orbicular, acute var. *buffaloensis*

subsp. **albicans**

var. **albicans**

Helipterum incanum var. *flavidiceps* F. Muell., Rep. Pl. Babbage's Exped.14(1859). *Lectotype*: Subalpine plains on the Snowy River, F.Mueller (K, iso: MEL) *fide* Wilson (1960).

Helipterum incanum var. *auriceps* F. Muell., Rep. Pl. Babbage's Exped. 14(1859). Type citation: 'In many of the arid plains and mountains of Australia Felix and in the northern parts of South Australia'. *Lectotype* not designated.

Helipterum incanum var. *filifolium* F. Muell., Rep. Pl. Babbage's Exped. 14(1859). *Lectotype*: Station Peak, You Yangs Mts, Victoria, F. Mueller (MEL, iso: K) *fide* Wilson (1960).

var. **buffaloensis** (Paul G. Wilson) Paul G. Wilson, comb. nov.

Helipterum albicans var. *buffaloensis* Paul G. Wilson, Trans. Roy. Soc. South Austral. 83:170(1960). Type: Mt Buffalo, Victoria, 10 Nov. 1955, E. Gauba (holo: GAUBA).

var. **tricolor** (DC.) Paul G. Wilson, comb. nov.

Helipterum incanum var. *tricolor* DC., Prod. 6:215(1838), Type: based on *Helichrysum incanum* Hook.

Helichrysum incanum Hook., Bot. Mag. t. 2881(1829). - *Helipterum albicans* var. *incanum* (Hook.) Paul G. Wilson, Trans. Roy. Soc. South Austral. 83:170(1960).

Helipterum incanum DC., Prod. 6:215(1838), *nom. superfl.*

Helipterum bicolorum DC., Prod. 6:215(1838). - *Roccardia albicans* f. *bicolorum* (DC.) Voss, Vilm. Blumeng. ed. 3, 1:532(1895). Type: see above.

Helipterum incanum var. *purpureo-album* F. Muell., Rep. Pl. Babbage's Exped. 14(1859). - *H. albicans* f. *purpureo-album* (F. Muell.) Paul G. Wilson, Trans. Roy. Soc. South Austral. 83:172(1960). *Lectotype*: Maneroo Plains, 1855, F. Mueller (MEL), *fide* Wilson *l.c.*

Helipterum albicans f. *grampianum* Paul G. Wilson, *op. cit.* 172. Type: Skipton Plains, 1860, W.J. Whan 39 (holo: MEL; iso: NSW).

subsp. **alpinum** (F. Muell.) Paul G. Wilson, comb. nov.

Helipterum incanum var. *alpinum* F. Muell., Rep. Pl. Babbage's Exped. 14(1859). - *H. albicans* subsp. *alpinum* (F. Muell.) Paul G. Wilson, *op. cit.* 174. Type: Summit of the Australian Alps, F. Mueller (holo: MEL; iso: K, NSW).

Note: When revising the *Helipterum albicans* complex (Wilson 1960), I assumed that *Helipterum incanum* DC. (1838) represented a new combination based on *Helichrysum incanum* Hook. (1829), a name that de Candolle had placed in synonymy under *Helipterum incanum* var. *tricolor* DC. After discussion with my colleague Gillian Perry I have decided that this assumption was incorrect. I now consider that *Helipterum incanum* DC. was published as a new species; the name was, however, superfluous and illegitimate since a previously published species name was cited under one of its varieties (i.e. under var. *tricolor*). The epithet var. *tricolor* is therefore legitimate but it does not create the autonym 'var. *incanum*' since the species name to which it was applied was not legitimate. The epithet var. *tricolor* therefore has priority over its synonym var. *incanum* (Hook.) Paul G. Wilson (1960).

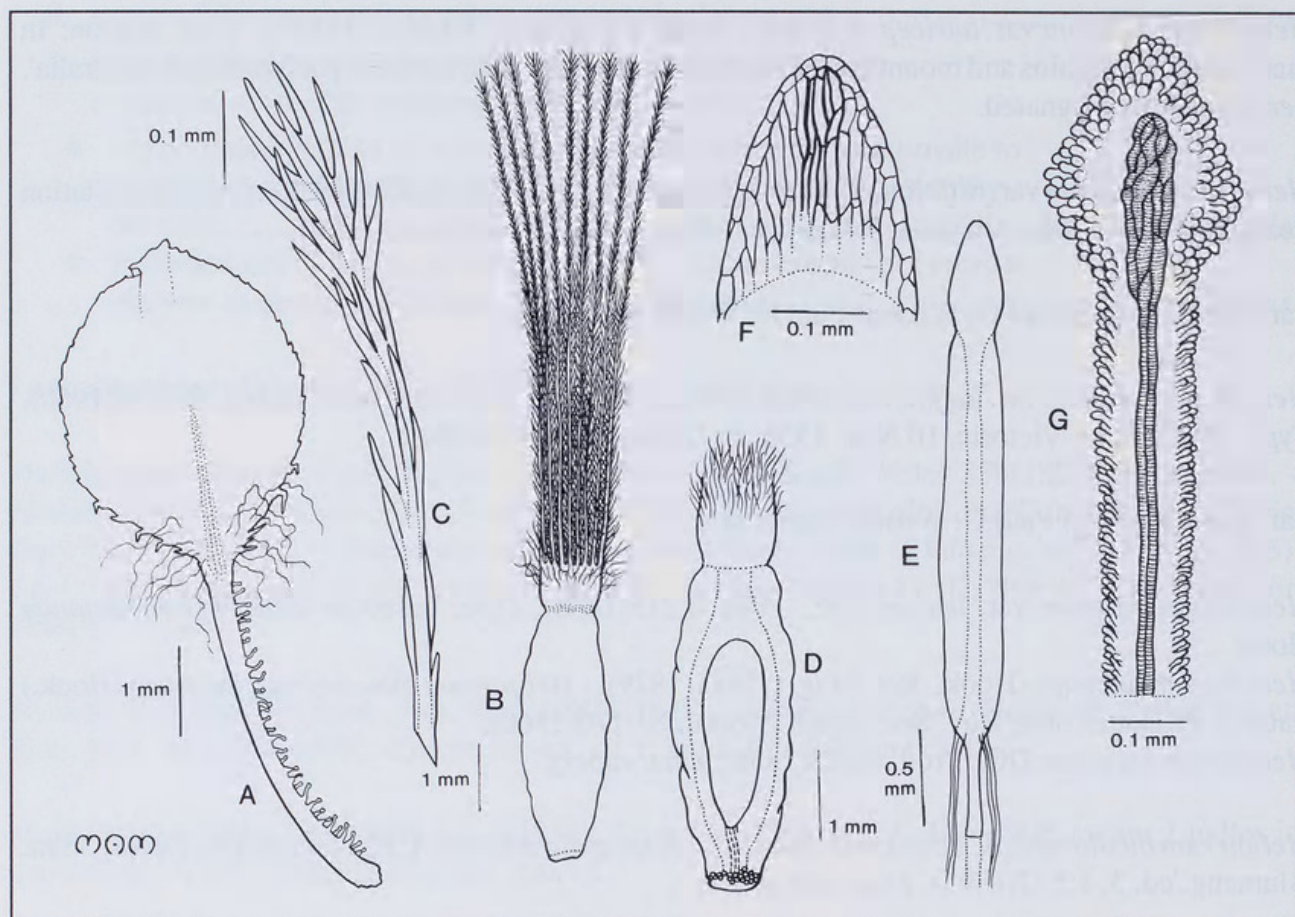


Figure 1. *Leucochrysum stipitatum*. A - Intermediate involucre bract. B - Achene with pappus. C - Apex of pappus bristle. D - Achene after pappus bristles have broken near base. E - Anther. F - Terminal portion of anther appendage. G - Style branch and apex showing thick vascular strand. From H. Demarz 2786.

***Leucochrysum fitzgibbonii* (F. Muell.) Paul G. Wilson, comb. nov.**

Helipserum fitzgibbonii F. Muell. Victorian Nat. 7:38 (July 1890); Trans. & Proc. Roy. Soc. South Australia 13:170 (Dec. 1890); Bot. Centralbl. 43:276(1890), *op.cit.* 45:122(1891). Type citation: 'Tempe Downs, R. Thornton; near Georgina-River, Alfr. Henry; Finke-river, Rev. H. Kempe; Lady Charlotte's Waters and west of Eringa, W. Tietkens; Nullarbor-Plains, J. Batt; Mount Moore, Edwin Merrall; remotest eastern sources of Swan-River, Miss Alice Eaton.' *Lectotype* (here chosen): Finke River, Kempe 408 (MEL 110456).

Distribution. Central Western Australia, far north South Australia, and southern Northern Territory.

***Leucochrysum graminifolium* (Paul G. Wilson) Paul G. Wilson, comb. nov.**

Helipterum albicans var. *graminifolium* Paul G. Wilson, Trans. Roy. Soc. South Austral. 83: 171 (1960). Type: Clarence-Wolgan Road, New South Wales, 26 Feb. 1939, W.F. Blakely, J. and W.J. Buckingham 3306 (holo: NSW; iso: AD).

This species is evidently found on sandstone cliffs in a small area c. 40 km north of Lithgow in New South Wales.

Although very similar to narrow-leaved variants of *L. albicans* it differs significantly in its almost silky indumentum, in its tightly revolute leaves that (unlike those of *L. albicans*) lack chlorenchymatous tissue beneath the thickened midrib, and in having 2-celled myxogenic papillae on the achene (these absent in *L. albicans*).

Leucochrysum molle (Cunn. ex DC.) Paul G. Wilson, comb. nov.

Helichrysum molle A.Cunn. ex DC., Prod. 6:194(1838). - *Helipterum molle* (Cunn. ex DC.) Paul G. Wilson, Trans. Roy. Soc. South Austral. 83:175(1960). - *Gnaphalium molle* (Cunn. ex DC.) Schultz-Bip., Bot. Zeitung (Berlin) 3:171(1845) *nom. illeg.* *Lectotype*: Molle's Plains, Lachlan River, New South Wales, July 1817, A. Cunningham (G-DC photo seen) *fide* Wilson (1960).

Waitzia brachyrrhyncha F. Muell., Linnaea 25:407 (April 1853). - *Helipterum brachyrrhynchum* (F. Muell.) Sonder, Linnaea 25:517 (June 1853). - *Helichrysum brachyrrhynchum* (F. Muell.) Baillon, Dict. Bot. 3:27(1891). - *Roccardia albicans* f. *brachyrrhyncha* (F. Muell.) Voss, Vilm. Blumeng. 3rd edn, 1:532 (1895). *Lectotype*: Cudnaka, South Australia, F. Mueller (MEL) *fide* Wilson (1960).

Helipterum incanum var. *brachylepis* F. Muell., Rep. Pl. Babbage's Exped. Type citation: 'Flinders Ranges, &c.' *Lectotype* (here chosen): Cudnaka, F. Mueller (MEL, holotype of *Waitzia brachyrrhyncha*).

Leucochrysum stipitatum (F. Muell.) Paul G. Wilson, comb. nov. (Figure 1)

Helipterum stipitatum (F. Muell.) Benth., Fl. Austral. 3:643(1867). - *Helichrysum stipitatum* F. Muell., Fragm. 3:133(1863). - *Argyrocome stipitata* (F. Muell.) Kuntze, Revis. Gen. Pl. 1:309 (1891). *Type*: Finke River, Central Australia, J. Macd. Stuart (holo: MEL 110722).

Distribution. Central Western Australia east to central and northern South Australia, southern Northern Territory, and south west Queensland.

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