

EUCHITON (ASTERACEAE: GNAPHALIEAE) IN NORTH AMERICA AND HAWAII

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ABSTRACT

Euchiton is treated apart from *Gnaphalium* primarily on the basis of its tendency for stolon production and cypselar surfaces with paired, non-mucilaginous epidermal papillae. Three species of *Euchiton* are recorded in North America: *E. sphaericus* (naturalized in California and Oregon), *E. gymnocephalus* (naturalized in California and Oregon), and *E. involucratus* (apparent waif in California and Massachusetts, the first published report of this species in North America). The first two species also are naturalized in Hawaii. A nomenclatural and ecological summary is presented for each species and a key clarifies their identifications, which have been confused in North America.

RESUMEN

Euchiton Se trata como diferente de *Gnaphalium* primariamente en base a su tendencia a la producción de estolones y superficie de las cipselas con papilas epidérmicas pareadas y no mucilaginosas. Se han citado tres especies de *Euchiton* en Norte América: *E. sphaericus* (naturalizada en California y Oregón), *E. gymnocephalus* (naturalizada en California y Oregón), y *E. involucratus* (aparentemente abandonada en California y Massachusetts, es la primera cita de esta especie en Norte América). Las dos primeras especies están también naturalizadas en Hawaii. Se presenta un resumen nomenclatural y ecológico de cada especie y una clave clarifica sus identificaciones, que han sido confusas en Norte América.

Euchiton is treated apart from *Gnaphalium* primarily on the basis of its tendency for stolon production and cypselar surfaces with paired, non-mucilaginous epidermal papillae (Anderberg 1991). The plants are mostly perennial and produce heads in terminal, capitate clusters immediately subtended by a whorl of leafy bracts. The distinctiveness of the group was emphasized by Drury (1972) and Holub (1974); nomenclatural transfers to *Euchiton* were made by Holub (1974) and completed by Anderberg (1991) and Ward and Breitwieser (1998). The species number about 22 (Drury 1972; Anderberg 1991), including recent additions (Buchanan 1999, Walsh 1999) or 20–30 (Walsh 1993). They are native to Australia and New Zealand and probably to New Guinea and eastern Asia; some species have weedy tendencies and have become widely naturalized.

The following synopsis of *Euchiton* in North America and Hawaii is based on surveys of collections at ARIZ, BRIT-SMU, CAS-DS, GH, HSC, MO, NCU, TEX-LL, UC-JEPS, and WIS.

Euchiton Cass. in F. Cuvier, *Dict. Sci. Nat.* ed. 2, 56:214. 1828. TYPE SPECIES: *Euchiton pulchellus* Cass.

= *Euchiton involucratus* (G. Forster) Holub

Plants perennial or (less commonly) annual, herbaceous, stoloniferous in most species (taprooted in 1), white-tomentose, eglandular. **Leaves** basal and cauline, sometimes in a rosette, lanceolate to linear, entire, sessile or petiolate, bicolored, usually with a close tomentum at least on the abaxial surfaces. **Capitulescences:** heads usually in a terminal cluster subtended by a whorl of leafy bracts, sometimes with axillary clusters below. **Capitula** narrowly campanulate to short-cylindric; phyllaries chartaceous, transparent, inner with larger stereomes. **Pistillate florets** fertile, more numerous than the bisexual florets, corollas purple or purple-tipped. **Bisexual florets** fertile, corollas purple or purple-tipped. **Cypselae** oblong, 0.6–1.5 mm, epidermis minutely papillate (the papillae imbricate and paired, nonmyxogenic); pappus of caducous, separate or weakly basally connate bristles separating in groups. Base chromosome number, $x = 14$.

1. Annual, taprooted; leaves not at all clasping or sheathing; capitula in a globose cluster; bisexual florets 1 per capitulum; capitulescence bracts 4–8. _____ **Euchiton sphaericus**
1. Perennial or biennial, fibrous-rooted; leaves subclasping or sheathing; capitula in a hemispheric cluster; bisexual florets 3–7 per capitulum; capitulescence bracts 2–5.
 2. Stolons commonly present, plants forming colonies; basal leaves present in a rosette at flowering; cauline leaves 2–4(–6), linear to oblanceolate, 0.5–3(–4) cm long, 1–3 mm wide; pistillate florets 40–60; capitulescence bracts 2–3, not exceeding the capitulescence or only slightly so. _____ **Euchiton gymnocephalus**
 2. Stolons usually absent, plants not evidently colonial; basal leaves usually withered or absent at flowering; cauline leaves 6–10, mostly linear, 3–8 cm long, 2–3 mm wide; pistillate florets 80–150; capitulescence bracts 3–5, distinctly longer than the capitulescence. _____ **Euchiton involucratus**

1. Euchiton gymnocephalus (DC.) Holub, *Folia Geobot. & Phytotax.* 9:271. 1974 [non (DC.) A. Anderberg 1991]. *Gnaphalium gymnocephalum* DC., *Prodr.* 6:235. 1838. TYPE: AUSTRALIA.

Gnaphalium collinum Labill., *Nov. Holl. Pl.* 2:44, t. 189. 1806. *Gnaphalium japonicum* var. *collinum* (Labill.) Maiden & Betche, *Census New South Wales Pl.* 204. 1916. TYPE: AUSTRALIA.

Flowering (late March–)May–October(–November). Grassy hills, margins and openings in woods, roadsides, cutover areas; ca. 100–2500 ft (30–750 m); California and Oregon, Hawaii. Apparently native to Australia and New Zealand. Recorded in Australia as “common and widespread, particularly in cooler parts ..., often colonizing bare ground, stream and track margins etc.” (Walsh 1993, p. 823) and “woodland areas near Canberra and also extending to upper slopes of mountains; widespread in many parts of Australia and Tasmania” (Burbidge & Gray 1970). In New Zealand, it occurs in a wide variety of habitats but is “typically associated with forest and scrub communities between sea level and 1,000 (–2,000) ft” (Drury 1972, p. 144).

A handwritten note by J.P. Tracy on the JEPS sheet of *Tracy 14110* notes the following: “My record of this plant [*Euchiton gymnocephalus*, presumably in Humboldt County] extends back to 1900 when it was already well estab.” Cita-

tions below indicate that Tracy collected the species repeatedly in Humboldt County from 1904 through 1946 and collections between 1960 and 1989 have continued to document its occurrence in counties of northeastern California and southeastern Oregon.

Collections examined. **UNITED STATES. California. Del Norte Co.:** 3 mi S of Klamath River, grassy hills near coast, 300 ft, 12 May 1929, *Tracy* 8588 (CAS, UC). **Humboldt Co.:** near Azalea Reserve State Park, cool woods in partial shade, 100 ft, 15 Jul 1960, *Adams* s.n. (HSC); along Mad River ca. 2 mi S of Blue Lake, 28 Jun 1971, *Anderson and Smith* J-1230 (HSC); 8 mi W of Berry Summit along US 299, 2500 ft, roadcut on serpentine soil, 15 May 1965, *Bos* 254 (HSC); Lord Ellis road near Shingle Mill, 28 Mar 1926, *Kildale* 1670 (DS); Lord Ellis road near Blue Lake, 25 Nov 1926, *Kildale* 2830 (DS); Trinidad, Camp Twenty One, 600 ft, 30 Jul 1932, *Parks and Tracy* 1133 (UC); above dirt road from old 101 to the top of the N bank of the Mad River, grassy hillside in half shade, 22 Jul 1967, *Stevens* 61 (HSC); Garberville Quad., old skid road, shady edge of redwood forest and mixed evergreen forest, 850 ft, moss-covered rocky subsoil, 13 Aug 1976, *Sutherland* 9.13.8.76 (HSC); Shubrick Peak Quad., Kinsey Ridge above Oat Creek, logged doug fir forest, 24 Apr 1978, *Sutherland* 6.24.4.78 (HSC); immediate vicinity of Eureka, small patches in open places in woods, 0–500 ft, 31 Jul 1904, *Tracy* 2134 (CAS, DS, GH, UC); Boynton Prairie road, near Carroll place, 1000 ft, 23 Jun 1918, *Tracy* 4958 (NCU, UC); near Blue Lake, in woods, spreading by stolons and forming patches, 1000 ft, 1 Apr 1923, *Tracy* 6175 (JEPS, UC); near Boynton Prairie, in recently logged area, among “fireweeds,” 2000 ft, 28 Aug 1927, *Tracy* 8358 (UC); Trinidad, logged-off lands, spreading in mats, 10–200 ft, 13 Aug 1932, *Tracy* 10349 (ARIZ, CAS, UC); near Blue Lake, roadside in open woods on Trinity Hwy, spreading and forming mats, 900 ft, 20 Jul 1935, *Tracy* 14110 (CAS, JEPS, UC-2 sheets); 4 mi SE of Korbek, near “Angels Ranch,” local in grassy moist places, 1000 ft, 22 Mar 1936, *Tracy* 14784 (CAS, DS, JEPS, UC-2 sheets); Fickle Hill, 6 mi SE of Arcata, in recently cleared land, 2000 ft, 17 May 1936, *Tracy* 14811 (UC); 2 mi NE of Orick, on Bald Hills road, local by roadside, 500 ft, 29 May 1936, *Tracy* 14829 (CAS, DS, GH, JEPS, UC); hillsides near Canyon Creek, 6 mi SE of Blue Lake, in logged-over land, 1200 ft, 1 Aug 1936, *Tracy* 15058 (UC); Carlotta, in recently logged area, with [*Gamochaeta ustulata*] and [*Euchiton sphaericus*], 100 ft, 23 Aug 1936, *Tracy* 15164 (UC); Fickle Hill, 6 mi SE of Arcata, in country recently logged, 2000 ft, 24 Aug 1936, *Tracy* 15175 (UC); vicinity of Carlotta, in recently cleared land, ca. 100 ft, 15 Jun 1938, *Tracy* 15936 (UC); “Riverside Park” near old Strong’s Station District School House (burned down), 30 May 1946, *Tracy* 17548 (UC); Kneeland Prairie, Dan McBride’s place (SE end of Kneeland), local, in partial shade of open fir woods, 2500 ft, 23 Jun 1946, *Tracy* 17596 (UC). **Mendocino Co.:** 15 air mi SW of Garberville, 60 air mi SSE of Eureka, 1/4 mi E of Bear Harbor on Lost Coast Trail, edge of trail bed, California bay riparian forest, 120 ft, 8 Jul 1989, *Bowcutt* 1369 (HSC); 3.2 km N of jct with Rte 1, along Usal Rd, openings in second growth redwoods, 305 m, 11 Jun 1981, *Smith* 6632 (CAS, HSC). **Siskiyou Co.:** Forest Service Road 17NO4, Doe Flat, T17N, R4E, Sec. 35, [no date], *Van Deventer* s.n. (HSC). **HAWAII.** Hawaii, Upper Waiakea Forest Reserve, along Disappointment Trail (Pu’u Maka’ala access rd.) of Stainback Hwy., in *Metrosideros* rainforest, ca. 1100 m, 26 Jul 1983, *Wagner et al.* 4842 (US). **OREGON. Curry Co.:** on old segment of Hwy 101 that leads as a dead-end from Harris Beach State Park, just N of Brookings, 10 Jun 1964, *Chambers* 2241 (DS, NCU); Brookings, 100 ft, 1 Aug 1937, *Tracy* 15606 (UC); moist slope 5 mi N of Brookings, 7 Jul 1939, *Peck* 20445 (CAS, UC). **Klamath Co.:** Winema National Forest, Cold Springs Road and State Route 140, T36S R6E, Sec. 18, 14 Oct 1978, *Sawyer* 3320 (HSC).

Wagner et al. (1997) recorded *Euchiton gymnocephalus*, identified as *E. japonicus* (Thunb.) Holub, as a new state record for Hawaii. In Australia it was identified as *Gnaphalium japonicum* Thunb. by Burbidge and Gray (1970), but the synonymy of *G. japonicum* with *G. gymnocephalum* was later rejected without specific comment by Cooke (1986) and Walsh (1993). In the present review, plants

from Japan and China appear to be consistently distinct from related ones of Australia and New Zealand, although differences are subtle, and until someone may provide a more detailed study of the complex, the morphological affinity of the North American plants with those of Australia is reinforced by the nomenclature. Differences between the two taxa are outlined in the following couplet.

Basal leaves usually narrowly oblanceolate, attenuate to a distinct petiolar portion, the cauline abruptly differentiated in size and shape from the basal, smaller and linear-lanceolate to linear-oblanceolate; adaxial leaf surfaces quickly glabrescent and shiny-green; stereome thickened and opaque, distinctly narrowed apically and separated from the lamina by a short, completely translucent portion; cypselae ca. 0.7 mm long.

_____ **Euchiton gymnocephalus**

Basal and cauline leaves linear-lanceolate to linear-oblong, without a distinct petiolar portion, the lower cauline slightly reduced in size but similar in shape to the basal; adaxial leaf surfaces persistently arachnoid, appearing dull; stereome thin-translucent, not evidently narrowed apically, more or less directly connected to the lamina; cypselae ca. 1.0 mm long.

_____ **Euchiton japonicus**

Plants from Japan, China, and Taiwan (specimens examined), and probably from Ryukyus and Korea are typical *E. japonicus* (see citation below). Collections referable to *E. japonicus* or *E. gymnocephalus* from New Guinea, New Caledonia, and Java need to be studied in order to assess their relationship. Reports of *E. japonicus* from the Philippines evidently refer, at least in part, to *Gnaphalium oblanceolatum* Elmer, which apparently is more closely related to *E. involucratus* (but probably not conspecific with it) than to *E. japonicus*.

Euchiton japonicus (Thunb.) Holub, Folia Geobot. & Phytotax. 9:271. 1974 [non (Thunb.) Anderb. 1991]. *Gnaphalium japonicum* Thunb., Fl. Jap. 311. 1784. TYPE: JAPAN ("prope urbem Nagasaki").

2. *Euchiton involucratus* (G. Forster) Holub, Folia Geobot. & Phytotax. 9:271. 1974 (non A. Anderberg 1991). *Gnaphalium involucratum* G. Forster, Fl. Ins. Austr., 55. 1786. TYPE: NEW ZEALAND.

Flowering July–October. Grassy open places, often moist or wet; ca. 50–600 m; California and Massachusetts. Native to Australia and New Zealand; collections also observed (present study) from New Guinea, New Caledonia, Java, and Taiwan. The species in Australia is recorded as a “weed of gardens and disturbed ground” (Burbidge & Gray 1970); it also is common “particularly in swampy sites, from near sea-level to the higher alps where usually in *Sphagnum* bogs” (Walsh 1993).

Both of the North American collections cited below probably represent waifs, because this species apparently has not been subsequently recorded in floristic summaries from anywhere in the USA. This apparently is the first published report of *E. involucratus* from North America.

Collections examined. **UNITED STATES. California. Humboldt Co.:** S end of Fickle Hill, 6 mi SE of Arcata, ca. 2000 ft, moist ground, among rushes and sedges, spreading by rootstocks, perennial, 26

Sep 1948, *Tracy* 18232 (ARIZ, NCU, UC-2 sheets, WIS). **Massachusetts. Hampshire Co.:** Northampton, weed in garden, Sep 1900, *Mrs. E.H. Terry s.n.* (GH).

3. *Euchiton sphaericus* (Willd.) Holub, *Folia Geobot. & Phytotax.* 9:271. 1974 (non A. Anderberg 1991). *Gnaphalium sphaericum* Willd., *Enum. Hort. Berol.* 2:868. 1809. TYPE: AUSTRALIA.

Gnaphalium involucreatum G. Forster var. *simplex* DC., *Prodr.* 6:236. 1838. Based on *G. sphaericum*.

Gnaphalium involucreatum G. Forster var. *ramosum* DC., *Prodr.* 6:236. 1838. TYPE: AUSTRALIA.

Gnaphalium morii Hayata, *lc. Pl. Formos.* 8:58. 1919. TYPE: Taiwan ("Formosa").

?*Leontopodium japonicum* (Thunb.) H. Lév. var. *sandwicense* H. Lév., *Fedde Repert.* 10:121. 1911.

TYPE: HAWAII.

Gnaphalium japonicum sensu various authors, non Thunberg 1784.

Flowering (late June, *Tracy* 15974; July–) August–October. Grassy open places in wooded areas, recent clearings and clearcuts, disturbed soil, especially along roadsides; ca. 100–2000 ft [30–600 m]; California and Oregon, Hawaii (Molokai, Lanai, Maui, and Hawaii, fide Wagner et al. 1999). "Reported from San Joaquin County," California (Ferris 1960; voucher not seen in present study). Native to Australia and New Zealand; also documented from New Guinea, New Caledonia, Java, Philippines, Japan, and Taiwan (Drury 1972). In Australia recorded as "a very common and widespread species, occurring on a wide variety of substrates, e.g., mallee and coastal sands, clayey floodplain area, and often colonizing disturbed ground" (Walsh 1993).

Euchiton sphaericus has long been identified in California, apparently beginning with Howell (1937), as *Gnaphalium japonicum*; it recently was correctly identified by Wagner et al. (1997) and by Peter W. Michael (annotations on specimens at GH). Correct nomenclature was earlier provided by Drury (1972). *Euchiton sphaericus* was established in California at least by 1915, when apparently first collected there. J.P. Tracy collected it repeatedly from that year through 1949; from one locality (*Tracy* 14752) he noted that it was "scarce now, abundant 15 years ago." Tracy also observed (fide label of *Tracy* 5097) that the species was "probably introduced in grass seed sown on logged-over country." Relatively recent collections (1954, 1977, 1992) confirm its persistence in northwestern California.

Euchiton sphaericus was collected in Hawaii, perhaps for the first time, in 1909 (on Maui, *Faurie* 928-BISH, as noted by Wagner et al. 1999). Rock (1914, p. 352) noted that in Hawaii *E. sphaericus* was among several species "imported accidentally during the last 10 or 20 years, by the cattle estates with grass seeds."

Collections examined. **UNITED STATES. California. Del Norte Co.:** Sutton Creek, 2 mi E of the Van Deventer Ranch and 2.5 mi air-line E of Fort Dick, 350 ft, 15 Oct 1954, *Van Deventer* 412 (UC). **Humboldt Co.:** Eel River, 16 mi N of Garberville, 29 Aug 1936, *Howell* 12888 (GH, LL, WIS); logged redwood flat, 2 mi E of Carlotta, 15 Aug 1936, *Jepson* 17,898 (JEPS); mouth of Larabee Creek, common as a weed but local, 200 ft, 12 Sep 1915, *Tracy* 4677 (CAS, MO, UC); around Humboldt Bay, Newells Camp on old Kneeland Prairie road, probably introduced in grass seed sown on logged over country, 1500 ft, 1 Sep 1918, *Tracy* 5097 (NCU, UC-2 sheets); South Fork of Eel River, 4 mi above the mouth, common road-

side weed, 200 ft, 29 Sep 1918, *Tracy 5103* (TEX, UC); at Eureka, introduced along old road in stump land, 0–200 ft, 6 Oct 1918, *Tracy 5118* (UC); North Fork of Mad River, along newly constructed road, evidently introduced and not yet common there, 1000 ft, 19 Sep 1920, *Tracy 5399* (UC); South Fork of Eel River, near Miranda, 300 ft, 9 Aug 1925, *Tracy 7229* (UC); along Lord-Ellis Road, headwaters of North Fork of Mad River, scarce, 2000 ft, 8 Aug 1931, *Tracy 9608* (UC); near Dyerville, roadside weed, scarce now, abundant 15 years ago, 300 ft, Sep 1935, *Tracy 14752* (UC); Carlotta, locally abundant as a “fireweed” in recently cleared land, 100 ft, 23 Aug 1936, *Tracy 15162* (GH, HSC-2 sheets, MO, TEX, UC-3 sheets, WIS); Fickle Hill, 6 mi SE of Arcata, restricted to land recently cleared and soil disturbed, 2000 ft, 24 Aug 1936, *Tracy 15176* (GH, JEPS, UC); Trinity River Valley, at Willow Creek, weed in garden, not common, 500 ft, 20 Jun 1938, *Tracy 15974* (UC); Trinity River Valley, along new road to Hors Linto Creek, disturbed soil, 800 ft, 4 Sep 1938, *Tracy 16142* (UC); Trinity River Valley, near Raccoon Creek, moist ground disturbed by road work, 500 ft, 11 Aug 1940, *Tracy 16694* (JEPS, LL-2 sheets, UC); Valley of South Yager Creek, recently logged land as a ‘fireweed’ on the Redwood House Road at old mill site, 1 mi N of Redwood House, 1500 ft, 26 Jul 1942, *Tracy 17299* (UC); Park’s place, 10–200 ft, 28 Sep 1947, *Tracy 17933* (UC); Fickle Hill, 6 mi SE of Arcata, recently logged area, scarce, ca. 2000 ft, 26 Sep 1948, *Tracy 18230* (UC); Van Duzen River, near Grizzly Creek, frequent in disturbed soil of recent logging operations, 300 ft, 16 Oct 1949, *Tracy 18591* (UC, WIS); Aikens Campground, T10N R5E, Sec. 30, mixed evergreen forest, 1 Jul 1977, *Sawyer 2990* (HSC). **Lake Co.:** road to Bartlett Mountain, Aug 1930, *Mason 5732* (UC). **Mendocino Co.:** 10 air mi W of Leggett, along and in dirt roadbed of Hotel Gulch Road 5.3 road mi from Usal, S-facing slope, coast redwood/douglas fir forest logged about 15–20 years ago, 21 Jul 1992, *Bowcutt 1571* (HSC); Mendocino Woodlands, 10 Jul 1938, *Eastwood and Howell 6238* (UC). **Trinity Co.:** Sharber Slough on the Trinity River, 3 mi E of the South Fork, along trail, sparsely introduced in moist ground, 6 Sep 1926, *Tracy 7783* (CAS, UC). **HAWAII. Hawaii:** Hawaii National Park, Kilauea Crater, on dry lava, 18 Jul 1931, *van Löben Sels 595* (UC); Waimea Mts., Jun 1910, *Rock 8433* (GH); Hawaii National Park, weed on xeric cinder flats in Kau Desert near Halemaumau, 3600 ft, 18 Jun 1948, *Webster and Wilbur 1793* (TEX). **Lanai:** Mts., E end, Jun 1913, *Forbes 276.2* (UC). **Mau:** Koolau Gap, Haleakala, volcanic cinders, 10 Aug 1927, *Degener 18451* (GH); Haleakala, 16 Aug 1927, *Degener 18450* (GH); Olinda, Pipe-Line Trail, 30 Jul 1927, *Toppings.n.* (GH); Haleakala, Aug 1909, *Faurie 928* (BISH, as cited by Rock 1914 and Wagner et al. 1999; not seen). **OREGON. Curry Co.:** dry ground along Chetco River, 3 mi above Harbor, 20 Jul 1919, *Peck 8924* (GH).

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REFERENCES

- ANDERBERG, A.A. 1991. Taxonomy and phylogeny of the tribe Gnaphalieae (Asteraceae). *Opera Bot.* 104:5–195.
- BUCHANAN, A.M. 1999. A new species of *Euchiton* (Gnaphalieae: Asteraceae) from southern Tasmania, Australia. *Pap. Proc. Roy. Soc. Tasmania* 133:115–116.
- BURBIDGE, N.T. and M. GRAY. 1970. *Flora of the Australian Capital Territory*. Australian National Univ. Press, Canberra.
- COOKE, D.A. 1986. *Gnaphalium*. In: Jessop, J.P. and H.R. Toelken, eds. *Flora of South Australia*. Part III, Polemoniaceae–Compositae. South Australian Govt. Printing Division, Adelaide. Pp. 1516–1519.

- DRURY, D.G. 1972. The cluster and solitary-headed cudweeds native to New Zealand: (*Gnaphalium* section *Euchiton* – Compositae). *New Zeal. J. Bot.* 10:112–179.
- FERRIS, R.S. 1960. Vol. IV, Bignoniaceae to Compositae. In Abrams, L. and R.S. Ferris, *Illustrated flora of the Pacific States*. Stanford Univ. Press, Stanford, California.
- HOLUB, J. 1974. New names in phanerogamae. *Folia Geobot. & Phytotax.* 9:261–275.
- HOWELL, J.T. 1937. Three species of *Gnaphalium* adventive in California. *Leafl. W. Bot.* 2: 10–12.
- ROCK, J.F. 1914. *Revisio plantarum Hawaiiensium a Léveillé descriptarum*. *Repert. Spec. Nov. Regni Veg.* 13:352–361.
- WAGNER, W.L., R.K. SHANNON, and D.R. HERBST. 1997. Contributions to the flora of Hawai'i. VI. *Bishop Mus. Occ. Papers* 48:51–65.
- WAGNER, W.L., D.R. HERBST, and S.H. SOHMER. 1999. *Manual of the flowering plants of Hawai'i* (rev. ed.), Volume 1. Univ. of Hawai'i Press and Bishop Museum Press, Honolulu, Hawaii.
- WALSH, N.G. 1993. *Euchiton*. In: N.G. Walsh and T.J. Entwistle, eds. *Flora of Victoria*, Volume 4. Inkata Press, Melbourne, Australia. Pp. 820–825.
- WALSH, N.G. 1999. New species in Asteraceae from the subalps of southeastern Australia. *Muelleria* 12:223–228.
- WARD, J.M. and I. BREITWIESER. 1998. New combinations in *Euchiton* (Compositae - Gnaphalieae) from New Zealand. *New Zeal. J. Bot.* 36:303–304.