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Ninety-three new combinations in *Euploca* for species of *Heliotropium* section *Orthostachys* (Boraginaceae *sensu* APG)

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Abstract

Many new combinations are needed in *Euploca*, previously regarded as *Heliotropium* section *Orthostachys*, to correspond with results of our forthcoming, world-wide, molecular phylogenetic analysis. We also need these names for our many $\delta^{13}C$ determinations that identify many *Euploca* species exhibiting C_4 photosynthesis and show that other *Euploca* species are not C_4. Here we make the many new combinations required to support these results.

Keywords: Australia, Heliotropiaceae, carbon assimilation systems

Introduction

Euploca was erected by Nuttall (1836: 189–190) for *E. convolvulacea* Nuttall (1836: 190) from what is now the western USA and northern Mexico. Subsequently, other authors from Asa Gray (1857: 403) onward placed *Euploca* within *Heliotropium* Linnaeus (1753: 130) section *Orthostachys* Brown (1810: 493) using the key generic character of dry fruit (i.e., nutlets), which distinguishes *Heliotropium* from the related *Tournefortia* Linnaeus (1753: 140), characterized by an indehiscent fleshy fruit.

Molecular studies by Hilger & Diane (2003) included a limited number of exemplars from *Heliotropium* section *Orthostachys* and showed that neither *Heliotropium* nor *Tournefortia* is monophyletic. Their sampled species of *H.* section *Orthostachys* were monophyletic and sister to *Tournefortia* section *Cyphocyema* Johnston (1930: 72–73). Our forthcoming more extensive sampling of *H.* section *Orthostachys* confirms that result.

Lyn A. Craven (now sadly deceased), in his monograph of Australian *Heliotropium* (1996) and subsequent work (Craven 2005a), had named many new species as members of *Heliotropium* section *Orthostachys*. To achieve monophyly of the genus, Craven (2005b) had favoured expanding *Heliotropium* to encompass all of *Tournefortia*, but we agree with Hilger and Diane (2003) that the best solution is to recognize *H.* section *Orthostachys* as the genus *Euploca* (as well as recognizing its sister, *T.* section *Cyphocyema*, as the genus *Myriopus* Small [1933: 1131]). To expand *Heliotropium* to include all of *Tournefortia* would be even more disruptive, resulting in a huge genus that is overly diverse (Hilger & Diane 2003, Diane *et al*. 2016). Most new combinations have already been made for the Americas, but not for Australia. We take this opportunity to make the needed new combinations for all the Australian species recognized as *Heliotropium* section *Orthostachys* in Craven (1996, 2005a), and we make new combinations for some additional species from other parts of the world.

Euploca includes shrubs and herbs, in warm-temperate and tropical climates, primarily in moderately dry to arid climates. It is especially diverse in Australia, North and South America, and the Caribbean. Several species are in the Horn of Africa and adjacent Arabia, but the rest of Africa and southern Asia have few but widespread species.

No single character distinguishes all species of *Euploca* from *Heliotropium s.s.* and from *Myriopus*. It is the molecular results that conclusively separates *Euploca* from the other genera (Hilger & Diane 2003). *Euploca* exhibits the following combination of characters, with exceptions in some species: flowers born in scorpioid cymes, and, if the cymes exhibit equal bifurcations, these present only at the base; cymes often with bracts, and bracts sometimes large and functioning as leaves, and then rarely bearing axillary branches that are also cymes. Flowers salverform or funnelform, often with upper ridged epidermal cells elongating into trichomes toward the centre of the disk, and often

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grading into moniliform trichomes in the corolla throat. Anther tips sterile and connivent to coherent by their more-or-less bulbous tips. Fruit dry at maturity, rounded or only weakly lobed, breaking into four equal nutlets; the two venter faces of each nutlet large, as long and broad as the nutlet itself, and nearly identical in form, each with a prominent pit. Notable exceptional species are *E. karwinskyi*, which has urceolate corollas, and *E. convolvulacea*, which has strongly bilobed fruits, with each half-fruit nearly spherical, and each half-fruit eventually breaking into nearly hemispherical nutlets, with the nutlets having one large venter face, without a pit, and one small venter face (Frohlich 1976, Craven 1996, Diane *et al*. 2016).

Among our many new combinations, one epithet, "*apertum*," requires some special explanations. Craven (1996: 628) wrote, regarding *Heliotropium apertum*, "The specific epithet is a reference to the discovery of this species on cleared ground on the edge of the Mitchell Plateau airstrip (L. *aperio*, I open, lay bare)." "*Aperio*" is a verb, so the epithet "*apertum*" must derive from the verb form, that is, the supin (=supine) form, so the epithet is a verbal noun, which does not agree in grammatical gender with the genus. The adjective "*apertus*" does have the neuter nominative form "*apertum*," which becomes "*aperta*" when feminine. Craven's use of a verb to explain his epithet means that it must be treated as a verbal noun in apposition.

Three species previously moved to *Euploca* have nomenclatural issues: Melo (2017b) made the new combination *Euploca axillare* (Greenm.) Melo (2017b: 559), based on *Heliotropium axillare* Greenman (1898: 483). This epithet is an adjective, so it must agree in grammatical gender with its genus. *Heliotropium* is neuter, but *Euploca* is feminine, so correcting the epithet to become feminine results in the name *Euploca axillaris*.

In moving *Heliotropium calcicola* Fernald (1907: 62–63) to *Euploca*, as *E. calcicola* (Fernald) Melo (2017a: 125), the author ignored an earlier name for this species: *Antiphytum mexicanum* de Candolle (1846: 121). Two other usages of the epithet *mexicanum* in *Heliotropium* had rendered this epithet unavailable for transfer to *Heliotropium*: *H. mexicanum* Greenman (1898: 484–485) and *H. mexicanum* Sessé & Mociño (1888: 20). There is, however, no *mexicana* in *Euploca*, so that epithet should have been applied to the species when transferred to *Euploca*.

Unfortunately, that could cause confusion. The name *Heliotropium mexicanum* Greenman had been widely used for the species more properly called *Heliotropium ternatum* Vahl (1794: 21), and many herbarium sheets bear this old usage of *Heliotropium mexicanum*. This is in spite of the earlier *Heliotropium mexicanum* Sessé & Mociño, which is a later synonym of *Lithospermum strictum* Lehmann (1818b: 303) as discussed by Johnston (1949: 109). *Heliotropium mexicanum* Greeenman is also properly in *Euploca*. To have a different species now called *Euploca mexicana* is unfortunate.

Furthermore, as pointed out by Feuillet (2016: 104), when the new combination *Euploca ternata* (Vahl) Melo & Semir (2009: 289) was made for *H. ternatum*, the authors should have used the earlier epithet based on *Tournefortia humilis* Linnaeus (1753: 141) for this species. Feuillet (2016) did not think *Euploca ternata* could be conserved against a Linnean name, so he made the new combination, *Euploca humilis* (L.) Feuillet (2016: 104).

Both *Euploca ternata* (i.e., *E. humilis*) and *E. calcicola* are widespread, ecologically important species. The name *E. ternata* has continued to be generally used. The complexity of the correct naming for each species adds to the confusion in the naming of the other. Unfortunately, we believe that a proposal to conserve the epithets *ternata* and *calcicola* for *Euploca* would not succeed, so we here make the new combination *Euploca mexicana* for *H. calcicola*. Although this will initially generate confusion, it should result in nomenclatural stability, that, in the long run, will facilitate understanding of the biology of this evolutionarily complex genus. In general, it is better to simply follow priority, rather than trying to determine when a later name should be conserved. In potentially many other specific cases, that would involve personal rather than objective views about the best option.

Taxonomy

Euploca aenigmata (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium aenigmatum* Craven, *Austral. Syst. Bot.* 9: 583 (1996).

Euploca aequorea (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium aequoreum* Craven, *Austral. Syst. Bot.* 12: 929 (1999).

Euploca albrechtii (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium albrechtii* Craven, *Beagle* 21: 19 (2005).

Euploca alcyonium (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium alcyonium* Craven, *Austral. Syst. Bot.* 9: 626 (1996).

Euploca amnis-edith (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium amnis-edith* Craven, *Austral. Syst. Bot.* 9: 584 (1996).

Euploca anderssonii (B.L.Rob.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium anderssonii* B.L.Rob., *Proc. Amer. Acad. Arts and Sci.* 38: 192 (1902).

Euploca apertum (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium apertum* Craven, *Austral. Syst. Bot.* 9: 627 (1996).

Euploca applanata (Thulin & Verdc.) Thulin, *comb. nov.*
Basionym: *Heliotropium applanatum* Thulin & Verdc., in Verdc., *Fl. Trop. E. Africa*, Boragin. 119 (1991).

Euploca arenitensis (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium arenitense* Craven, *Beagle* 21: 16 (2005).

Euploca argyrea (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium argyreum* Craven, *Beagle* 21: 13 (2005).

Euploca brachygyne (Benth.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium brachygyne* Benth., *Fl. Austral.* 4: 396 (1869).

Euploca brachythrix (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium brachythrix* Craven, *Austral. Syst. Bot.* 9: 585 (1996).

Euploca bracteata (R.Br.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium bracteatum* R.Br., *Prodr. Fl. Nov. Holland*. 493 (1810).

Euploca calvariavis (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium calvariavis* Craven, *Austral. Syst. Bot.* 9: 586 (1996).

Euploca chalcedonia (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium chalcedonium* Craven, *Austral. Syst. Bot.* 9: 587 (1996).

Euploca chrysocarpa (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium chrysocarpum* Craven, *Austral. Syst. Bot*. 9: 554 (1996).

Euploca collina (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium collinum* Craven, *Austral. Syst. Bot*. 9: 616 (1996).

Euploca conocarpa (F.Muell. ex Benth.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium conocarpum* F.Muell. ex Benth., *Fl. Austral.* 4: 398 (1869).

Euploca consimilis (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium consimile* Craven, *Austral. Syst. Bot*. 9: 629 (1996).

Euploca cracens (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium cracens* Craven, *Austral. Syst. Bot.* 9: 589 (1996).

Euploca cunninghamii (Benth.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium cunninghamii* Benth., *Fl. Austral*. 4: 400 (1869).

Euploca delestangii (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium delestangii* Craven, *Austral. Syst. Bot.* 9: 571 (1996).

Euploca dichotoma (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium dichotomum* Craven, *Austral. Syst. Bot*. 9: 591 (1996).

Euploca dichroa (Urb.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium dichroum* Urb., *Symb. Antill.* [Urban] 5(3): 481 (1908).

Euploca diffusa (Britton) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium diffusum* Britton, *Bull. New York Bot. Gard.* 4: 122 (1905).

Euploca discordis (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium discorde* Craven, *Austral. Syst. Bot.* 9: 593 (1996).

Euploca diversifolia (F.Muell. ex Benth.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium diversifolium* F.Muell. ex Benth., *Fl. Austral*. 4: 400 (1869).

Euploca eggersii (Urb.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium eggersii* Urb., *Symb. Antill.* [Urban] 5(3): 481 (1908).

Euploca epacridea (F.Muell. ex Benth.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium epacrideum* F.Muell. ex Benth., *F1. Austral*. 4: 396 (1869).

Euploca euodes (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium euodes* Craven, *Austral. Syst. Bot*. 9: 594 (1996).

Euploca fasciculata (R.Br.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium fasciculatum* R.Br., *Prodr. Fl. Nov. Holland.* 494 (1810).

Euploca ferreyrae (I.M.Johnst.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium ferreyrae* I.M.Johnst., *J. Arnold Arbor.* 37: 296 (1956).

Euploca filaginoides (Benth.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium filaginoides* Benth., *Fl. Austral*. 4: 398 (1869).

Euploca flintii (F.Muell. ex A.S.Mitch.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium flintii* F.Muell. ex A.S.Mitch., *J. Adelaide Bot. Gard*. 2: 357 (1980).

Euploca foveolata (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium foveolatum* Craven, *Austral. Syst. Bot.* 9: 595 (1996).

Euploca frohlichii (Craven) M.W.Chase, *comb. nov.*
Basionym: *Heliotropium frohlichii* Craven, *Austral. Syst. Bot*. 9: 574 (1996).

Euploca galioides (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium galioides* Craven, *Austral. Syst. Bot.* 9: 597 (1996).

Euploca geocharis (Domin) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium geocharis* Domin, *Biblioth. Bot.* 89: 547 (1928).

Euploca glabella (R.Br.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium glabellum* R.Br., *Prodr. Fl. Nov. Holland.* 494 (1810).

Euploca glandulifera (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium glanduliferum* Craven, *Austral. Syst. Bot.* 9: 557 (1996).

Euploca haesum (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium haesum* Craven, *Austral. Syst. Bot.* 9: 600 (1996).

Euploca haitiensis (Urb.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium haitiense* Urb., *Symb. Antill.* [Urban] 5(3): 482 (1908).

Euploca heterantha (F.Muell.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium filaginoides* Benth. var. *heteranthum* F.Muell., *Trans. Roy. Soc. South Australia* 13: 171 (1890).

Euploca hintonii (I.M.Johnst.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium fallax* I.M.Johnst. var. *hintonii* I.M.Johnst., *J. Arnold Arbor.* 18: 15 (1937).

Euploca imbricata (Griseb.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium imbricatum* Griseb., *Cat. Pl. Cub*. [Grisebach] 211 (1866).

Euploca inexplicita (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium inexplicitum* Craven, *Austral. Syst. Bot*. 9: 617 (1996).

Euploca lapidicola (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium lapidicola* Craven, *Beagle* 21: 16 (2005).

Euploca laxa (Thulin) Thulin, *comb. nov.*
Basionym: *Heliotropium laxum* Thulin, *Nordic J. Bot.* 23: 529 (2005).

Euploca leptalea (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium leptaleum* Craven, *Austral. Syst. Bot*. 9: 601 (1996).

Euploca maxima (Chodat & Hassl.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium maximum* Chodat & Hassl., *Bull. Herb. Boissier* ser. 2, 5: 482 (1905).

Euploca mexicana (DC.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Antiphytum mexicanum* DC., *Prodr*. 10: 121 (1846).
= *Euploca calcicola* (Fernald) J.I.M.Melo, *Harvard Pap. Bot*. 22: 125 (2017a).

= *Heliotropium calcicola* Fernald, *Proc. Amer. Acad. Arts and Sci.* 43: 62 (1907).

Euploca melanopedii (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium melanopedii* Craven, *Austral. Syst. Bot*. 9: 603 (1996).

Euploca microsalsoloides (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium microsalsoloides* Craven, *Beagle* 21: 19 (2005).

Euploca mitchellii (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium mitchellii* Craven, *Beagle* 21: 13 (2005).

Euploca moorei (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium moorei* Craven, *Austral. Syst. Bot.* 9: 604 (1996).

Euploca mutica (Domin) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium muticum* Domin, *Biblioth. Bot.* 89: 544 (1928).

Euploca myriophylla (Urb.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium myriophyllum* Urb., *Repert. Spec. Nov. Regni Veg*. 13: 473 (1915).

Euploca nana (Northr.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium nanum* Northr., *Mem. Torrey Bot. Club* 12: 61 (1902).

Euploca nashii (Millsp.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium nashii* Millsp., *Publ. Field Columb. Mus.,* Bot. Ser. 2: 309 (1909).

Euploca nesopelyda (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium nesopelydum* Craven, *Austral. Syst. Bot.* 9: 623 (1996).

Euploca nexosa (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium nexosum* Craven, *Austral. Syst. Bot.* 9: 576 (1996).

Euploca nigricans (Balf.f.) M.W.Frohl., M.W.Chase & Thulin, *comb. nov.*
Basionym: *Heliotropium nigricans* Balf.f., *Proc. Roy. Soc. Edinb.* 12: 81 (1884).

Euploca ottoni (Lehm.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium ottoni* Lehm., *Pl. Asperif. Nucif.* 1: 59 (1818a).

Euploca pachyphylla (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium pachyphyllum* Craven, *Austral. Syst. Bot.* 9: 560 (1996).

Euploca paniculata (R.Br.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium paniculatum* R.Br., *Prodr. Fl. Nov. Holland.* 494 (1810).

Euploca parviantrum (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium parviantrum* (Craven), *Austral. Syst. Bot.* 9: 562 (1996).

Euploca pauciflora (R.Br.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium pauciflorum* R.Br., *Prodr. Fl. Nov. Holland*. 493 (1810).

Euploca peckhamii (Craven) M.W.Froh. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium peckhamii* Craven, *Austral. Syst. Bot. 9*: 624 (1996).

Euploca peninsularis (Craven) M.W.Froh. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium peninsularis* Craven, *Austral. Syst. Bot.* 9: 619 (1996).

Euploca personata (Thulin) Thulin, *comb. nov.*
Basionym: *Heliotropium personatum* Thulin, *Nordic J. Bot.* 23: 530 (2005).

Euploca plumosa (Craven) M.W.Froh. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium plumosum* Craven, *Austral. Syst. Bot.* 9: 605 (1996).

Euploca prostrata (R.Br.) M.W.Froh. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium prostratum* R.Br., *Prodr. Fl. Nov. Holland*. 494 (1810).

Euploca protensa (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium protensum* Craven, *Austral. Syst. Bot.* 9: 608 (1996).

Euploca ramulipatens (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium ramulipatens* Craven, *Austral. Syst. Bot.* 9: 621 (1996).

Euploca rhadinostachya (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium rhadinostachyum* Craven, *Austral. Syst. Bot*. 9: 632 (1996).

Euploca scabra (Retz.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium scabrum* Retz., *Observ. Bot.* [Retzius] 2: 8 (1781).

Euploca skeleton (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium skeleton* Craven, *Austral. Syst. Bot.* 9: 578 (1996).

Euploca sphaerica (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium sphaericum* Craven, *Austral. Syst. Bot.* 9: 609 (1996).

Euploca sphaerococca (Urb.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium sphaerococcum* Urb., *Symb. Antill.* [Urban] 5(3): 483 (1908).

Euploca subreniformis (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium subreniforme* Craven, *Austral. Syst. Bot.* 9: 610 (1996).

Euploca synaimon (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium synaimon* Craven, *Austral. Syst. Bot.* 9: 625 (1996).

Euploca tabuliplagae (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium tabuliplagae* Craven, *Austral. Syst. Bot*. 9: 567 (1996).

Euploca tachyglossoides (Craven) M.W.Frohl. & M.W.Chase, *comb. nov*.
Basionym: *Heliotropium tachyglossoides* Craven, *Austral. Syst. Bot.* 9: 563 (1996).

Euploca tanythrix (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium tanythrix* Craven, *Austral. Syst. Bot.* 9: 611 (1996).

Euploca texana (I.M.Johnst.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium texanum* I.M.Johnst., *J. Arnold Arbor.* 29: 231 (1948).

Euploca transformis (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium transforme* Craven, *Austral. Syst. Bot.* 9: 581 (1996).

Euploca tytoides (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium tytoides* Craven, *Austral. Syst. Bot.* 9: 568 (1996).

Euploca uniflora (Craven) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium uniflorum* Craven, *Austral. Syst. Bot.* 9: 569 (1996).

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Basionym: *Heliotropium vagum* Craven, *Austral. Syst. Bot.* 9: 614 (1996).

Euploca ventricosa (R.Br.) M.W.Frohl. & M.W.Chase, *comb. nov.*
Basionym: *Heliotropium ventricosum* R.Br., *Prodr. Fl. Nov. Holland*. 494 (1810).

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Basionym: *Heliotropium vestitum* Benth., *Fl. Austral*. 4: 395 (1869).

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Basionym: *Heliotropium viator* Craven, *Beagle* 21: 23 (2005).

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