The Galápagos Endemic *Darwiniothamnus alternifolius* (Asteraceae, Astereae) transferred to *Erigeron*

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Abstract. Following molecular phylogenetic evidence that the Galápagos (Ecuador) endemic genus *Darwiniothamnus* Harling (Asteraceae, Astereae) is biphyletic, with supporting evidence from several morphological traits, the species *D. alternifolius* is transferred to the genus *Erigeron* L. as *E. alternifolius* (Lawesson & Adsersen) N. Andrus & Tye.

Key words: *Darwiniothamnus*, Ecuador, *Erigeron*, Galápagos.

The genus *Darwiniothamnus* Harling (Asteraceae, Astereae) was erected in 1962 for two Galápagos endemic species, which Hooker (1847) originally assigned to *Erigeron* L. To the two original species, *D. lancifolius* (Hook. f.) Harling and *D. tenuifolius* (Hook. f.) Harling, a third was added with the discovery of *D. alternifolius* Lawesson & Adsersen (Lawesson & Adsersen, 1987). Two different growth forms were encompassed within the genus as so defined. *Darwiniothamnus lancifolius* and *D. tenuifolius* are woody shrubs that usually grow to 1–2 m in height and occasionally reach 3.5 m, have leaves condensed in terminal whorls with internodes much shorter than half the length of the leaves, a condensed corymbiform synflorescence more or less enclosed within the terminal leaves, and 3- to 6-nerved achenes (Harling, 1962; Lawesson & Adsersen, 1987). In contrast, *D. alternifolius* is a perennial herbaceous plant, woody only at the base, reaching up to 50 cm in height and having alternate leaves not condensed in terminal whorls, with internodes at least half the length of the leaves, a cymiform synflorescence that exceeds the terminal leaves, and with all achenes 2-nerved (Lawesson & Adsersen, 1987; pers. obs.). The three species were nevertheless considered to belong to a single genus because they possess many ray florets, imbricate phyllaria of unequal length, slightly dimorphic achenes, and an aromatic scent (Lawesson & Adsersen, 1987). Although Nesom (2000) recognized the differences between *D. alternifolius* and the two other species of the genus that had been previously noted, Nesom and Robinson (2007) maintained *Darwiniothamnus* as a monophyletic genus. *Darwiniothamnus* has always been considered closely related to *Erigeron* (Harling, 1962; Lawesson & Adsersen, 1987; Nesom, 1989), a large genus (s.l., ca. 400 spp.) of mostly herbaceous species within the subtribe Conyzinae (Nesom & Robinson, 2007; Nesom, 2008).

Harling (1962) suggested that the closest relative of *Darwiniothamnus* could be among shrubby species of *Erigeron* endemic to coastal Chile, specifically *E. fasciculatus* Colla (as *E. berterianus* DC.) or *E. luxurians* (Skottsb.) Solbrig (as *E. litoralis* (Phil.) Skottsb.), or any of the six species endemic to the Juan Fernández Islands, 600 km off the Chilean coast. Lawesson and Adsersen (1987) preferred the latter hypothesis, noting further that *D. alternifolius* is "even more similar to *E. fernandezianus*" (Colla) Harling than are the other species of *Darwiniothamnus*. Johnston (1931) and Nesom (1989), in contrast, suggested that *Darwiniothamnus* might have their closest relatives in the Northern Hemisphere, with candidates *E. crenatus* Eastw. and *E. socorrensis* Brandegee from the Revillagigedo Islands (Johnston, 1931), or two groups of mainly Caribbean and Mexican *Erigeron* (Nesom, 1989, 2000).

A recent molecular study of the three species of *Darwiniothamnus*, using nucleotide sequences of the internal transcribed spacers of nuclear ribosomal DNA (Andrus et al., 2009), indicates that *Darwiniothamnus* is biphyletic, with both northern and southern origins. *Darwiniothamnus lancifolius* and *D. tenuifolius* form a monophyletic assemblage that shares a recent common ancestor with the Cuban endemic *Erigeron bellidiastroides* Griseb. The latter nests with a number of Greater Antillean endemics grouped as *Erigeron* sect. *Microcephalum* Nesom (Nesom, 2008). *Darwiniothamnus alternifolius* shares recent ancestry with Chilean species of *Erigeron*, forming a clade with *E. luxurians* and *E. fasciculatus* (as suggested by Harling [1962] for the other two *Darwiniothamnus* species, but to which they are not closely related [Andrus et al., 2009]), and nested with *Erigeron* sect. *Meridionales* Nesom & Andrus, which is otherwise composed exclusively of South American mainland species (Nesom, 2008).

While logical nomenclatural assignment of the *Darwiniothamnus lancifolius–D. tenuifolius* clade

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awaits a fuller revision of the genus *Erigeron* and its close relatives (Nesom, 2008), these findings require removal of *D. alternifolius* from the genus *Darwiniothamnus*. This taxon is therefore transferred to:

Erigeron alternifolius (Lawesson & Adsersen) N. Andrus & Tye, comb. nov. Basionym: *Darwiniothamnus alternifolius* Lawesson & Adsersen, Opera Bot. 92: 10. 1987. TYPE: Ecuador. Galápagos: Isabela Island, Sierra Negra Volcano, NW slope, 700 m, 18 Nov. 1985, *J. E. Lawesson, H. Adsersen, B. Nowak, A. M. Velasco, S. Abedrabbo & A. Tupiza 2452* (holotype, QCA; isotypes, C not seen, CDS).

IUCN Red List category. The species has for some time been listed as Critically Endangered (CR A2ace) (Tye, 2000, in press) according to IUCN Red List criteria (IUCN, 2001), owing to a sharp decline in recent decades due to habitat loss and pressure from introduced herbivores in its only known sites on southern Isabela Island.

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