



Delairea aparadensis (Asteraceae, Senecioneae), the first native species of the genus in the Americas

LUÍS A. FUNEZ^{1,5*}, GUSTAVO HASSEMER^{2,6}, NIVALDO PERONI^{3,7} & ELISANDRO R. DRECHSLER-SANTOS^{4,8}

¹ Departamento de Botânica, Universidade Federal de Santa Catarina, Câmpus Trindade, CEP 88040-900, Florianópolis, SC, Brazil.

² Universidade Federal do Mato Grosso do Sul, Câmpus de Três Lagoas, CEP 79613-000, Três Lagoas, MS, Brazil.

³ Departamento de Ecologia e Zoologia, Universidade Federal de Santa Catarina, Câmpus Trindade, CEP 88040-900, Florianópolis, SC, Brazil.

⁴ Departamento de Botânica, Universidade Federal de Santa Catarina, Câmpus Trindade, CEP 88040-900, Florianópolis, SC, Brazil.

⁵ lfunezz@gmail.com; <https://orcid.org/0000-0002-0008-1061>

⁶ g.hassemer@ufms.br; <https://orcid.org/0000-0003-4365-6934>

⁷ peronin@gmail.com; <https://orcid.org/0000-0002-6770-5377>

⁸ drechslersantos@yahoo.com.br; <https://orcid.org/0000-0002-3702-8715>

*Author for correspondence

Abstract

We describe a narrowly endemic new species of *Delairea* from the highlands of southern Brazil. It is the second species described in this previously monospecific genus that was endemic to Africa, and the first record of a native species of *Delairea* in the Americas. *Delairea aparadensis* differs from *D. odorata* by its deltoid leaves and capitulescences composed by cymes of 2–6 capitula. Additionally, the new species is classified as critically endangered using the IUCN criteria.

Keywords: Atlantic Rainforest; Brazil; critically endangered species; Santa Catarina; Senecioninae

Introduction

The tribe Senecioneae Cass. is part of family Asteraceae Bercht. & J.Presl, subfamily Asteroideae (Cass.) Lindl. and includes *ca.* 150 genera and *ca.* 3500 species, with a worldwide distribution (Jeffrey & Chen 1984, Jeffrey 1992, Hind 1993, 1999, Knox & Palmer 1995, Matzenbacher 1998, Nordenstam 2007, Pelsner *et al.* 2007, Teles 2008, Teles & Stehmann 2016). Included in this tribe is the subtribe Senecioninae Dumort., with the megadiverse genus *Senecio* Linnæus (1753: 866) and a number of small genera. One of those smaller genera, *Delairea* Lemaire (1844: 379), has been considered monospecific (Nordenstam 2007). Its only species, *D. odorata* Lemaire (1844: 380), is native to South Africa but has been introduced to most continents, having become naturalised and even a noxious invasive species in Australia, New Zealand and many countries in Asia, Europe and the Americas (Balciunas & Smith 2006, Robison & DiTomaso 2010, Robison *et al.* 2011, Prabu *et al.* 2012, Mehelis *et al.* 2015).

On occasion of field work conducted in southern Brazil we discovered a population of a scandent species of Senecioneae, which promptly caught our attention for its distinctiveness when compared to the native members of the tribe that occur in the region. We subsequently were able to confirm, with revision of relevant literature and herbarium collections, that those plants correspond to an undescribed species of *Delairea*, a formerly monospecific genus. In this work we describe the new species and present its field photographs, distribution map, proposed conservation status assessment and comparisons with *D. odorata*, its only known congener.

Material and methods

We studied Senecioneae specimens kept at ASE, C, EFC, FI, FLOR, FT, FURB, JOI and MBM, and images of specimens kept at B, ESA, GH, HAL, K, MO, P, RB and US (herbarium codes according to Thiers 2020). For microscopic

character observations we utilized a stereomicroscope, and for measurements a pachymeter. A thorough revision of the taxonomic literature on the tribe Senecioneae in South America was conducted (Baker 1884, Dusén 1905, Barroso 1957, 1959, Cabrera 1950, 1957, 1974, Cabrera & Klein 1975, Zardini 1979, Hind 1993a, 1993b, 1994, 1999, 2003, Matzenbacher 1996, 1998, 2009, Cabrera *et al.* 1999, Teles 2008, Teles *et al.* 2009, Teles & Meireles 2010, Tortosa & Bartoli 2010, Teles & Stehmann 2011, Teles & Freitas 2013, Oliveira 2014, Funez & Hassemer 2017, Teles *et al.* 2020).

The conservation status assessment followed the IUCN (2012, 2019) criteria. Areas of occupancy (AoO) of species were calculated using GeoCAT (Bachman *et al.* 2011), and the distribution map was made using QGIS Desktop (Quantum GIS Development Team 2021). Field work was conducted in Santa Catarina state, southern Brazil, from 2008 to 2020. All field photographs were taken by L.A. Funez.

Results and discussion

Delairea aparadensis Funez & Hassemer, *sp. nov.*

Type:—BRAZIL. SANTA CATARINA: Urubici, Parque Nacional de São Joaquim, Morro da Igreja, 1780 m, 13 March 2020, L.A. Funez & W.I. Ribeiro-Nardes 9796 (holotype: FLOR!; isotypes: FURB!, HTL!, HBR!).

Diagnosis:—The new species differs from *Delairea odorata* by its leaves deltoid and capitulescences composed by cymes of 2–6 capitula vs. leaves subcordiform polygonal-lobed and capitulescence composed by dozens of capitula.

Description:—Perennial scandent subshrubs 40–150 cm tall. Stems green, erect, branching from the basal portion and often along its length, *ca.* 3 mm diam. on the basal portion gradually thinner toward the apical portions, striate, glabrous, apically foliose. Leaves gradually decreasing in size towards the apex, petiolate, petioles purple, 11–18 mm long, cylindric, glabrous, sulcate adaxially, blades deltoid, 18–62 × 15–65 mm, apex acuminate, base truncate-sagittate, with two more prominent teeth and more 2–6 smaller teeth, venation actinodromous, secondary veins adaxially and abaxially raised, reticulate, coriaceous, glabrous on both surfaces, margins slightly revolute, (6)–8–10 teeth. Capitulescences terminal and axillary, 2–6 capitula disposed in a lax corymb 5–45 mm long, glabrous or with sparse arachnoid hairs on the axes. Capitula homogamous, discoid, pedunculate; peduncles 1–5 mm long, bracteolate, glabrous or with arachnoid hairs; bracteoles 1–2, rhombiform, 0.8–6 mm long, glabrous or very scarce arachnoid trichomes. Involucre cupuliform, 4–5 × 3–4 mm, calyculate; bracts of calyculae *ca.* 5, lanceolate, 0.8–6 mm long; involucre bracts 7, lanceolate, 4.0–4.5 × 0.8–1.2 mm wide, apex acute, margin entire, glabrous with an apical tuft of hairs; receptacle plane and glabrous. Florets 15–22, perfect, corolla yellow, tubulose, tube 0.4–2.1 mm long, limb 1.5–3.0 mm long, five triangular lobes up to 0.6 mm long; anthers 1.6–2 mm long, connectival appendage oblong, 0.7–0.8 mm long; style 3.0–3.5 mm long, style branches with truncate apex, 1.0–1.3 mm long. Ovary cylindrical, 1.0–1.2 × *ca.* 0.2 mm, costate, glabrous, carpodium symmetrical, setose; pappus 4.0–4.5 mm long, uniseriate, bristles numerous 60+, white, filiform, deciduous.

Photographs:—Figure 1.

Etymology:—The specific epithet makes reference to the *Aparados da Serra Geral*, a region in southern Brazil where the new species is endemic to.

Phenology:—Flowering in March and fruiting probably from April to May.

Distribution and habitat:—The new species is endemic to Morro da Igreja, in Parque Nacional de São Joaquim, at Urubici, Santa Catarina state, southern Brazil (Figure 2). It occurs in Cloud Forest environment, at elevations of 1700–1800 m.

Conservation status:—Critically Endangered—CR-B2a,b(iii). *Delairea aparadensis* has a confirmed area of occupancy (AoO) of less than 1 km², with only one population known. The species unfortunately cannot be considered satisfactorily safe, because of the ongoing trend of reduction of environment protection areas in the region, due to the pressure caused by the agricultural advance in Santa Catarina state (Hassemer *et al.* 2015) and in Brazil as a whole, leading to the conversion of natural environments in agricultural and silvicultural lands. According to Hassemer *et al.* (2015), Asteraceae is the family with most species exclusive to Santa Catarina state. Some examples of micro-endemic species of Asteraceae in the Aparados da Serra region are *Baccharis chionolaenoides* Falkenberg & Deble (2010: 64–67), *Baccharis scopulorum* Schneider & Heiden (2011: 9–13), *Conyza retirensis* Cabrera (1959: 196), *Hysterionica matzenbacheri* Schneider in Schneider & Boldrini (2012: 51–54), *Hysterionica pinnatisecta* Matzenbacher & Sobral

(1996: 16), *Malmeanthus catharinensis* King & Robinson (1980: 226–227), besides these examples there are dozens of micro-endemic species from other families and an elevate number of rare and threatened species.

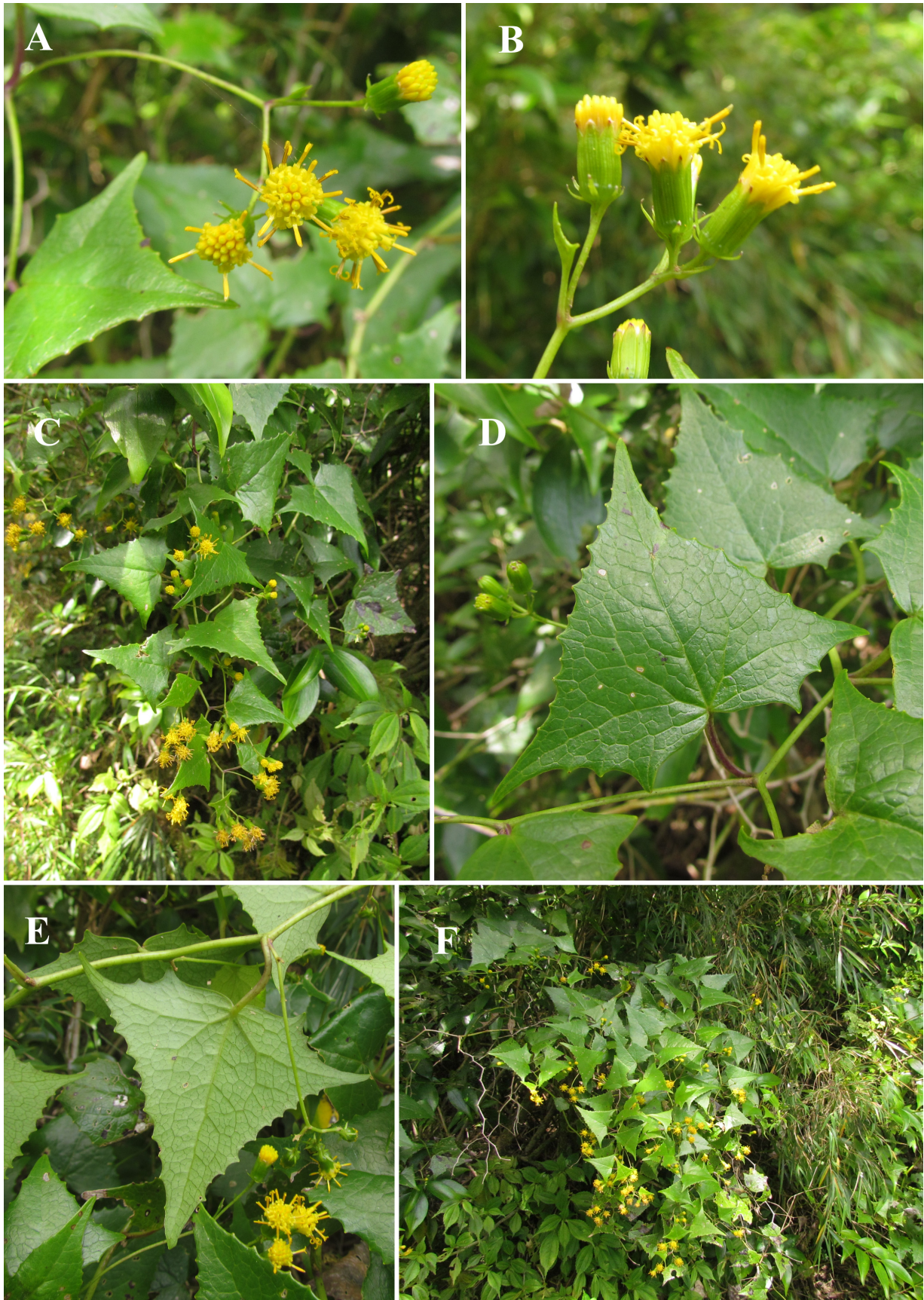


FIGURE 1. *Delairea aparadensis*. A. Capitulescence in frontal view, with four capitula, showing the homogamous flowers. B. Capitulescence in lateral view, showing the rhomboid bracteole, calyculc and involucre. C. Apex of a flowering branch. D. Leaf blade in adaxial surface. E. Leaf blade in abaxial surface. F. Habit.

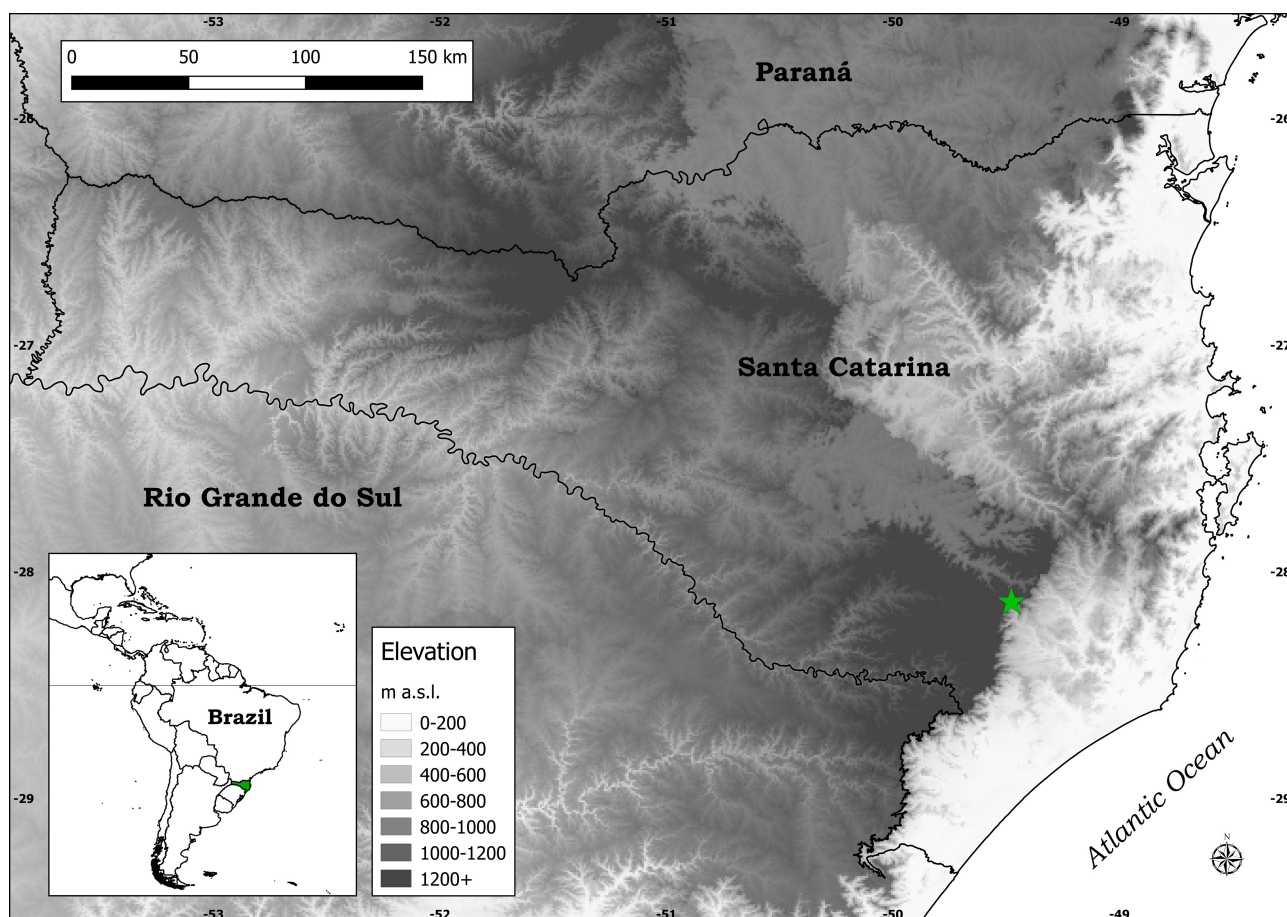


FIGURE 2. Distribution map of *Delairea aparadensis* (Asteraceae, Senecioneae) in Santa Catarina state, southern Brazil.

Observations:—This species is morphologically extremely distinct from all South American species of Senecioneae. According to the identification keys in Cabrera (1957), the new species matches best with *Senecio* sect. *Delairea* Bentham & Hooker (448: 1873) due the climbing habit, with foliose stems, leaves succulent, palmatinervate, capitulescences in dense cymes capitula discoid, homogamous, style branches truncate, pilose on the apex, and glabrous cypselae. According to the current classification of the tribe (e.g. Nordenstam 2007), Cabrera’s *Senecio* sect. *Delairea* is accepted as the hitherto monotypic genus *Delairea*, with its sole species, *D. odorata* (= *S. mikanioides* Otto ex Walpers [1845: 42]), being a South African native that was introduced and became naturalised in many continents.

Despite these similarities, *D. aparadensis* is notably distinct from *D. odorata*, being a scandent subshrub vs. vines in *D. odorata*, the leaves are deltoid with dentate margins vs. subcordiform polygonal-lobed with entire margins in *D. odorata*. Additionally, the capitulescence of *D. odorata* is composed by dozens of capitula vs. 2–6 capitula in *D. aparadensis*. Despite the fact that *D. odorata* can be found cultivated, naturalised or invasive in the Americas, also in southern Brazil, this species is originally from South Africa, while *D. aparadensis* is, according to all evidence, native to the southern Brazilian cloud forests, an environment known for high prevalence of plant endemism (Hassemer *et al.* 2015).

TABLE 1. Main morphological differences between *Delairea aparadensis* and *D. odorata* (Asteraceae, Senecioneae).

	<i>D. aparadensis</i>	<i>D. odorata</i>
Habit	Scandent subshrub	Vine
Leaf blade	Deltoid, base sagittate, margin dentate, coriaceous	Subcordiform, polygonal, margin entire, succulent
Capitulescence	2–6 capitula	20+ capitula
Distribution	Endemic to Morro da Igreja, in Parque Nacional de São Joaquim, Santa Catarina state, southern Brazil	Native to South Africa in Eastern Cape, KwaZulu-Natal and Western Cape provinces, nowadays widespread as a naturalised weed in many continents

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