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

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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, Pelser et al. 2007, Teles 2008, Teles & Stehmann 2016). Included in this tribe is the subtribe Senecioninae Dumort., with the megadiverse genus Senecio Linnaeus (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, 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

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.


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 calycule ca. 5, lanceolate, 0.8–6 mm long; involucral 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, carpopodium 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, calycule and involucre. C. Apex of a flowering branch. D. Leaf blade in adaxial surface. E. Leaf blade in abaxial surface. F. Habit.
**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 to 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).

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