Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 11(6): 1812, 12 December 2015 doi: http://dx.doi.org/10.15560/11.6.1812
ISSN 1809-127X © 2015 Check List and Authors

Two new records of endemic and endangered angiosperms in Santa Catarina, Brazil

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Abstract: The two endemic, endangered species, *Baccharis hypericifolia* (Asteraceae) and *Hypericum salvadorense* (Hypericaceae), were known only for the Rio Grande do Sul state, in Brazil. In this paper we report two new occurrences of these species in Santa Catarina, expanding their geographic distribution to the north. *Baccharis hypericyfolia* and *H. salvadorense* were collected in areas of PPBio (Programa de Pesquisa em Biodiversidade) project. These novelties evidence the presence of knowledge gaps regarding the flora and little collecting effort in the grasslands from Southern Brazil.

Key words: Asteraceae; Hypericaceae; distribution gaps; taxonomy

Baccharis hypericyfolia Baker and *Hypericum salvadorense* N.Robson, are two endangered species endemic to southern Brazil. They were known only from Rio Grande do Sul (RS), and given their rarity and threats, both were included as endangered (EN) in the Official List of Threatened Flora of Rio Grande do Sul (FZB/RS Decreto 52,109/2014). Their assessment was made according to IUCN Red List Criteria (IUCN 2014) with regional adjustments using the LIVE (Lista Vermelha) System (http://www.liv.fzb.rs.gov.br/). Undoubtedly the main threat for these two species is habitat loss, mostly due to the expansion of agriculture and forestation in areas where both occur.

The aim of this study is to report two new records for the flora of Santa Catarina (SC) and fill knowledge gaps regarding the grasslands from Southern Brazil.

Vouchers of these new records were incorporated into the herbarium of the Instituto de Ciências Naturais of the Universidade Federal do Rio Grande do Sul (ICN; acronym according to Thiers 2015). Specialized literature and experts on the referred genera were consulted to confirm the species' identifications. The geographic distributions were checked in scientific articles and two databases (speciesLink; Lista de Espécies da Flora do Brasil 2015). For preparation of the map, when there were no specific coordinates cited for prior records of *Baccharis* and *Hypericum*, we use the centroid obtained in Global Gazetteer Version 2.3 (http://www.fallingrain.com/world/).

The new records of angiosperms for Santa Catarina state are listed below:

Baccharis hypericifolia Baker, Martius, *Fl. Bras*. 6(3): 69–70. 1882. Figure 1A and B.

Herb 0.3–0.7 m tall. Leaves alternate, sessile, ovate-elliptical, imbricated at the apex of the branches, glabrous, 1–3-nerved, margins entire or incise-dentate, apex acute and base obtuse semi-amplexicaul. Capitula sessile or subsessile, isolated in the armpit of the leaves. Female capitula with cylindrical involucre. Involucral bracts acute, hyaline at margin and brown at the apex, arranged in three series: external, ovate-lanceolate; internal, lanceolate. Female flowers, 3–4, tuberous-filiform corolla 1.8–2 mm length with dentate margin. Cypsela 1.5–2 mm long. Male capitula with campanulate involucre. Involucral bracts acute, arranged in two-three series: external, ovate-lanceolate; internal, lanceolate. Male flowers, 4–8, corolla 2.8 mm length with apex 5-lobed, revolute.

Notes: This is a rare species found in high and humid grasslands of Rio Grande do Sul and Santa Catarina (Figure 2). *Baccharis hypericifolia* resembles *Baccharis serrula* Sch.Bip. *ex* Baker and *Baccharis axillaris* DC., from which it differs by habit and 1–3-veined leaved that are entire or incise-dentate at the apex (Oliveira and Marchiori 2006). The description of *B. hypericifolia* corresponds to a summary of Oliveira and Marchiori (2006).

Our data represents the first record of *B. hypericifolia* for Santa Catarina's flora and expands the species' distribution 85 km north (Painel, Santa Catarina) (Table 1). According to Nakajima et al. (2013) the presence of alien species, agriculture and fire are the main threats to the survival of this species. Thus, given the ecological specificity (humid grasslands) of this species and habitat loss, we agree it deserves attention. According to Shine and Klemm (1999) human activities have caused the reduction of wetlands worldwide, resulting in loss of associated biodiversity. As we know, the loss of these ecosystems in South Brazilian grasslands are not different and, therefore, represents a real threat to this species.

Material examined: Brazil. Rio Grande do Sul: São Francisco de Paula, RS202, em campo de altitude, próximo ao banhado, fl. fem., 25 November 2005, *A.A. Schneider 1196* (ICN 141083); São Francisco de Paula, RS202, em campo de altitude, úmido, 20 November 2007, *A.A. Schneider 1555* (ICN 189658). Santa Catarina: Painel, Área 4 Projeto PPBio, WGS84, 27°59′54.0″ S, 050°09′19.6″ W, 29 January 2015, *C. Vogel-Ely & K. Helmicki 385* (ICN 182230).

Hypericum salvadorense N.Robson, *Bull. Br. Mus. Nat. Hist.,* Botany Series 20(1): 79–80. 1990. Figure 1c–e

Shrub or subshrub 0.3–0.7 m tall, erect. Leaves opposite-decussate, rarely 3-whorled, sessile, narrowly oblong to oblong, narrowly ovate to ovate, rarely obovate, margins incurved, apex obtuse to rounded-cucullate, base parallel-sided to subcordate, decurrent (pair forming shallow V), basal veins 1, rarely branched; laminar glands dense. Inflorescence 3–31-flowered, grouped in dichasial and monochasial cymes, rarely pleiochasial cymes. Flowers 8–15 mm in diam. Sepals unequal. Petals yellow, asymmetric, apiculus absent or obsolete. Stamens arranged in a continuous ring. Styles 3(–4). Capsule black to reddish-brown. Seeds brown.

Notes: This rupicolous species, rarely terrestrial, is restricted to the states of Rio Grande do Sul and Santa Catarina (Figure 2). *Hypericum pedersenii* N.Robson (restricted to Rio Grande do Sul) resembles *H. salvadorense,* from which it can be distinguished by having narrowly elliptic leaves with truncate or attenuate base and equal sepals (Vogel-Ely and Boldrini 2014).

Until now, *H. salvadorense* was known from Bom Jesus, Montenegro, Porto Alegre and Salvador do Sul in Rio Grande do Sul (Robson 1990). In this study, we report the first record of *H. salvadorense* from Santa Catarina, expanding its distribution 100 km north (Painel, Santa Catarina), 170 km west (Espumoso, Rio Grande do Sul), 150 km south (Encruzilhada do Sul, Rio Grande do Sul) and 50 km east (Glorinha, Rio Grande do Sul). We also indicate other collection points of this species in Rio Grande do Sul (Table 1). In its natural habitat, we found *H. salvadorense* growing on rocks, usually on hill tops. Most of these hill tops in southern Brazil are not protected by law anymore (BRAZIL Lei 12,651/2012) and, therefore, these open habitats have been commonly converted into forestry areas (e.g., *Pinus* spp., *Acacia* spp., *Eucalyptus* spp. and *Malus* spp.). Forestation is extremely compromising for heliophytic species like *H. salvadorense* and, probably represent the main threat for this species.

Material examined: Brazil. Rio Grande do Sul: Encruzilhada do Sul, Cerro São Salvador, WGS84, 30°31′58.73″ S, 052°33′56.92″ W, 27 November 2012, fl., *C. Vogel-Ely, S. Bordignon, G.E. Ferreira 114* (ICN 176281); Espumoso, Boron, beira do arroio Butiá, August 1998, *D. Guadagnin, J. Larocca & M. Sobral* (ICN 176282); Farroupilha, 18 November 1957, *Camargo 2586* (PACA 61925); Glorinha, divisa com Taquara, Maracanã, WGS84, 29°46′56.80″ S, 050°46′27.63″ W, 21 January 2013, *C. Vogel-Ely & S. Bordignon 115* (ICN 176283); Montenegro, Keppesberg, 29 December 1946, *E. Henz* (HUCS 1613, PACA 35800); Nova Petrópolis, Linha Brasil, Pedras do Silêncio September 2004, *M. Grings* (ICN 192126); Vacaria, Fazenda da Ronda, 3 January 1947, *B. Rambo SJ* (PACA 34787). Santa Catarina: Painel, Área 4 Projeto PPBio, WGS84, 27°59′54.0″ S, 050°09′19.6″ W, 29 January 2015, *C. Vogel-Ely & K. Helmicki 388* (ICN 182233).

This reports new sites where *B. hypericifolia* and *H. salvadorense* are recorded in Brazil. These data are especially important since they expand the known distribution of these two species, which are endemic to the South Brazilian grasslands. Furthermore, both species are in the Red List of Rio Grande do Sul (FZB/RS Decreto 52,109/2014) and both have less than 10 known locations. According to the Red List of Brazil's flora (Nakajima et al. 2013), *B. hypericifolia* is categorized as Endangered (EN), while *H. salvadorense* has not been evaluated.

These data are important for conservation of *B. hypericifolia* and *H. salvadorense* because knowledge of their biology, ecology, and especially, distribution (number of locations) is essential for assessing the threats to these species. Thus, if there is a higher number of known locations, the prospects for these species to survive in the wild will also tend to be higher.

ACKNOWLEDGEMENTS

We are grateful to Kassiane Helmicki for providing photos and for the help during fieldwork. We also thanks *PPBio Campos Sulinos — Vegetação campestre* for supporting this work.

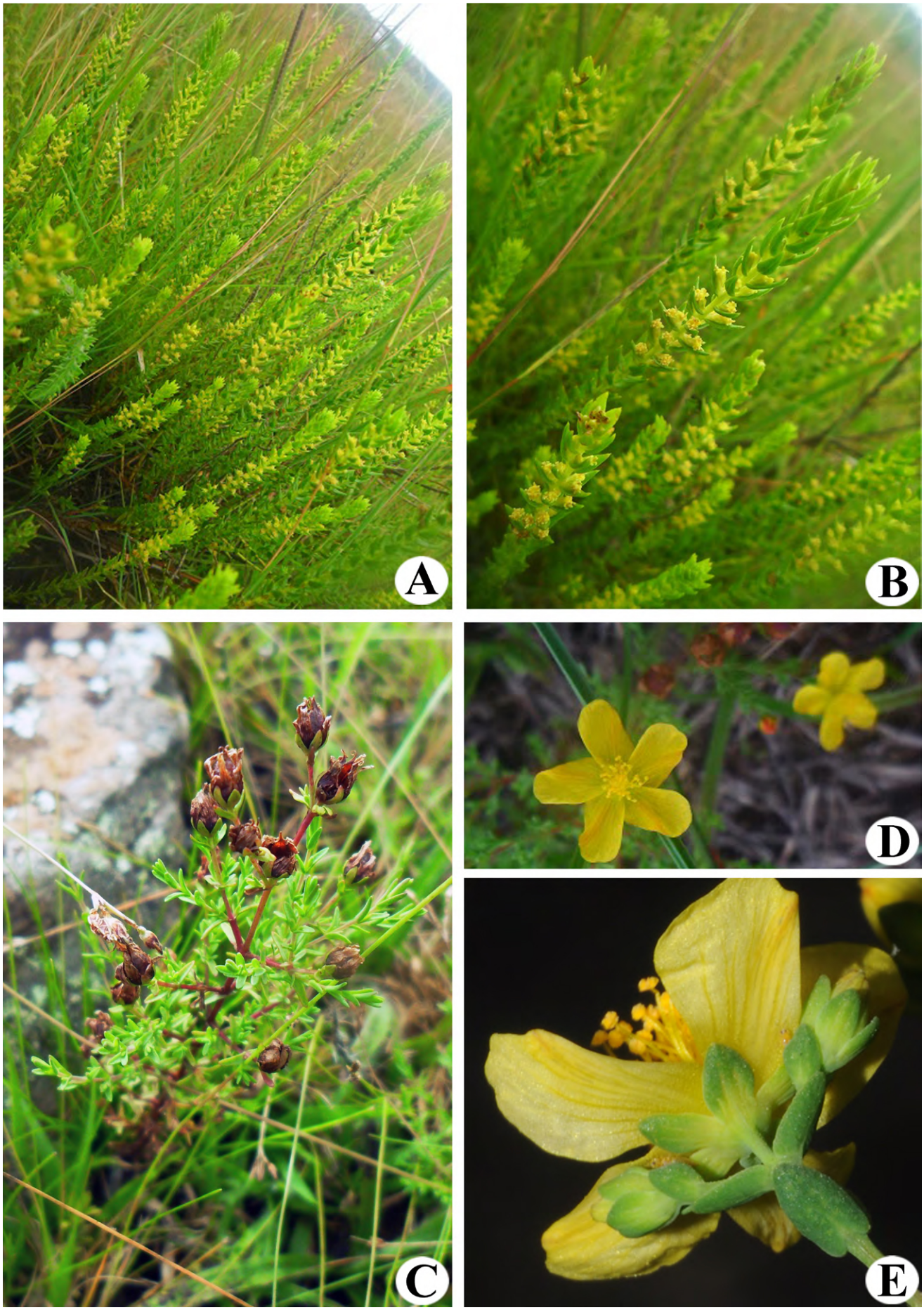

Figure 1. A–B. *Baccharis hypericifolia*. A. Habit. B. Capitula in the armpit of the leaves. **C–E.** *Hypericum salvadorense.* C. Habit. D. Flower. E. Leaf base subcordate. (Photos A, B and D by K. Helmicki, C by C.V. Ely and E by S.A.L. Bordignon).

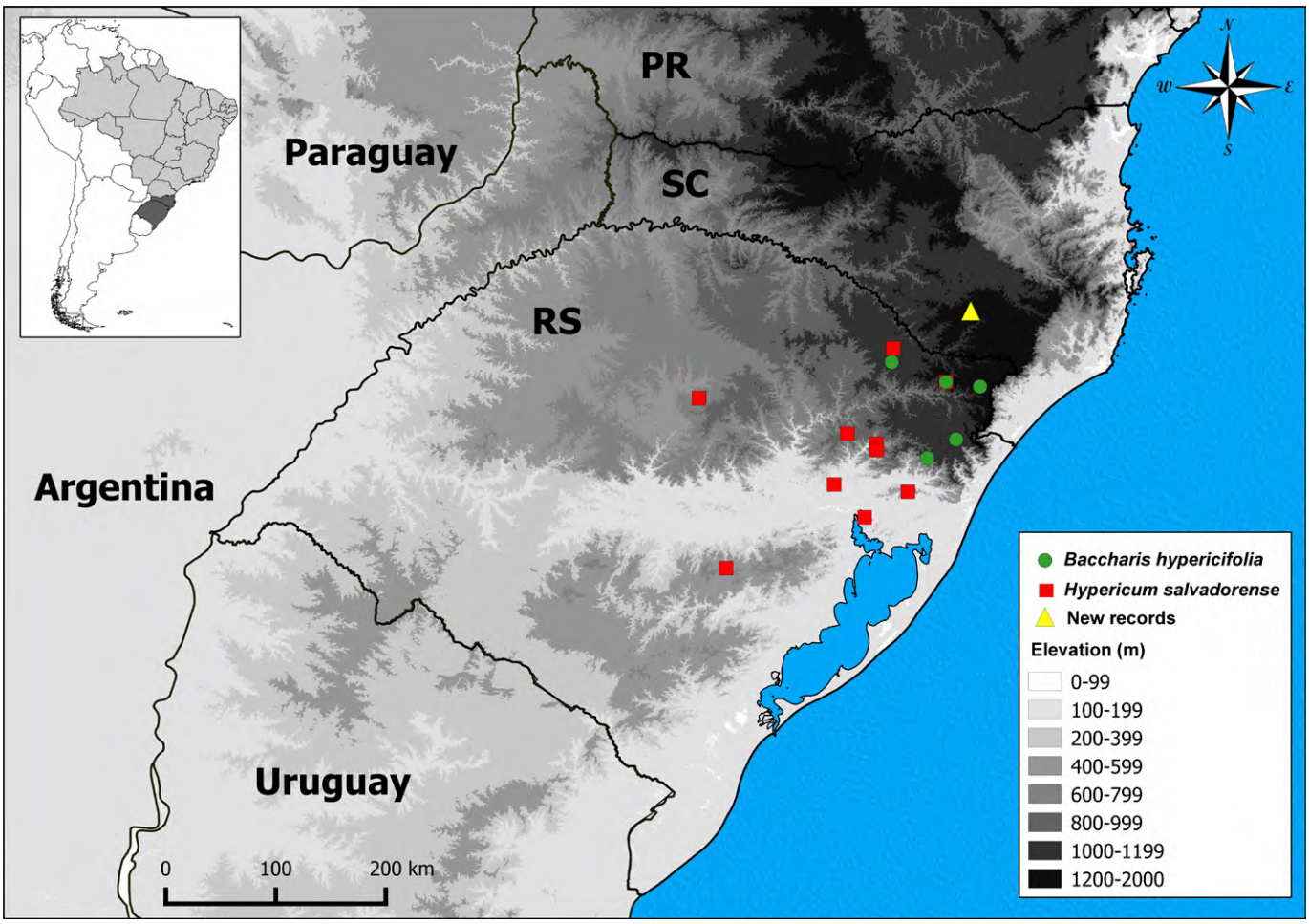

Figure 2. Geographic distribution of *Baccharis hypericifolia* and *Hypericum salvadorense* (WGS84).

Table 1. Known records of *Baccharis hypericifolia* and *Hypericum salvadorense* in Rio Grande do Sul (RS) and Santa Catarina (SC), Brazil.

City/state	*Baccharis hypericifolia*	*Hypericum salvadorense*
Bom Jesus/RS	−28.700000 , −50.400000	−28.700000 , −50.400000
Encruzilhada do Sul/RS	—	−30.532778 , −52.565556 (*)
Espumoso/RS	—	−28.733300 , −52.850000 (**)
Farroupilha/RS	—	−29.233300 , −51.350000 (**)
Glorinha/RS	—	−29.782445 , −50.774341 (*)
Montenegro/RS	—	−29.700000 , −51.466700
Nova Petrópolis/RS	—	−29.309601 , −51.084700 (*)
Nova Petrópolis/RS	—	−29.366700 , −51.133300 (**)
Painel/SC	−28.003333 , −50.157778 (*)	−27.998333 , −50.155278 (*)
Porto Alegre/RS	—	−30.033300 , −51.200000
São José dos Ausentes/RS	−28.746600 , −50.064500	—
São Francisco de Paula/RS	−29.450000 , −50.583300	—
Vacaria/RS	−28.506100 , −50.933800	−28.506100 , −50.933800 (**)

*new georeferenced records (WGS84); **new records with coordinates obtained from Global Gazetteer Versopm 2.3 (centroid).

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Author contributions: CVE collected the data and wrote part of the text; IIB wrote part of the text.

Received: 2 Sepetember 2015
Accepted: 8 December 2015
Academic editor: Alexander Zizka