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Short Communication

Stichelia pelotensis (Lepidoptera, Riodinidae): conservation, notes, and rediscovery of an endangered butterfly from southern Brazil

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ABSTRACT

Stichelia pelotensis (Lepidoptera, Riodinidae) is an endemic and threatened butterfly from the Pampa biome in southern Brazil, and has not been recorded in its type locality in the last 56 years. Recently, a population was found in two sites from extreme south Brazil, Pelotas, Rio Grande do Sul state. These records are an important find given the conservation status of *S. pelotensis*, since all the information gathered is new and involve the natural history of this species. The information obtained is useful for the management, monitoring and conservation priorities of this species and its associated habitats, since its known distribution is restricted to a narrow area in the Rio Grande do Sul Coastal Plain inside this threatened biome in southern Brazil.

Riodinid butterflies (Lepidoptera, Riodinidae) are highly concentrated in the Neotropics (c.a. 95%), and occupy a wide range of environments, usually restricted to some specific microhabitats (Brown, 1993; DeVries, 1997). *Stichelia* Zikán, 1949 (Symmachiini) comprises five species distributed in southern and southeastern South America (Callaghan and Lamas, 2004; Dias et al., 2013). In Rio Grande do Sul, the southernmost state of Brazil, three *Stichelia* species have been recorded in areas including Atlantic Forest and Pampa biomes: (1) *Stichelia bocchoris* (Hewitson, 1876), widespread and occurring in forested habitats within the two biomes; (2) *S. dukinfieldia* (Schaus, 1902), with only one record in the São José dos Ausentes municipality (>900 m a.s.l.) in the highlands of the Atlantic Forest; and (3) *Stichelia pelotensis* Biezanko, Mielke and Wedderhoff, [1979], present in a narrow area stretching along the Rio Grande do Sul Coastal Plain (Siewert et al., 2014a), between Pampa and Atlantic Forest biomes. The latter species was described based on eight specimens collected during the 1950s in the Pelotas municipality, and since then no other individuals have been observed in this same region (Krüger and Silva, 2003; Siewert et al., 2014a). The only additional record of a single female came in April 2001 from the Parque Estadual de Itapuã (30°22′52″ S, 51°01′25″ W), a protected area located in the Viamão municipality (L.A. Kaminski, Pers. Comm.), about 250 km north of Pelotas.

In Brazil, there is a great effort to better know the distribution, natural history and conservation of threatened butterflies, and during the last few years efforts involving several threatened species have been successful, including actions concerning, mainly, the rediscovery of populations and an increase of the known geographical distribution of butterflies in different ecosystems within Brazil (Freitas et al., 2011, 2014; Greve et al., 2013; Gomes et al., 2014).

Recently, the red list of the endangered fauna from Rio Grande do Sul state was updated, and 18 butterfly species were categorized as threatened (Federal law 51.797/14). Most of these species belong to the Atlantic Forest domain, and only a few species are associated with formations in the Pampa biome. This scenario is probably due to (1) the large sampling efforts to increase the knowledge of the butterflies within the equally threatened Atlantic Forest habitats; (2) the lack of recent and both optimized and specific inventories of butterflies in the Pampa; and (3) the small number of existing projects and limited funding available to support conservation programs aiming to increase the knowledge of the Pampa biodiversity. *S. pelotensis* is an example of this alarming scenario, giving that its known distribution is based only on historical records, and due to its restricted distribution linked with its supposed endemism and rarity, this species was evaluated as “Critically Endangered” within Rio Grande do Sul state (Federal law 51.797/14).

In this study, the rediscovery of *S. pelotensis* in south Brazil is reported, including information in the natural history and behavior of adults, and of its current conservation. Seven adult individuals of *S. pelotensis*, six males and one female, were observed in two

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Figs. 1–2. General view of the habitat used by the individuals of *Stichelia pelotensis*, a stretched area of arboreal vegetation along Embrapa watercourses surrounded by grasslands (1); detailed site in which most individuals of *Stichelia pelotensis* were observed, including a marshy environment with small trees and shrubs (2).

sites near of Embrapa Clima Temperado Center (Empresa Brasileira de Pesquisa Agropecuária) (31°40′53″ S, 52°26′22″ W), located in the Monte Bonito district, about 17 km from Pelotas municipality, Rio Grande do Sul, Brazil. The specimens were associated to areas of arboreal vegetation (Fig. 1), flying near the ground, and most of them were observed near a marsh surrounded by grasslands (Fig. 2). The first record was on November 21, 2014, in which a single male was observed at 12:30 h feeding on an inflorescence of *Sapium glandulosum*. On January 14, 2015, in another nearby place 250 m away from the first one (these two sites are separated by an unpaved road used for car access) four additional males were observed. One male was recorded in the late morning, about 11:30 h, perching on *Desmodium incanum* DC (Fabaceae) (Fig. 3), and the other three males were seen during the early afternoon from 14:30 h to 14:45 h. The climate was cloudy and muggy, and all individuals were close to each other perching under leaves of the same *D. incanum*. On January 21, 2015 a male and a female were observed feeding on *Eryngium elegans* flowers (Fig. 4) from 12:40 h to 12:50 h. Before

Figs. 3–4. (3) Male of *Stichelia pelotensis* perching in an individual of *Desmodium incanum* in the study area; (4) female of *Stichelia pelotensis* feeding in the inflorescence of an individual of *Eryngium elegans* in the study area.

feeding on the plant, the female was perching on grass also close to the ground. After feeding, both specimens flew away in a rapid and erratic flight and were not seen again. The climate was sunny, humid and very warm. In subsequent days no additional individuals were observed. Two males were collected and the voucher specimens are deposited at the Museu Entomológico Ceslau Biezanko (MECB), Universidade Federal de Pelotas, Pelotas, Rio Grande do Sul, Brazil.

During the entire study period, no territorial (such as chasing and aerial interactions with other butterflies and with different *S. pelotensis* individuals) or courtship behavior was observed, as well as any females attempting to lay eggs.

These records of *S. pelotensis* are the first in its type locality since its original description (Biezanko et al., 1979). The lack of information of the biology, natural history and occurrence of *S. pelotensis* in the region of Pelotas is probably due to under sampling as well as absence of specific inventories targeting this species. Although, Krüger and Silva (2003) did carry out several collections in the region of Pelotas about 12 years ago, the sites collected most likely did do not include areas inhabited by *S. pelotensis*. Moreover, within the description of the species, the authors do not provide detailed information on sites or localities inside the Pelotas region (Biezanko et al., 1979), so that the precise location in which to search for the butterfly cannot be determined.

Like many riodinids, *S. pelotensis* probably occurs in low densities, and has small and erratic populations active during only a few months of the year (Callaghan, 1978; Brown, 1993). All the results presented herein are new information on the natural history of the species, including: (1) the duration of occurrence across the year (November and January, in late spring and early summer), (2) the feeding habits on two flowering plant species, (3) the period of activity during the day, and (4) the probable type of habitat use. This kind of information is useful for the management, monitoring and conservation priorities concerning this butterfly and its associated habitats.

The records made in November and January may raise two hypotheses: (1) the species is univoltine and the sampled Spring and Summer are warmer and more humid than the usual allowing a temporal fluctuation of *S. pelotensis*; or (2) the species is bivoltine with two peaks of adult occurrence (November to January and March and April). The monitoring of the Embrapa population should help to elucidate this issue, indicating if this period of November 2014 and January 2015 is atypical and rare, resulting in the increase in sightings of this butterfly.

The observations of *S. pelotensis* were made in a private area, and some of its area is protected, thus, the maintenance of the arboreal vegetation along the watercourses in Embrapa is crucial. The suggestion of management measures in the marsh environments and their associated areas of trees and shrubs that delimit different grassland areas may ensure the protection and persistence of a viable population of this butterfly through time. Thus, the concentration of optimized and specific inventories are needed to verify the maintenance of this population, given that the continuous narrow areas of arboreal vegetation (Fig. 1) possibly serve as green corridors for several species, including *S. pelotensis*. Moreover, the known immatures of other species of *Stichelia* feed on *Miconia* spp. (Melastomataceae) (Beccaloni et al., 2008) and in the study area several individuals of *Miconia* were observed, indicating a possible resource for females to lay their eggs.

S. pelotensis is one of a few species of butterflies that are considered endemic and very rare in Rio Grande do Sul, and despite its records are in the Pampa biome (Fig. 5), these areas are associated with Atlantic Forest Domain, being composed by ‘Restinga’ forest allied with lacustrine environments, ‘Butiazal’ formations and dunes (Câmara, 2003). This environment is unique in southern Brazil, evolving throughout the Holocene and Pleistocene with