ARGENTINATACHOIDES, A NEW GENUS FROM ARGENTINA PUTATIVELY RELATED TO THE AUSTRALIAN-TASMANIAN *TASMANITACHOIDES* ERWIN 1972 (COLEOPTERA: CARABIDAE: BEMBIDIINI)

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ABSTRACT

Argentinatachoides balli new genus, new species in the tribe Bembidiini is described and illustrated and its microhabitat noted. Adults of this new species were found in Argentina, east of the Andean Cordillera, in Mendoza and La Rioja Provinces. The subulate apical palpomere and other characters place this new genus in Bembidiini, and the sub-oblique notched anterior tibia assign it to the subtribe Tachyina. Structural attributes, for example the elytral recurrent groove appearing double and the symmetrical basal lobes of the aedeagal median lobe indicate that this species is related to the Australian-Tasmanian genus, *Tasmanitachoides* Erwin 1972. This discovery amplifies the known range of a particular fauna of Carabidae that was once widely distributed in the

1

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western part of Gondwana. Some aspects of the biogeography of the group are discussed.

KEY WORDS: Austral Gondwana, Argentina, Bembidiini, Tachyina, *Argentinatachoides balli* **n. gen. n. sp**.

RESUMEN

En la presente contribución se describe un nuevo género y especie de Bembidiini de la Argentina. Este nuevo taxón fue colectado en la región oeste de Argentina, en la vertiente oriental de Los Andes en las provincias de Mendoza y La Rioja. El palpito apical de los palpos maxilares y labiales reducido, ubica a este nuervo género dentro de Bembidiini, y la escotadura en la región apical de la protibia, lo ubica dentro de la subtribu Tachyina. Otras características morfológicas, como el surco recurrente de los élitros doble y la simetría de los lóbulos basales del lóbulo medio del edéago, lo relacionarían con el género *Tasmanitachoides* Erwin de Australia y Tasmania. El descubrimiento de este nuevo carábido aporta nuevos datos sobre la particular fauna que existió en la región occidental de Gondwana. Se describe e ilustra el adulto y se discuten algunos aspectos de la distribución del grupo.

PALABRAS CLAVE: Austral Gondwana, Argentina, Bembidiini, Tachyina, *Argentinatachoides balli* **n. gen. n. sp**.

INTRODUCTION

The southern part of South America has a particular pan-austral fauna, especially among insects (e.g. see Brundin, 1966). Within the Carabidae, several tribes such Broscini, Migadopini, and Zolini (Roig-Juñent, 2000) exhibit a congruent pan-austral pattern of distribution, The presence of congeneric species in distant circum-Antarctic areas is also recorded for other insects, as well as plants, such as species in the genera *Nothofagus* and *Araucaria* (Cranwell, 1963, Drinnan and Crane, 1989, Hiroaki, *et al.* 1998). The taxa that inhabit Australia, New Zealand, and South America were considered by Jeannel (1967) as the Paleantarctic elements of Gondwana.

Southern South America is an under-explored area, principally in Patagonia and along the Andean mountains. Expeditions made in Mendoza and La Rioja provinces of Argentina led to the discovery of this undescribed genus and species of Bembidiini. This new taxon appears related to species of the genus *Tasmanitachoides* Erwin, presently known from Northern Australia to Tasmania (Erwin, 1972, Baehr, 1990, 2001). The presence of this new genus in South America, and *Tasmanitachoides* in the Australian Region is congruent with the distribution of others groups that occur only in South America and Australia, but are not known in New Zealand. The genera of insects that present this distribution were considered by Jeannel (1967) as young groups of a Paleantarctic element, because these two areas, South America and Australia were the areas that remained united until the Cenozoic (Flemming, 1975, Dalziel, 1983, Vizcaíno *et al.,* 1998).

The aim of this contribution is to describe this new genus and species of Bembidiini, propose a preliminary relationship with other bembidiine genera, and to consider some biogeographical aspects of the new discovery.

MATERIAL AND METHODS

This study is based on the examination of seven adult specimens, three males and four females, one of which is in ethanol for future molecular studies. Specimens are deposited in the entomological collections of the following institutions (indicated in the text by codons). Names of curators of these collections are in parentheses. **IADIZA**: Instituto Argentino de Investigaciones de Zonas Áridas Mendoza, Argentina (Sergio Roig-Juñent); **MACN:** Museo Argentino de Ciencias Naturales, “Bernardino Rivadavia” (Arturo Roig-Alsina); **NMNH:** United States National Museum of Natural History, Smithsonian Institution (Terry L. Erwin).

Techniques. Dissections were made following the techniques recorded in previous contributions of South American Bembidiini (Roig-Juñent and Scheibler, 2004). Drawings were made with camera lucida. The images were made with a Wild Heerbrug photomakroshop M400 Microscope, using AutoMontage software.

Measurements. The only measurement reported is overall length (ABL), and was taken from the clypeus to the apex of the left elytron (Erwin and Kavanaugh, 1981).

Terms. For morphological terminology, we follow the criteria proposed by Erwin (1972).

SPECIES ACCOUNT

Argentinatachoides Sallenave, Erwin, and Roig-Juñent, **new genus**

(Figs. 1 – 3)

Type species: *Argentinatachoides balli* Sallenave, Erwin, and Roig-Juñent, **new species**, by present designation and monotypy. **Etymology:** The name

Argentinatachoides derives from Argentina, the country where the new species was found, together with – *tachoides*, a reference to its inferred relationship with *Tasmanitachoides* Erwin 1972. **Diagnosis:** Head with frontal furrows deeply sulcate anteriorly, shallowly arcuate toward gena, extended slightly past posterior eye margin; frons slightly convex. Labrum shallowly arcuate; clypeus with two pairs of setae. Ultimate maxillary and labial palpomeres very small, subulate, one-fourth length of penultimate; ligula tetrasetose. Protibial apex subobliquely notched; male protarsomeres not dilated. Elytron with scutellar interneur present, deep, markedly elongate; interneur 5 not sulcate at base; only interneur 1 extended to apex; humeral margin extended to level of interneur 4; recurrent groove doubled. Median lobe of aedeagus with basal lobes symmetrical. Dorsal and ventral surface of body, including eyes, with short, sparse, fine setae. **Description:** *Form.* Large-headed, elongate, depressed, parallel-sided with narrow prothorax (Figs. 2–3). *Color* of whole body reddish. *Head.* Head across eyes slightly wider than prothorax. Antennomeres 1–3 sparsely setose, 4th sparsely setose in basal two-thirds, pubescent and setiferous in apical third, 5–11th pubescent and setiferous (Fig. 4). Maxillary and labial palpomeres 1–3 densely setiferous. Ligula tetrasetose, with two medial long setae and two shorter lateral ones; paraglossae glabrous, rounded, and surpassing the ligula. Mentum not foveate; median tooth rounded (Fig. 6). *Elytra.* With suture more impressed than the remaining interneurs (Fig. 5), complete; striae 1-3 well impressed, 4-6 barely impressed, 7 effaced anteriorly and deeply impressed at the apex, parallel to recurrent groove. Stria 3 with three setae (Fig. 1). Lateral series of setae with nine setae, the 2nd, 7th, and 9th longer than the others (Fig. 1). Principle recurrent groove short and deep; second recurrent groove formed by the union of elongate punctures (Figs. 1, 5). *Legs.* Protibial apex subobliquely notched. Male protarsomeres not dilated. *Aedeagus.*

Median lobe with the basal lobes symmetrical. Parameres styliform, with four setae on each, three apical setae and one subapical (Fig. 7). *Notes.*--Within Tachyina, adults of *Argentinatachoides balli* have several character states shared only with the genus *Tasmanitachoides* Erwin, such as the clypeus with two pairs of setae, recurrent groove of elytra doubled, and median lobe of aedeagus with the basal lobes symmetrical. Yet they can be easily distinguished from the adults of the genus *Tasmanitachoides* because the interneur 5 is not sulcate at base, the ligula is tetrasetose, the male protarsus is without dilated tarsomeres, and by the presence of a scutellar interneur.

Argentinatachoides balli Sallenave, Erwin, and Roig-Juñent, **new species**

(Figs. 1 – 7)

Specimens examined. – Holotype, male: **ARGENTINA**, **Mendoza Province**, Las Heras, Arroyo Uspallata, puente ciudad, 32° 35´ 25.5" S, 069° 08´ 34.8" W, 27 January 2004, S. Roig (IADIZA). Paratypes: **ARGENTINA, Mendoza Province:** Luján, Agua de las Avispas, 13 October 1999, S. Roig, female, (NMNH), same locality, 26 October 2005, S. Sallenave, E. Ruiz Manzanos and S. Roig, female, (IADIZA); Las Heras, Arroyo Uspallata, puente ciudad, 32° 35´ 25.5" S, 069° 08´ 34.8" W, 27 January 2004, S. Roig, female, (NMNH); Parque Provincial Divisadero Largo, 32º 52.75´ S, 060º 55.69´ W, 14 October 2002, S. Roig, male (IADIZA); **La Rioja Province:** 5 km NE Guandacol, 29° 31´ 32.268" S, 068° 33´ 37.368" W, 16 April 1998, S. Roig, male, (IADIZA).

Etymology. The species is dedicated to Dr. George E. Ball in recognition of his 80th Birthday and his tireless and lasting contributions to the field of Carabidology.

Diagnosis. See under genus above since there is only one species known.

Description. *Length.* ABL = 2 mm. *Color.* Flavotestaceous throughout. *Head.* Dorsal

surface with slightly stretched isodiametric microreticulation. Surface with scattered fine punctures with short setae; a dense patch of setae on gena posteriad of eye. Eyes moderately produced and sparsely setiferous. Head across eyes slightly broader than pronotum. Two supraorbital setae present, one at the middle of the eye and the posterior seta situated posterior to hind margin of eye (Fig. 1). Maxillary and labial palpomeres multisetose (Fig. 6). Mentum with two setae; submentum with two setae. Antennomeres testaceous with a lateral dark brown sensory stripe. Antennomeres 1 to 7 longer than wide, 8-11 wider than the precedents. *Pronotum.* Transverse, cordiform, one-fifth wider than long, five-sevenths width of elytra (Figs. 1–2), widest at anterior third, sides evenly arcuate anteriorly, slightly sinuate posteriorly, rectangular basal angles. Anterior angles not projected. Base slightly arcuate. Median line visible, not deeply engraved. Two lateral setae, the anterior at the first third, the posterior at the hind angle. Two basal fovea. Dorsal surface with slightly stretched isodiametric microreticulation. Surface with scattered fine punctures with short setae. *Elytra.* Elongate, parallel, flat. Humeral margin setulose-serrate to apical third, then setulose to apex. Interneurs finely More or less punctuate. Interneur 3 with three setae. Intervals flat. Umbilicate marginal pores located four behind humerus, two at middle, and two near apex. *Legs.* Femora and tibae with dense short setae. *Aedeagus.* Median lobe long and slender. Apex of median lobe rounded (Fig. 7). Internal sac with small chitineous strips.

DISTRIBUTION

Argentinatachoides balli n. sp**.** is known from localities in two provinces of Argentina, Mendoza and La Rioja (Fig. 8). The distance between these areas is about

1000 kilometers. It is probable that the species occurs elsewhere between the known areas, but due to the small size of the specimens, they have not yet been discovered. Known adults were discovered, in all cases, at the foot of mountains; in Mendoza in the west and east side of the foothills of the Precordillera, a mountain chain that runs parallel to the main Andean uplift. The locality in La Rioja is at the foot of the Andean uplift.

HABITAT

Adults were discovered at the edge of creeks on sandy and clay soil. The border of the creeks present different salt concentration. The quantity of salt vary from one creek to another, for example of Agua de las Avispas had a high quantity of salt and in the Arroyo Uspallata has a lower concentration. The presence of this species in the different habitats show that has a great tolerance to salt. The creeks are about 1200-1800 meters altitude, but the vegetation that surrounds them is not mountain vegetation, rather it belongs to the Monte Biogeographical Province, that is characteristic of Argentine arid lands (Roig-Juñent *et al*., 2001).

SYSTEMATIC CONSIDERATIONS

Argentinatachoides is considered as belonging to Bembidiini because of the subulate apical palpomere, and to the subtribe Tachyina because of the sub-oblique notched anterior tibia. Other morphological features such as head with two sulcate frontal furrows continuous on clypeus, two pairs of setae on clypeus, procoxal cavities uniperforate, male aedeagus with symmetrical basal lobes, and the two recurrent grooves allow us to hypothesize a relationship with the genus *Tasmanitachoides* Erwin that has these character states. However several of these characters states could be plesiomorphic conditions within basal groups of Bembidiini. Erwin (1972) considered

that the presence of symmetrical basal lobes of the median lobe appears in some basal groups of Bembidiini, such as *Tasmanitachoides* and *Bembidarenas* Erwin, many trechines, all patrobines, Anillina, and several others styliferan (*sensu* Jeannel, 1941) carabid groups. Within Bembidiini, the symetrical basal lobes do not occur anywhere else. This particular form suggests a relationship of *Tasmanitachoides* with the tachyine linage which gave rise to the Anillina (Erwin, 1972). The presence of two pairs of setae on clypeus appears in *Bembidarenas.* Also, Erwin (1972) proposed that the species of *Tasmanitachoides* and *Bembidarenas* show similarities to the trechines, and these characteristics indicate an old lineage that maintains characteristics of an early "trechini-bembidiine" stock.

Finally the unique character state that are exclusively shared by *Argentinatachoides* and *Tasmanitachoides* is the presence of doubled recurrent groove that could indicate that these two genera conform a monophyletic group. However, a complete phylogenetic analysis of all genera of Tachyina will be necessary to postulate a relationship of *Argentinatachoides* plus *Tasmanitachoides* with the remaining genera of Tachyina and its place amongst the basal bembidiine stock, as well as a possible relationship with the enigmatic taxa of Gehringiini.

BIOGEOGRAPHIC CONSIDERATIONS

The discovery of this new genus putatively closely related to *Tasmanitachoides* shows the particular and close relation between southern South America and Australian – Tasmania faunas. Jeannel (1967) considered the distribution patterns of the southern taxa as a tool with which the relative age of a carabid group can be determined. Thus, the groups which were distributed in South America and Australia were considered by Jeannel (1967) likely more recent groups, derived from groups that originated in the Eocene, and after New Zealand had separated from South

America and Australia. An example of this is the genus *Pericompsus* (Erwin, 1974). However it is possible that *Tasmanitachoides* and *Argentinatachoides* do not belong to this more recent austral faunal group that are restricted to Australia and South America. Erwin's points of view considers an origin relating *Tasmanitachoides* to Anillina (Erwin, 1972), so the genera *Tasmanitachoides* and *Argentinatachoides* would have a greater antiquity. Thus it may be possible that the common ancestor of these taxa were present when all the austral plates were still joined (Australia, New Zealand, and South America). Considering this point of view, it is possible that in the future a new taxon related to *Tasmanitachoides* plus *Argentinatachoides* might be found in New Zealand. A second question, following the theory of taxon pulses (Erwin, 1985), is what could be the amphitropical adelphotaxon residing in the north temperate region.

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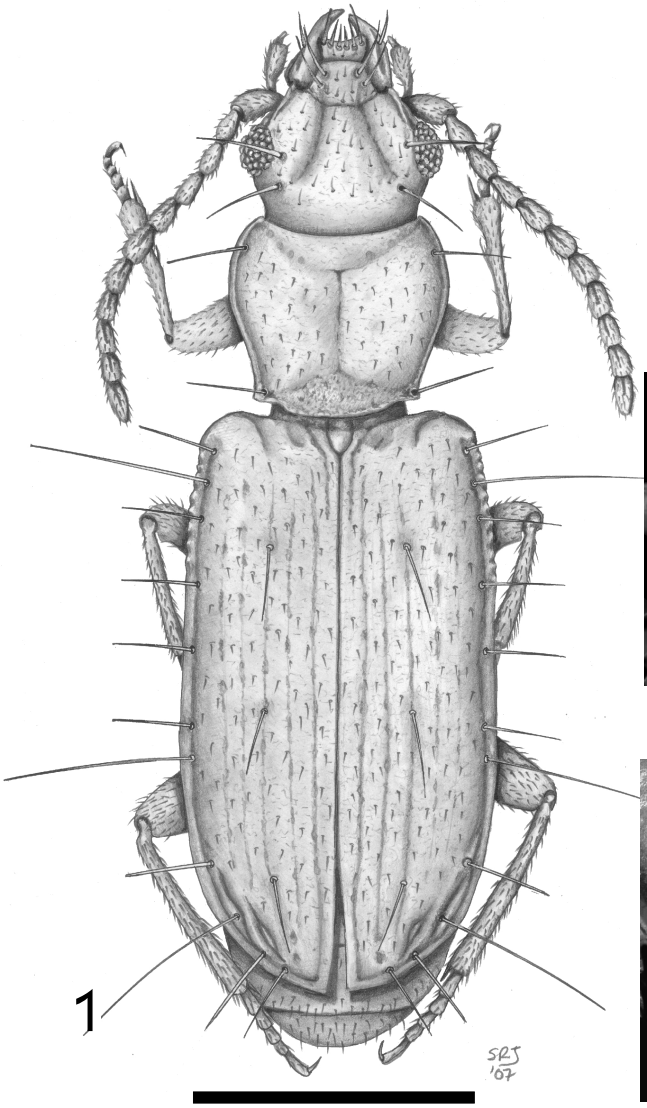
FIGURE CAPTIONS

Figs. 1-5. *Argentinatachoides balli* new species. 1, habitus, dorsal aspect, of; 2, habitus, lateral aspect; 3, head, dorsal aspect; 4, elytra, dorsal aspect; 5, apex of elytra showing the double recurrent groove. Scale 0.5 mm.

Fig. 6. Labium and right maxilla, dorsal aspect, of *Argentinatachoides balli* new species (scale 0.1 mm).

Figs. 7-8. Male genitalia of *Argentinatachoides balli* new species: 7, left lateral aspect; 8 right lateral aspect (scale 0.1 mm).

Fig. 9. Distribution map of *Argentinatachoides balli* new species.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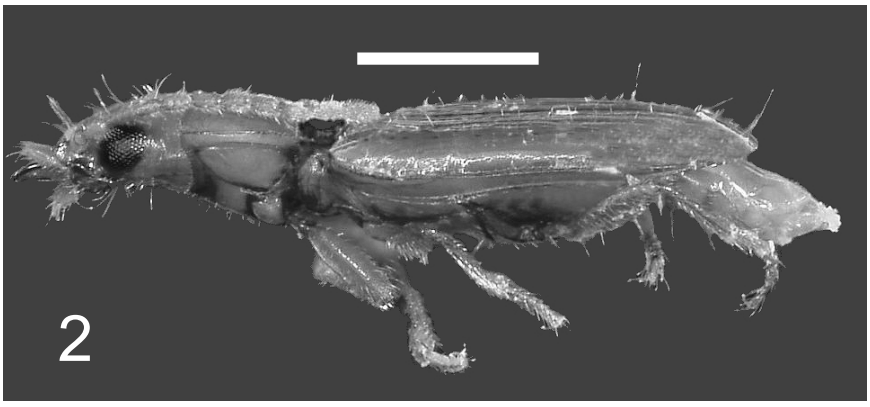
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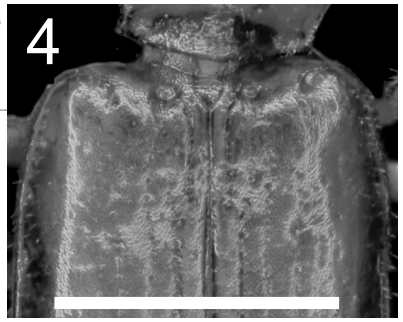
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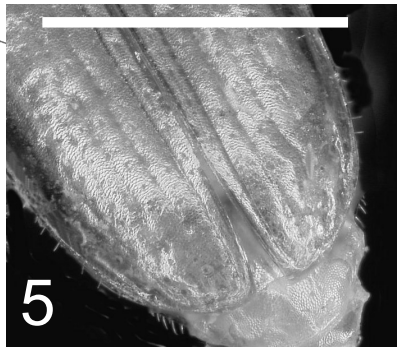
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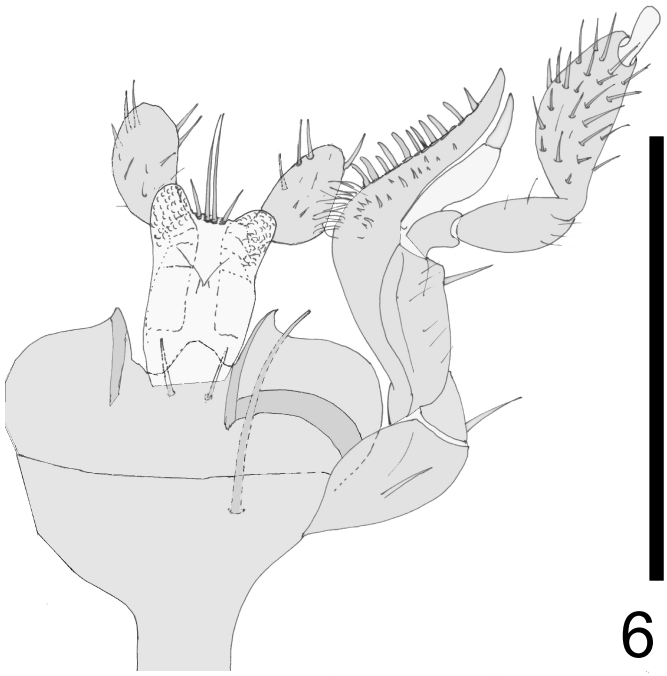

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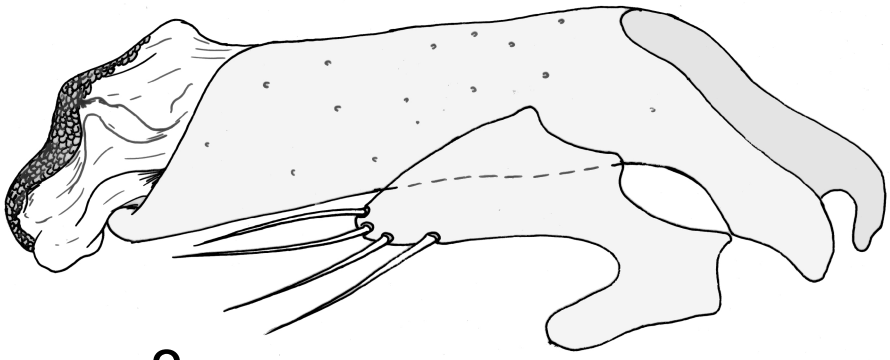

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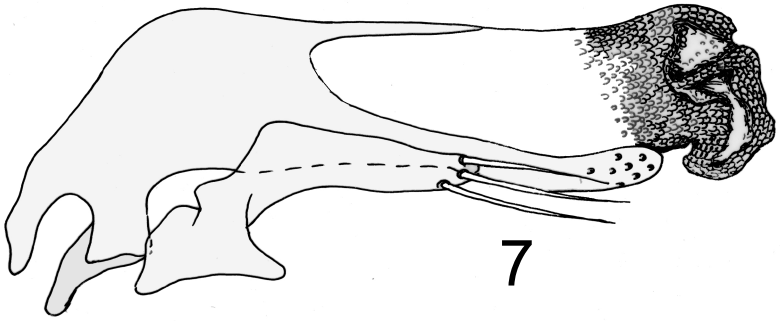

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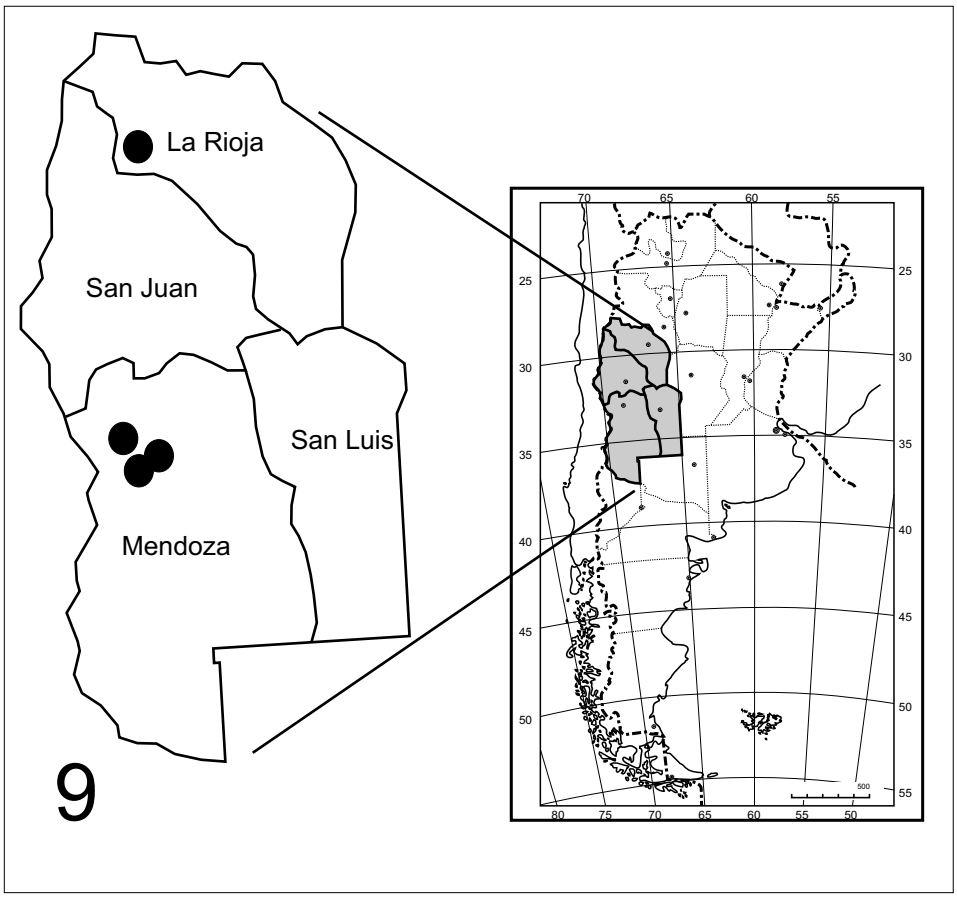
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