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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 palpomeres and other characters place this new genus in Bembidiini and the sub-oblique notched anterior tibiae 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 western part of Gondwana. Some aspects of the biogeography of the group are discussed.

KEY WORDS: Argentina, *Argentinatachoides balli*, Austral Gondwana, Bembidiini, Tachyina

RESUMEN

En la presente contribución se describe ***Argentinatachoides balli***, **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: Argentina, *Argentinatachoides balli*, Austral Gondwana, Bembidiini, Tachyina

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 as 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* Blume and *Araucaria* Jussieu (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 underexplored area, principally in Patagonia and along the Andean mountains. Expeditions in Mendoza and La Rioja provinces of Argentina led to the discovery of an 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 other 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 purpose of this contribution is to describe this new genus and species of Bembidiini, propose a preliminary relationship with other bembidiine genera, and to consider biogeographical aspects of the new discovery.

SPECIMENS 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

Order Coleoptera Linnaeus, 1758
Family Carabidae Latreille, 1802
Tribe Bembidiini Stephens, 1827
Subtribe *Tachyina* Motschulsky, 1862

Argentinatachoides, new genus
(Figs. 1A–E)

Type species.—*Argentinatachoides balli* Sallenave, Erwin, and Roig-Juñent, **n. sp.,** 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 genae, 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 striole present, deep, markedly elongate; stria 5 not sulcate at base; only stria 1 extended to apex; humeral margin extended to level of stria 4; recurrent groove doubled. Median lobe of aedeagus with basal lobes symmetrical. Parameres apically setose. 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. 1A, E).

Color.—Entire body flavotestaceous.

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. 1A, E). 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. 2).

Elytra.—With suture more impressed than the remaining striae (Fig. 1A), 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. 1A). Ombilicate series with nine setae, the 2nd, 7th, and 9th longer than the others (Fig. 1A). Principle recurrent groove short and deep; second recurrent groove formed by the union of elongate punctures (Fig. 1A).

Legs.—Protibial apex subobliquely notched. Male protarsomeres not dilated.

Aedeagus.—Median lobe with the basal lobes symmetrical. Parameres styliform, with four setae on right paramere, three apical setae and one subapical, and three setae on left paramere, all apical (Fig. 3).

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 stria 5 is not sulcate at base, the ligula is tetrasetose, the male protarsus is without dilated tarsomeres, and a scutellar striole is present.

Argentinatachoides balli, new species
(Figs. 1A–E, 2, 3A-B, 4)

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 as there is only one species known.

Description. *Length.*—ABL = 2.0 mm.

Color.—Flavotestaceous throughout.

Head.—Dorsal surface with slightly stretched isodiametric microreticulation. Surface with scattered fine punctures with short setae; dense patch of setae on gena posteriad eye. Eyes moderately produced and sparsely setiferous. Head across eyes slightly broader than pronotum. Two supraorbital setae present, one at middle of eye, and posterior seta situated posterior to hind margin of eye (Fig. 1A). Maxillary and labial palpomeres multisetose (Fig. 2). Mentum with two setae; submentum with two setae. Antennomeres testaceous with

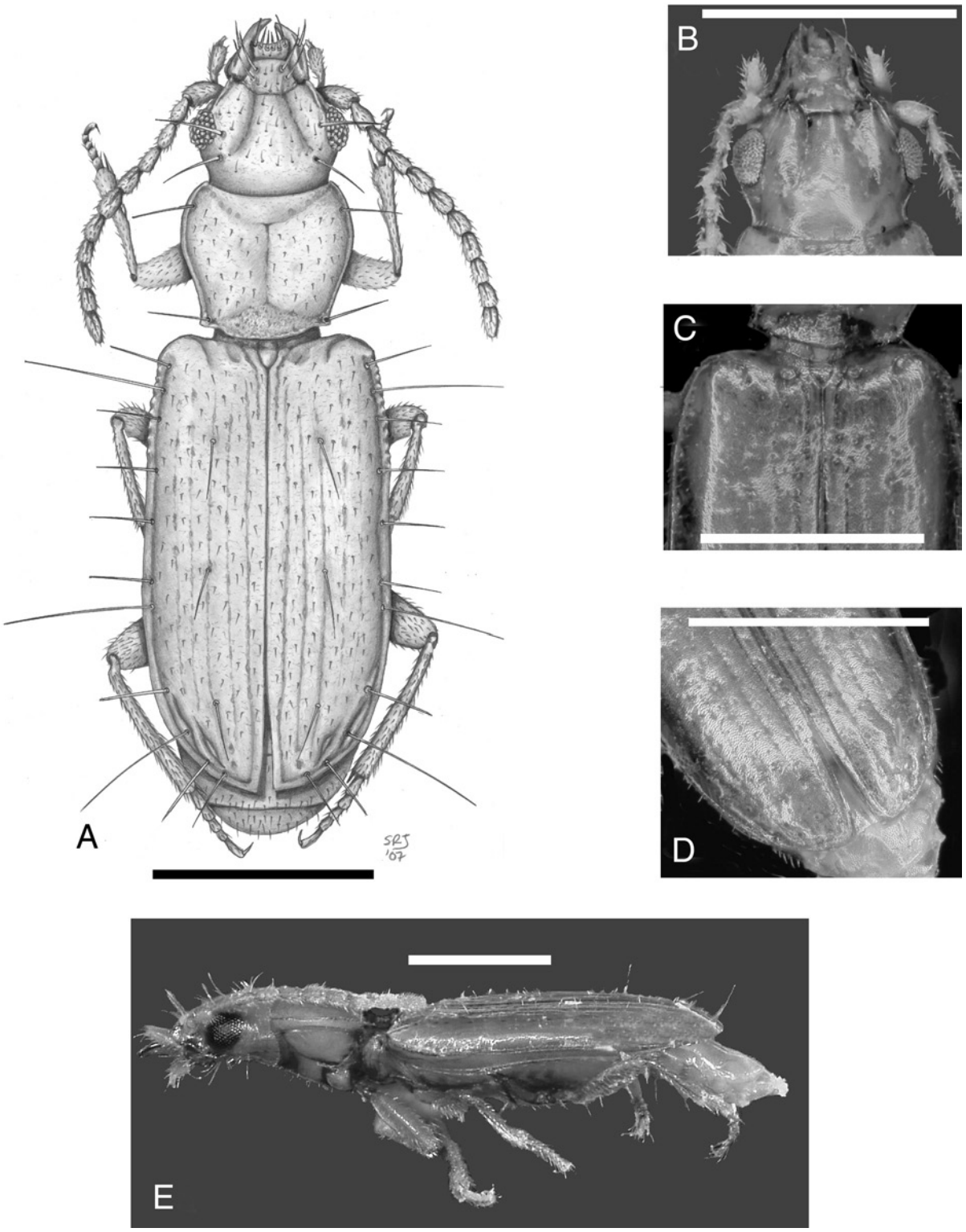

Fig. 1.—*Argentinatachoides balli*, new species. **A**, habitus, dorsal aspect; **B,** head, dorsal aspect; **C,** elytra, dorsal aspect; **D,** apex of elytra showing the double recurrent groove; **E,** habitus, lateral aspect. Scale = 0.5 mm.

Fig. 2.—Labium and right maxilla, dorsal aspect, of *Argentinatachoides balli*, new species. Scale = 0.1 mm.

lateral dark brown sensory stripe. Antennomeres 1 to 7 longer than wide, 8-11 wider than the preceding.

Pronotum.—Transverse, cordiform, one-fifth wider than long, five-sevenths width of elytra (Fig. 1A), 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. Striae finely more or less punctuate. Stria 3 with three setae. Intervals flat. Umbilicate marginal pores located four behind humerus, two at middle, and two near apex.

Legs.—Femora and tibiae with dense short setae.

Aedeagus.—Median lobe long and slender. Apex of median lobe rounded (Figs. 3A-B). Internal sac with small chitinous strips.

Distribution.—*Argentinatachoides balli* is known from localities in two provinces of Argentina, Mendoza and La Rioja (Fig. 4). 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 encountered. Known adults were discovered, in all cases, at the foot of mountains; in Mendoza on the west and east side of 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 borders of the creeks present different salt concentrations. The quantity of salt varies from one creek to another, for example at Agua de las Avispas there is a high quantity of salt but at the Arroyo Uspallata there is a lower concentration. The presence of this species at these different salt concentrations demonstrates its wide tolerance range to saline habitats. 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 to belong to Bembidiini because of the subulate apical palpomere, and to the subtribe Tachyina because of the sub-oblique notched anterior tibia. Other morphological features (head with two sulcate frontal furrows continuous on clypeus, two pairs of setae on clypeus, procoxal cavities uniperforate, aedeagus with symmetrical basal lobes, and the two recurrent grooves of the elytra) allow us to hypothesize a relationship with the genus *Tasmanitachoides* 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 other styliferan (*sensu* Jeannel 1941) carabid groups. Within Bembidiini, the symmetrical basal lobes do not occur anywhere else. This particular form suggests a relationship of *Tasmanitachoides* with the tachyine lineage which gave rise to the Anillina (Erwin 1972). Two pairs of setae on the clypeus also are present 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 "trechine-bembidiine" stock.

Finally a unique character state that is exclusively shared by *Argentinatachoides* and *Tasmanitachoides* is the presence of the doubled recurrent groove, which could

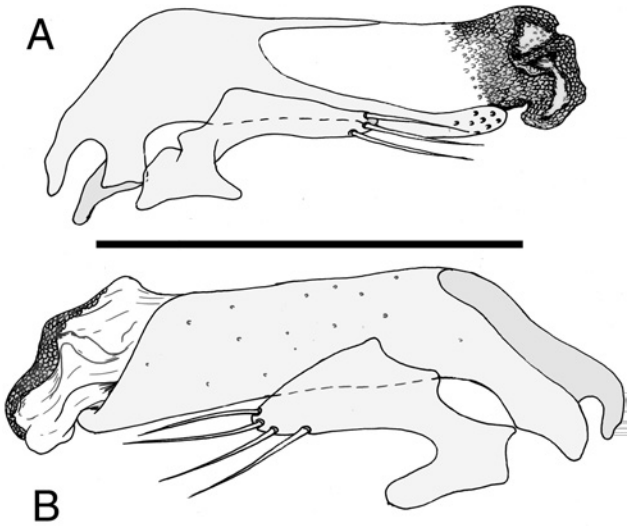

Fig. 3.—Male genitalia of *Argentinatachoides balli*, new species: **A**, left lateral aspect; **B**, right lateral aspect. Scale = 0.1 mm.

indicate that these two genera form 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, members of which possess some of the attributes discussed above.

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–Tasmanian faunas. Jeannel (1967) considered the distribution patterns of the southern taxa as a tool by which the relative age of a carabid group could 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* LeConte (Erwin 1974). However, it is possible that *Tasmanitachoides* and *Argentinatachoides* do not belong to this more recent austral faunal group that is restricted to Australia and South America. Erwin's point of view considers an origin relating *Tasmanitachoides* to Anillina (Erwin 1972), so the genera *Tasmanitachoides* and *Argentinatachoides* would have greater antiquity. Thus, it may be possible that the common ancestors 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 might be the amphitropical adelphotaxon residing in the north temperate region.

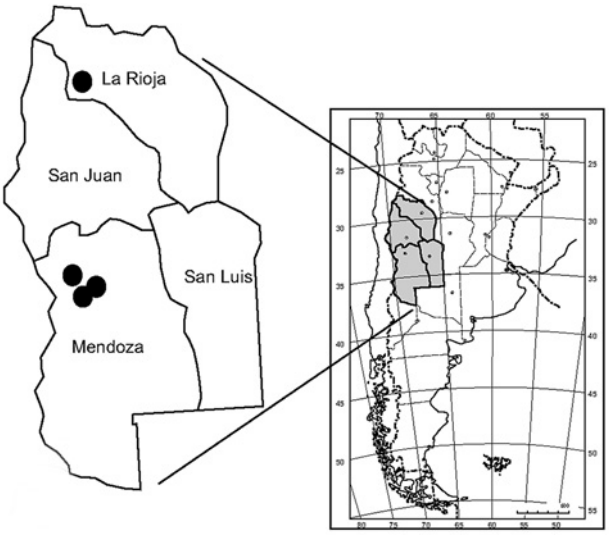

Fig. 4.—Distribution map of *Argentinatachoides balli*, new species.

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