

A new Argentinian species of *Bembidion* (*Chilioperypus*) (Coleoptera: Carabidae: Bembidiini) with accessory setae

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ABSTRACT

The new species, *Bembidion* (*Chilioperypus*) *cuyanus* (type locality ARGENTINA, San Luis, Quebrada Lopez, 7 km SE San Francisco) is described, based on external structural features (extra setae in the supraorbital region, pronotum, elytral margin and intervals 3, 5 and 7) and those of the male genitalia (details of the endophallic flagellum). Line drawings illustrate diagnostic features and a key distinguishes among the species of subgenus *Chilioperypus* Jeannel. This species lives along the border of rivers and creeks in the arid region of western Argentina.

KEY WORDS. Carabidae. Bembidiini. *Bembidion* (*Chilioperypus*) *cuyanus* n. sp., Argentina

RESUMEN

Se describe una nueva especie del género *Bembidion* Latreille (Coleoptera: Carabidae: Bembidiini) del centro oeste de la Argentina. Esta ha sido encontrada en las orillas de arroyos y ríos de esta región semidesértica. La morfología externa y las características de las estructuras de la genitalia masculina hacen considerar que esta nueva especie pertenece al género *Bembidion* Latreille, y algunos caracteres del edéago muestran que pertenece al subgénero *Chilioperypus* Jeannel. La estructura del flagelo y la presencia de numerosas setas, tanto en la región supraorbital, pronoto, borde del élitro e intervalos 3, 5 y 7, permiten reconocer a esta como una nueva especie, *Bembidion* (*Chilioperypus*) *cuyanus* nov. sp. Se provee la descripción e ilustraciones de esta nueva especie, como así también una clave para diferenciarla de las restantes especies del subgénero *Chilioperypus*.

PALABRAS CLAVE. Carabidae. Bembidiini. *Bembidion* (*Chilioperypus*) *cuyanus* n. sp., Argentina

INTRODUCTION

The Bembidiini are one of the richest Argentinian groups of Carabidae in number of species, with maximum diversity of the group in humid regions (Roig-Juñent 1998). However, these small carabids are also abundant in arid lands, particularly in riparian habitats such as along the borders of streams, creeks or rivers (Roig-Juñent & Scheibler 2004). This bembidiine fauna of arid regions has been partially described based on material collected from only a few localities (Jensen-Haarup 1910; Jeannel 1962). During the past several years, the entomological collection of the Instituto Argentino de Investigaciones de Zonas Áridas (IADIZA) has acquired, from arid environments of western Argentina, numerous specimens of several species of this tribe. Based on some of this material, we describe a strange new species of *Bembidion* Latreille 1802, and include it in the subgenus *Chilioperyphus* Jeannel. *Chilioperyphus*, together with the subgenera *Antiperyphanes* Jeannel and *Antiperyphus* Jeannel, were considered by Jeannel (1962) as subgenera of *Peryphus* Stephens because they have discal setiferous punctures on stria 3. But Toledano (2002) considered the assignment of the species of these subgenera to the genus *Peryphus* as incorrect. Using characters of internal sac, he proposed that these three endemic subgenera of Southern South America, *Chilioperyphus*, *Antiperyphanes*, and *Antiperyphus*, have to be considered as subgenera of *Bembidion*.

The present contribution is part of a systematic revision of the southamerican species of *Bembidion*. The complete monograph, providing treatment of the systematics and taxonomy of the *Bembidion* species will take some years. Several new species have been detected and will be described as part of this monograph. However, the new species present a particular morphology that permit it to be distinguished from all other South American species of Bembidiina. Therefore we considered it important to describe this species before the monograph is complete.

MATERIAL AND METHODS

Material

This study is based on the examination of 147 adult specimens of the new species of *Bembidion*. Specimens were deposited in the entomological collections of the following institutions (indicated in the text by codes). Names of curators of these collections are in parentheses.

AMNH: American Museum of Natural History, New York, USA (Lee Herman);

IADIZA: Instituto Argentino de Investigaciones de Zonas Áridas Mendoza, Argentina (Sergio Roig-Juñent);

IMLA: Instituto Miguel Lillo, Tucumán, Argentina (Arturo Terán);

MACN: Museo Argentino de Ciencias Naturales, "Bernardino Rivadavia" (Arturo Roig-Alsina);

MLPA: Museo de La Plata, La PLata, Argentina (Norma Díaz);

UASM: Strickland Entomological Museum, National Museum, Department of Biological Sciences, University of Alberta, Edmonton, Alberta, Canada (George Ball).

Additional specimens were examined of *Bembidion (Chilioperiphus) orregoi* Germain, *B. (C.) cassinensis* Roig-Juñent & Gianuca, *B. (C.) mendocinus* Jensen-Haarup, *B. (Antiperiphanes) chilensis* Solier, *B. (A.) maculifer* Gemminger and Harold, *B. (Antyperiphus) eburneoniger* Germain, *B. (A.) engelharti* Jensen-Haarup, and *B. (A.) ringueleti* Jeannel, belonging to the Museo de Historia Natural de Santiago (Chile), IADIZA, MLPA, and MACN.

Methods

Techniques. Dissections were made following the techniques recorded in previous contributions of South American Bembidiini (Roig-Juñent & Gianuca 2001; Roig-Juñent & Scheibler 2004). Drawings were made with a camera lucida.

Measurements. The only measurement reported is overall length, and was taken from the apex of clypeus to the apex of the elytra.

Terms

For the morphological terminology, we follow Jeannel (1962).

TAXONOMIC TREATMENT

Bembidion (Chilioperiphus) cuyanus Roig-Juñent & Scheibler *sp. nov.*

(Figs. 1–13)

Holotype. San Luis, Quebrada López, 7 km SE San Francisco, 4-XII-2000, S. Roig & C. Domínguez col. (32° 39.65' S, 66° 07.57' W) (IADIZA).

Paratypes. 3 exx. La Rioja, 3 km E Solca, 15 XII-2000, S. Roig & C. Domínguez col. (30° 46' 10" S, 66° 24' 51" W, 720 m) (IADIZA); 17 exx. La Rioja, Quebrada de Olta, 10 km 14 XII-2000, S. Roig & C. Domínguez col. (30° 38' 51" S, 66° 21' 16" W, 750 m) (IADIZA; MLP, MACN); 10 exx. San Luis, Qda. del Tala, ca. Papagallos, 08-XII-2000, S. Roig & C. Domínguez col. (32° 39' 00" S, 64° 57' 31" W, 1059 m) (IADIZA); 21 exx. San Luis, Trapiche, Camping, 06-XII-2000, S. Roig & C. Domínguez col. (33° 06' 18" S, 66° 03' 40" W) (IADIZA; ILMA; MLPA, MACN; UASM); 9 exx. San Luis, Quebrada La Bodega, 3-XII-2000, S. Roig & C. Domínguez col. (33° 01' 09" S, 66° 17' 00" W, 417 m) (IADIZA); 19 exx. San Luis, Quebrada López, 7 km SE San Francisco, 4-XII-2000, S. Roig & C. Domínguez col. (32° 39.65' S, 66° 07.57' W) (IADIZA; ILMA; MLP, MACN; UASM); 14 exx. San Luis, Dique La Toma, 7-XII-2000, S. Roig & C. Domínguez col. (33° 02' 16" S, 65° 09' 51" W) (IADIZA); 22 exx. San Luis, La Toma, Río Rosario, XII-7-2000, L. Herman col., gravel on shore (33° 02' 16" S, 65° 39' 51" W) (AMNH); 15 exx.

San Luis, Villa La Quebrada, 3-XII-2000, S. Roig col. (33° 01' 09" S, 66° 17' 00" W, 412 m) (IADIZA); 2 exx. San Luis, Virorco, 7-XII-2000, col. S. Roig (33° 06' 33" S, 66° 06' 32" W, 1138 m) (IADIZA); 3 exx. same locality and date, L. Herman col., under rocks and shingle (AMNH); 1 ex. Mendoza, El Challao, Cerro la Bodeguita, 7-I-1985, S. Roig col. (IADIZA); 1 ex. Mendoza, Reserva Divisadero Largo, 22-IX-1997, S. Roig col. (IADIZA); 2 exx. Mendoza, La Paz, Desaguadero, 2-XII-2000, S. Roig col. (33° 16.93" S, 67° 02.03" W, 457 m) (IADIZA); 13 exx. Mendoza, San Rafael, 4 km S Punta del Agua, 15-XII-98, Flores, G. & S. Roig col. (35° 32.96' S 68° 03.81' W) (IADIZA; ILMA, MLPA, MACN, UASM); 1 ex. Mendoza, Salinas del Nihuil, S. Roig col. (IADIZA); 1 ex. Mendoza, Malargüe, Salinillas, Reserva Total el Payén, 7-I-2003, col. S. Roig (36° 16' 51.8" S, 68° 31' 04" W) (IADIZA); 1 ex. Catamarca, 5 km N Belén, 17-X-1997, S. Roig col. (27° 37.19' S, 67° 01.01' W) (IADIZA); 1 ex. Córdoba, 15 km N de Capilla del Monte, 11-XII-2000, C. Domínguez & S. Roig col (30° 41.59' S, 64° 39.71' W, 658 m) (IADIZA); 17 exx. Córdoba, Ruta 41 y Río de Cañada Honda, 07-XII-2000, S. Roig & C. Domínguez col. (33° 07' 10" S, 65° 54' 43" W) (IADIZA).

Specific epithet. The specific epithet, is a Latinized adjective based on "Cuyo", the name of the region of Argentina, where the species is widely distributed.

Diagnosis. Head with front and vertex impunctate, frontal furrows parallel, extended anteriorly toward clypeus; with supraorbital setae three to five each side; terminal maxillary palpomere three times shorter than the length of penultimate palpomere; pronotum narrow and constricted basally; lateral margin sinuate basally, with five to seven lateral setae; posteriolateral angles rounded; elytra maculate, humerus rounded; eight striae, punctuate, intervals 3, 5 and 7 each with a row of setae from base to apex; stria 8 with 28 to 37 setae in umbilicate series; hind wings fully developed.

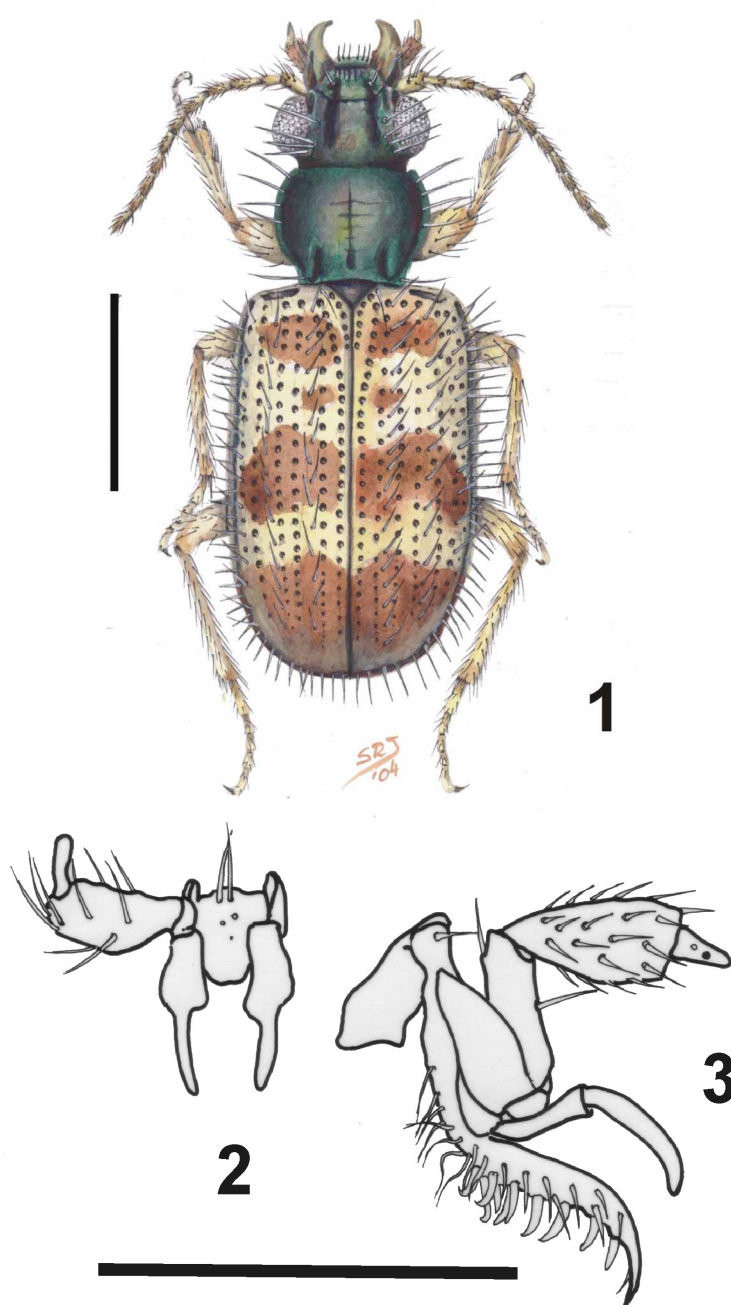
Description. Length: 3.7–4.3 mm.

Habitus (Fig. 1). Head large, pronotum narrow, and elytra proportionately long.

Color (Fig. 1): Head and pronotum dark green, in some specimens almost black. Mandibles and maxillary and labial palpomeres yellow brown. Antennomeres yellow brown, darker in the apical region. Legs of same color as antenna, with basal and apical regions of femur, tibia and tarsomeres darker. Elytra yellow, each elytron with three maculae: a small basal, a medial transversal, and an apical macula (Fig. 1). Punctures of elytral striae dark brown.

Head. Eye rounded, of moderate size. Head smooth, without punctures, and dorsally convex, slightly constricted posteriad eyes; frontal furrows deep and broad (Fig. 1), parallel, each extended anteriorly to seta of clypeus; with three to five supraorbital setiferous punctures, generally with four.

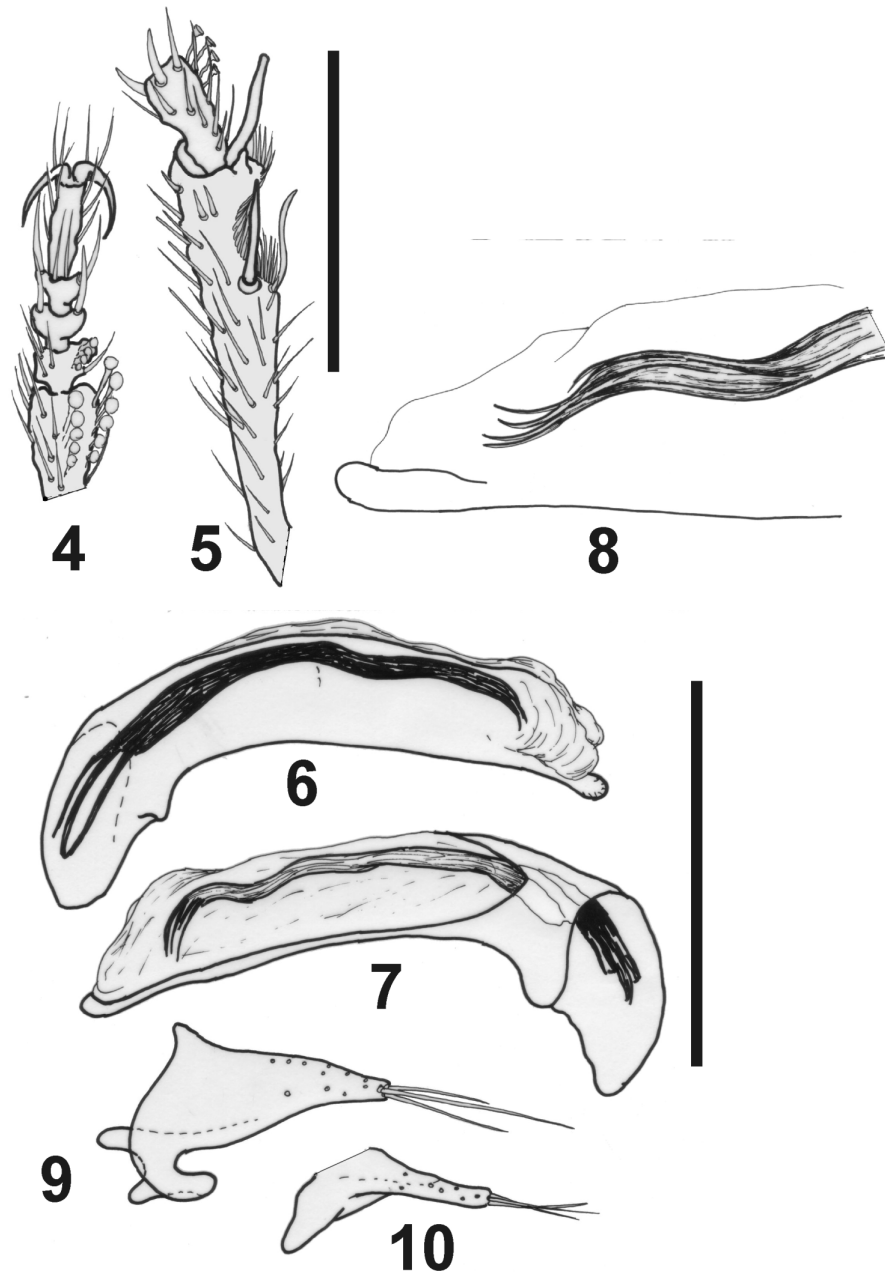
Antennae long and slender, antennomeres sub-rectangular, scape with one to 5 or 6 setae, antennomere 2 to 10 with subapical ring of setae, apical half of antennomeres 3 and 4 with some very short setae in addition to those of apical ring; 5 to 11 covered with dense, short setae.



FIGURES 1–3. Habitus of *Bembidion (Chilioperyphus) cuyanus* nov. sp. male. Scale bar = 1 mm; Fig. 2 Maxilla, ventral view; Fig. 3 labium, ventral view. Scale bar = 0.35 mm.

Mouthparts Mandibles porect, long. Maxillary and labial palpi long, except terminal palpomeres short, labial palpomere and maxillary palpomere less than 3 times the length of penultimate palpomere (Figs. 2, 3), penultimate labial palpomere with four-five setae;

mentum with a rounded tooth, with two rounded foveae, with two paramedian setae; submentum with four setae; glossal sclerite with two setae; paraglossae long, aetose (Fig. 3).



FIGURES 4–10. *Bembidion (Chilioperyphus) cuyanus* nov. sp., Fig. 4, front tibia, ventral view, ; Fig. 5 front male tarsomeres, ventral view; Figs. 6–10. Aedeagus of *Bembidion (Chilioperyphus) cuyanus* nov. sp., Fig. 6 median lobe lateral left view; Fig. 7 median lobe lateral right view; Fig. 8, apex median lobe showing the apex of flagellum; Fig. 9 left paramere; Fig. 10, right paramere. Figs. 4, 5 and 8 scale bar = 0.35 mm; Figs. 6, 7, 9 and 10 scale bar = 0.50 mm.

Prothorax. Pronotum maximum width at middle (Fig. 1); disc convex, constricted in the basal region; basal margin slightly convex; apical angles obsolete, rounded; anterior transverse impression only slightly defined laterally, median longitudinal impression slightly impressed, except in the apical region in form of a longitudinal fovea, disc with slight transverse impressions in the center; posteriolateral foveae each in the form of a long impression, four to six anterior and midlateral setiferous punctures, generally four, one more at base. Prosternal intercoxal process smooth, glabrous, and marginate only laterally.

Elytra. Moderately convex, scutellar stria with four to eight punctures, generally five; striae with punctures distinctly impressed throughout length, decreased in size toward apex. Punctures of moderate size, about 12 punctures in one millimeter. Only stria 1 distinctly impressed in apical third, remaining striae shallow in apical region, basal and medial region represented only by punctures. Recurrent stria confluent with seventh stria. Plica present. Intervals flat; umbilicate series of on stria 8 of 28 to 37 setae. Intervals 3, 5 and 7 each with complete row of setae: interval 3 with 12 to 17, interval 5 with 15 to 21, and interval 7 with 18 to 27.

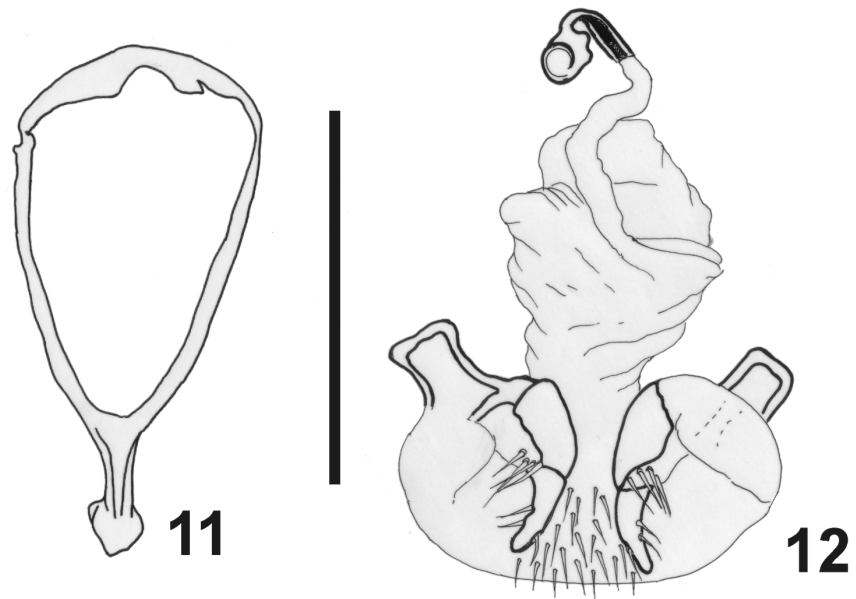
Legs. Antenna cleaner of front tibia (Fig. 4), with one clamp seta; protarsomeres 1 and 2 of male expanded (Fig. 5), 1 with two rows of articuloetae; 2, with only the internal row of articuloetae. All male protarsomeres dorsally sulcate. Meso and metatarsomeres long and slender. Female tarsomeres long and slender. Femur, tibia (Fig. 4) and tarsomeres with numerous setae, even the 5th tarsomeres with extra setae (12 or more) (Fig. 5).

Male genitalia (Figs. 6–11). Median lobe moderately narrow, with apex rounded, and basal bulb with right wall almost lacking; ventral margin concave in lateral view; internal sac without brush sclerite, flagellum long, sinuate on apex (Fig. 8), not extended beyond basal bulb (Figs. 6 and 7). Flagellum constituted by long fibers, grouped closely together in central sector (Fig. 6 and 7); apically, several fibers extended beyond others (Fig. 8), basally, two or three fibers observed (Figs. 6 and 7). Left paramere (Fig. 9) styliform, with base expanded, apical setae three generally, four in some specimens; central seta thicker and longer than others (Fig. 9). Right paramere styliform, apical setae three (Fig. 10). Sclerite IX complete and slender (Fig. 11).

Female genitalia (Figs. 12). Spermatheca rounded, sclerotized. Bursa copulatrix without sclerites. Ovipositor: gonocoxite 2 with two ensiform setae on dorsal and ventral margins; subapical setose organ present, with nematiform setae.

Geographical distribution. The specimens were collected in the Western region of Argentina, in sites from Catamarca province (27° latitude South) to southern Mendoza (36° latitude South), occurring in a long strip of about 1000 km. From East to West the species range extends from Mendoza (68° longitude West) to Córdoba provinces (64° longitude West) (Fig. 13).

Habitat. *Bembidion cuyanus* lives along the border of creeks, rivers, and shore of lakes in the arid Monte and Chaco biomes.



FIGURES 11–12. Fig. 11, sclerite IX of *Bembidion (Chilioperypus) cuyanus* nov. sp. Fig. 12, female genital tract of *Bembidion (Chilioperypus) cuyanus* nov. sp. Scale bar = 0.5 mm.

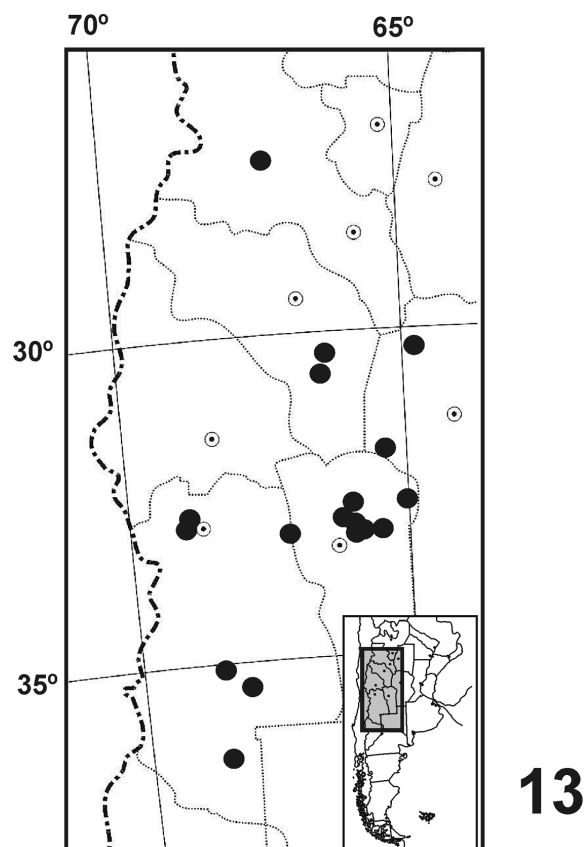


FIGURE 13. Geographical distribution of *Bembidion (Chilioperypus) cuyanus* nov. sp.

Phylogenetic relationships with other Bembidiina. *Bembidion cuyanus* sp. nov. is included with the South American group of subgenera (phylogenetic series *sensu* Jeannel 1962) that have discal setiferous punctures on stria 3 and basal bulb of median lobe is without most of a right wall. This group is composed of six subgenera, all of them endemic in Southern South America (Toledano, 2002). Within this group of subgenera this new species is clearly separated from the subgenus *Nothonepha* Jeannel because it has elytral striae represented by grooves and punctures, from the subgenus *Plocamoperyphus* Jeannel because the clypeus is not fused with the frons, and from subgenus *Notoperyphus* Bonniard de Saludo because the dorsal surface is shiny. Based on the external morphology *Bembidion cuyanus* belongs to one of the other three subgenera, *Antiperyphus* Jeannel, *Antiperyphanes* Jeannel or *Chilioperyphus* Jeannel. Also, an important feature of the internal sac of these three subgenera is the absence, in most species, of the central sclerotized brush typical of the genus *Bembidion* (Toledano, 2002). These subgenera are separated from one another principally on the basis of details of the flagellum of the internal sac. The species of the subgenus *Antiperyphus* Jeannel have in addition to a long flagellum, several small sclerotized structures; and in *Antiperyphanes* Jeannel, the flagellum is extended beyond the basal orifice of median lobe, in some species reaching the dorsal part of median lobe; in *Chilioperyphus*, the flagellum is not extended beyond the basal bulb, and other sclerites are lacking from the internal sac. Based on details of its internal sac, we consider *Bembidion cuyanus*, as a member of the subgenus *Chilioperyphus* Jeannel. Moreover, *Bembidion (Chilioperyphus) cuyanus* adults are easily distinguished from most other South American species by the extra setae, and from the setose *Bembidion (Antiperyphus) hirtipes* (Jeannel) because its numerous extra setae are only found on the legs.

The subgenus *Bembidion (Chilioperyphus)* has three known species, *Bembidion (C.) mendocinus* (Jensen-Haarup), *Bembidion (C.) orrego* (Germain), and *Bembidion (C.) cassinensis* Roig-Juñent & Gianuca. *Bembidion (C.) orrego* was redescribed and illustrated by Jeannel (1962).

Key to the species of subgenus *Chilioperyphus* based on structural features of adults

- 1(2) Head with three to five pairs of supraorbital setae; pronotum with five to six pairs of lateral setae; intervals 3, 5 and 7 each with complete row of setae *B. (C.) cuyanus* n. sp.
- Head with two pairs of supraorbital setae; pronotum with two pairs of lateral setae; interval 3 with two setae, 5 and 7 without setae 2
- 2(3) Pronotum slightly constricted basally; posterior angles right; color mostly black, elytra with a postmedial macula; wingless *B. (C.) orrego* Germain
- Pronotum markedly constricted basally; posterior angles right or notched; color mostly reddish or yellowish; elytron with or without a postmedial macula; hind wings present 3

3. Pronotum with posterior angles notched; color yellowish; elytra without a postmedial macula *B. (C.) cassinensis* Roig-Juñent & Gianuca
- Pronotum with posterior angles right; color reddish; elytra with a postmedial macula
B. (C.) mendocinus Jensen-Haarup

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