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## Description of One New Species of *Chileria* and Three New Species of *Orthotylus*, with Nomenclatural and Distributional Notes on Neotropical Orthotylinæ (Heteroptera: Miridae: Orthotylini)

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### ABSTRACT

Based on fieldwork conducted in northwestern Argentina for the Planetary Biodiversity Inventory project, and from the study of several specimens of entomological collections from other Neotropical countries—in particular Chile and Argentina—new taxa are described, and additional nomenclatural and distributional notes are provided for some Neotropical Orthotylini taxa. The male genitalia of *Biobiocoris setosus* Carvalho, 1985 are illustrated, and a diagnosis is proposed for this monotypic genus. New distributional information for *B. setosus* is provided, which is newly recorded from Argentina. *Chileria andina*, sp. nov., is described from Argentina. Host-plant data are given for the new species. *Conostethus pamparum* Berg, 1883 is transferred to *Chileria*, and *Saileria chilena* Carvalho and Carpintero, 1991, is proposed as junior synonym of *Chileria pamparum*, comb. nov. Detailed male genitalia drawings are provided, including genital capsule and phallosome, for all the known species of *Chileria*. Based on these changes, a diagnosis of *Chileria* is provided as well as a key to all the species. Female genitalic structures of *Hadronemella argentina* (Carvalho and Wallerstein, 1978) are described and depicted, and new distributional information is provided. *Hyporhinocoris tomentosus* Reuter, 1909, is regarded as a junior synonym of *Hyporhinocoris fratruei* (Berg, 1879). *Hyporhinocoris* is thus a monotypic genus with widespread distribution in Argentina associated with *Larrea* spp. (Zygophyllaceae). *Orthotylus chullan*, sp. nov., *O. kakan*, sp. nov., and *O. kikin*, sp. nov., are described from Chile. Male and female genitalic structures are compared with the most similar described species, *O. chilensis* Carvalho and Fontes, 1973. A diagnosis is proposed for *O. tafoensis* Kerzhner and Schuh, 1995,

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and its male genitalia illustrated. New distributional and host-plant information is provided for *O. chilensis* and *O. tafoensis*. *Platyscytus youngi*, comb. nov. (Phylinae) is proposed for *Saileria youngi* Carvalho, 1953, and thus removed from the Orthotylinae. A diagnosis for *Saileria bella* (Van Duzee, 1916), the type species of *Saileria*, is provided and its male genitalia illustrated. Digital dorsal habitus photographs are provided for all the species treated, and distribution maps are provided for the South American taxa. Scanning electron micrographs of selected structures and illustrations of male genitalia are presented for most species.

## INTRODUCTION

The knowledge of the diversity of the mirid fauna of South America has been improved mostly because of the descriptive efforts of J.C.M. Carvalho and collaborators (e.g., Carvalho, 1984, 1985; 1990; Carvalho and Carpintero, 1991, 1992; Carvalho and Costa, 1992b, 1994; Carvalho et al., 1983). Despite these efforts, most of the genera of the Neotropical region remain ill defined, with a large proportion of undescribed diversity. Many genera are monotypic, and others are probably non-monophyletic. This situation is in sharp contrast to the fauna of North America, in which most of the large groups of Phylinae have been revised in recent years (e.g., Henry, 1984, 1991, 1999; Henry and Schuh, 1979; Schuh, 2001, 2004a, 2004b; Schuh and Schwartz, 1985, 1988, 2005; Schwartz and Stonedahl, 2004; Weirauch, 2006a, 2006b). Orthotylinae genera have also been the subject of major revisions in North America (e.g., Henry, 1976b; Stonedahl and Schuh, 1986; Stonedahl and Schwartz, 1986, 1988). These revisions are usually complemented with phylogenetic hypotheses (e.g., Henry, 1991, 1999; Schuh, 1991, 2006b; Schuh and Schwartz, 1985; Stonedahl, 1990; Stonedahl and Schuh, 1986). Recent fieldwork in North America has enabled the documentation of host plants, acquisition of large series of specimens, and survey of species-rich (California and Arizona) or previously unsampled areas (Colorado, Nevada, and Utah) (e.g., Knight, 1968; Polhemus, 1994), all of which led to the revision of several taxa and to an improved understanding of Miridae classification. Similar efforts in South America will improve the knowledge and classification of the Orthotylinae of this region.

Toward this goal, as part of the Plant Bug—Planetary Biodiversity Inventory (PBI) project, funded by the National Science Foundation (USA), fieldwork was carried

out in northwestern Argentina in February 2006 with senior investigator Thomas J. Henry to collect Orthotylinae and Phylinae. Several species were collected in long series with associated host-plant data. This fieldwork complements the specialized mirid fieldwork of Schuh (1981–1982, 1993) and the long-term general collecting of the late Luis Peña.

Study of the collections resulting from the PBI fieldwork and of specimens from several Neotropical entomological collections, in conjunction with the opportunity to examine the type collection of La Plata Museum, allowed me to furnish new information on South American Orthotylini. I describe in this paper some new species, propose nomenclatural changes, illustrate genitalic features, and provide distributional and host-plant data—in many cases for the first time—for various Neotropical Orthotylinae species.

Of the three tribes included in Orthotylinae—Halticini, Nichomachini, and Orthotylini—Orthotylini is the largest (Schuh, 1974, 1995). Schuh (1974) recognized four informal suprageneric assemblages within Orthotylini: the *Falconia*, *Orthotylus*, *Sericophanes*, and *Zanchius* groups. This paper deals with Neotropical species of the *Orthotylus* and *Zanchius* groups. The *Orthotylus* species group is by far the largest of all, and can be recognized by the well-developed and sclerotized spicules of the vesica (Schuh, 1974). Many genera of Orthotylini have been described in the Neotropical region (e.g., Carvalho, 1985) without reference or discussion to which species group they belong.

Members of the *Zanchius* group have a delicate, flattened body, usually hyaline hemelytra, and a vesica with reduced or without spicules (Schuh, 1974; Henry, 1995). Schuh (1974) included 13 genera in the *Zanchius* group, which have mostly a pantropical distribution. Henry (1995) slightly modified the concept of the group and added *Blepharidopterus* Kolenati (as *Diaphnocoris*

Kelton [see Kerzhner, [1977]] *Proboscidotylus* Henry, and *Saileria* Hsiao. Henry (1985) listed seven Neotropical genera of the *Zanchius* group, although there are about 12 genera in this region that can be assigned to it (personal obs.). *Saileria* has 12 described species (Schuh, 1995; Carvalho and Costa, 1994), many of them Neotropical, some of which may not belong in it. As an effort to clarify the generic limits of members of the *Zanchius* group, some available South American species of *Saileria* were examined.

*Biobiocoris* Carvalho is a monotypic genus described from central Chile (Carvalho, 1985). Augmented by material from new localities, I provide detailed illustrations of the male genitalia and a diagnosis for this taxon, as well as new distributional information. Based on the structure of the spicule of the vesica I include *Biobiocoris* is the *Orthotylus* species group of Schuh (1974).

With the specimens collected in Argentina, in part from our fieldwork, and the study of additional specimens, I realized that *Saileria chilena* Carvalho and Carpintero, 1991, is not a species of *Saileria*, but in fact a synonym of *Conostethus pamparum* Berg, 1883, which in turn should be transferred to *Chileria* Carvalho. Carvalho (1985) in describing *Chileria* compared it to *Saileria* Hsiao, but did not mention in which species group should be placed. I am placing *Chileria* in the *Orthotylus* species group. In this paper, one new species of *Chileria* is described, a redefinition of *Chileria* is proposed based on the examination of all included species, and a key is provided for the four species.

*Hadronemella* Carvalho is a genus with 12 described species, distributed mostly in southern Brazil and Argentina (Carvalho, 1984; Carvalho and Carpintero, 1991; Carvalho and Costa, 1992b). This is a seldom-collected group, with unknown host-plant associations (Schuh, 1995), and poorly documented genitalia. Females are rarely associated with males, and thus the opportunity to have several males and females from a single collecting event allowed me to document the female genitalia and provide new distributional information.

*Hyporhinocoris* Reuter is a genus with two nominal species distributed in Argentina for which no host information was available

(Schuh, 1995). Given the host-associated specimens collected in our fieldwork in Argentina in 2006, coupled with the abundance of material from collections, I was able to test the species limits in this genus. After studying the male genitalia of several specimens from across the geographic range, I propose to synonymize *H. tomentosus* Reuter under *H. fratrueis* (Berg). As a result, *Hyporhinocoris* is a monotypic genus associated with species of *Larrea* (Zygophyllaceae).

Carvalho and collaborators have described several species of *Orthotylus* Fieber from South America (e.g., Carvalho and Fontes, 1973; Carvalho and Costa, 1990). Three new species of *Orthotylus* are described in this paper based on material collected from Chile. These species are mostly similar to *O. chilensis* Carvalho and Fontes, and thus detailed illustrations of the male and female genitalia are provided for these species. *Orthotylus tafoensis* Kerzhner and Schuh is a common Chilean species for which the male genitalia are illustrated, and new distributional and host-plant information are provided. Because *Orthotylus* has been treated as a heterogeneous group (e.g., Kerzhner and Schuh, 1995; Kerzhner and Josifov, 1999; Schuh, 1995), it is not clear whether the South American species of *Orthotylus* truly belong in this genus. I am describing the new taxa from Chile in *Orthotylus*, which can be called the Chilean *Orthotylus* group, until a comprehensive review of *Orthotylus* and allied groups is carried out on a worldwide basis.

In order to facilitate comparisons with *Saileria* (e.g., *Chileria*, see above), a diagnosis for *S. bella* (Van Duzee, 1916), its type species, is provided, as well as illustrations of the male genitalia. This information is based mostly on specimens collected during a PBI fieldwork carried out in southern California in 2004. One of the *Saileria* species examined in this paper is *S. youngi*, described from Panama (Carvalho, 1953). After studying the holotype, I realized that *S. youngi* should be transferred *Platyscytus* (Phylinae), a genus that is badly in need of a revision.

## MATERIAL AND METHODS

Observations were made with a Nikon SZM1500 stereoscope. Observations and

drawings of male and female genitalic structures were made with Nikon Eclipse 80i compound microscope at a magnification of 20 $\times$  or 40 $\times$ , with 10 $\times$  eyepieces, and with a camera lucida attachment. Scanning electron micrographs (SEMs) were taken using a Hitachi S4700 Field Emission SEM. Digital dorsal color images were made using a Microptics-USA photomicrographic system, with Infinity K2 lens and CF-2 or CF-3 objectives. In some cases part of these dorsal images were digitally modified in order to fit the specimen on the plate (e.g., adjusting the position of the antennae). No digital modification was made to the holotype image of *Orthotylus chullan*.

Specimens examined during the course of this project are associated with unique specimen identifier (USI) numbers, which are printed as a matrix code label that also provides an alphanumeric string. Each has a prefix followed by a number, e.g., AMNH\_PBI 00190646. USI numbers explicitly identify particular specimens studied during the PBI project. Their associated information can be searched through the "Discover Life" website (<http://www.discoverlife.org/>).

Locality label data without geographic coordinates were georeferenced with GEOLocate (Rios and Bart, 2005), and with the aid of regional or local maps for Argentina and Chile. All geographic coordinates were entered in the PBI project database to produce a list of locality points for specimens examined. Distribution maps were generated with ArcMap 9.1 (ESRI, 2005), and include only actual examined specimens, not literature records. The maps were transformed using a Lambert conformal conical projection, using the South American datum of 1969. The shaded-relief base map was derived from a digital elevation model of the Shuttle Radar Topography Mission (SRTM) from NASA.

All habitus photographs and documented morphological structures are associated with USI numbers (without the AMNH\_PBI prefix) printed next to each structure or set of structures. Male genitalic structures are drawn with the posterior (caudal) portion up and the anterior (cephalic) portion down. The orientation of each of the structures drawn, unless

otherwise stated, is: vesica, lateral left; phalotheca, dorsal; genital capsule, dorsal, lateral right, and lateral left; left paramere, dorsal; right paramere, lateral right. Figures 3, 6, and 7 depict general morphological terms and orientation of structures. Because the new species of *Orthotylus* from Chile are very much alike, I describe in length the morphology of *O. chullan*, whereas in *O. kakan* and *O. kikin* I describe only those structures that differ from *O. chullan*. Measurements are in millimeters unless otherwise indicated.

The taxa treated in this paper are listed in alphabetical order. Under the examined material sections, the interpolated data of the type series, such as geographic coordinates or secondary political divisions, are in square brackets.

### *Biobiocoris setosus* Carvalho

Figures 1, 3–4

*Biobiocoris setosus* Carvalho, 1985: 253 [n. sp.]; Schuh, 1995: 83 [catalog].

**DIAGNOSIS:** Recognized by the uniform dark brown color (fig. 1); short and strongly transverse head (fig. 1); vestiture composed of simple bristlelike setae, and sericeous setae; genital capsule with reclined opening, located at the center, without tergal processes (fig. 3); left paramere trapezoidal, with a bifid process directed ventrally; vesica with two spicules; left spicule slightly sinuate, apically bifurcate, shorter ramus broad and denticulate, longer ramus hook-shaped; right spicule with three rami, basal and subbasal ones bifurcate, apical one simple.

**DISTRIBUTION:** *Biobiocoris setosus* is known from Valparaíso (Region V) through Los Lagos (Region X), including the Santiago Metropolitan Region, of Chile. This is the first time *B. setosus* has been recorded from Argentina, in the Neuquén Province (fig. 4).

**DISCUSSION:** Carvalho (1985) described the new genus and species *Biobiocoris setosus* from two localities in Chile: El Abanico, Bio Bio (Region VIII), and Vegas del Flaco, Cordillera de San Fernando, O'Higgins (Region VI). Several new localities (fig. 4) and detailed illustrations of the male genitalia are here provided for *B. setosus* (fig. 3). The paratype



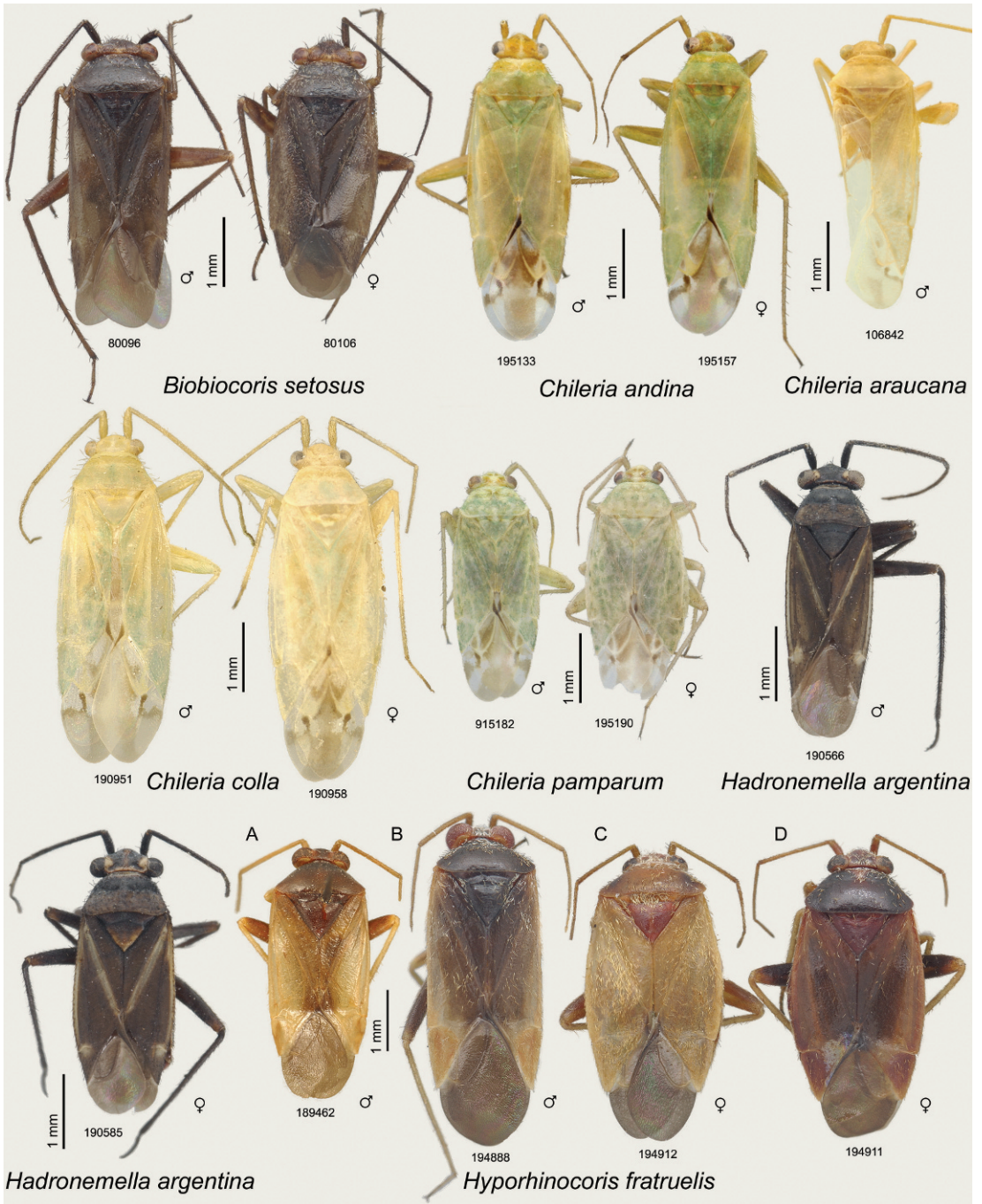


Fig. 1. Dorsal habitus digital photographs. *Biobiocoris setosus*, *Chileria andina*, *C. araucana*, *C. colla*, *C. pamparum*, *Hadronemella argentina*, and *Hyporhinocoris fratrueis*. Specimens of *H. fratrueis* (A–D) show color and total length variation among males and females.

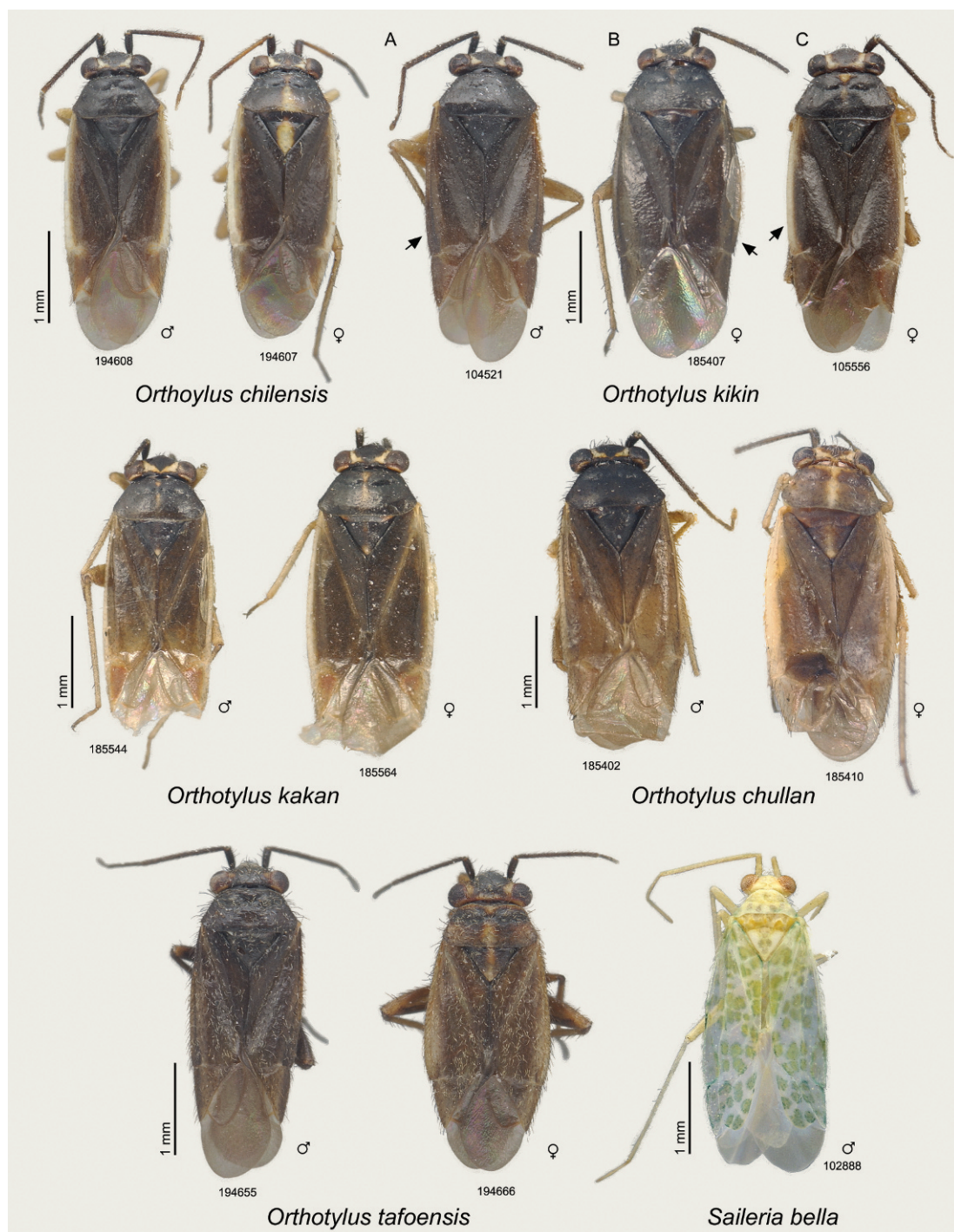


Fig. 2. Dorsal habitus digital photographs. *Orthotylus chilensis*, *O. chullan*, *O. kikan*, *O. kikan*, *O. tafoensis*, and *Saileria bella*. Specimens of *O. kikan* (A–C, arrows) show variation on embolus coloration from brown to white.



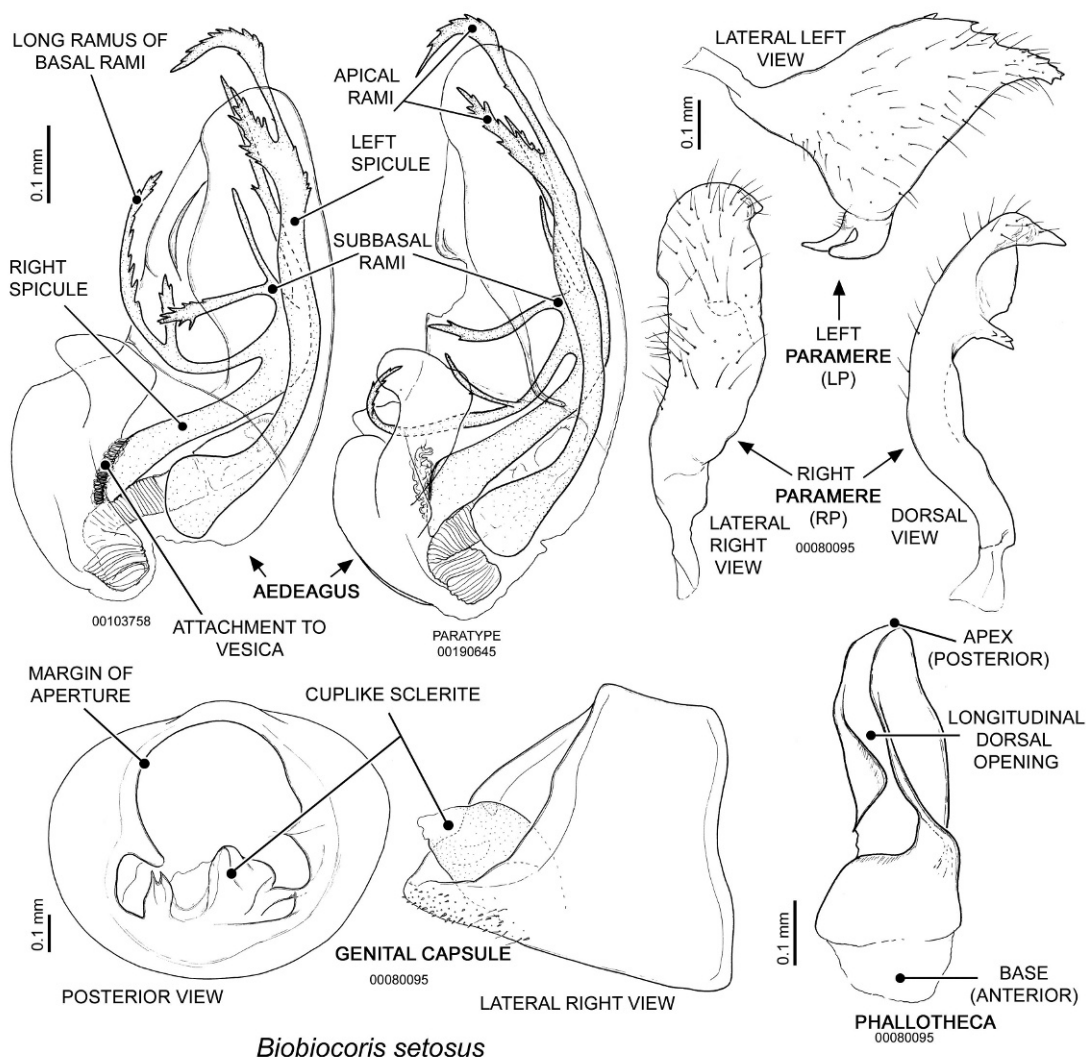


Fig. 3. *Biobiocoris setosus*. Male genitalia: aedeagus of two specimens in lateral left view showing vesica variation; left paramere; right paramere; genital capsule; and phallosome in dorsal view.

illustrated (fig. 3, AMNH\_PBI 00190645) is topotypic with the holotype (cf. Carvalho, 1985: 253). The latter is deposited in the California Academy of Sciences, but was not available to me during this project.

In species of Orthotylini the vesica protrudes from the phallosome through its opening. Nonetheless, the basal rami of vesica's right spicule has the longer ramus usually coming off the aedeagus through the phallobase, not through the opening of the

phallosome (e.g., AMNH\_PBI 00190645) (fig. 3), although this is not the case in all specimens examined (e.g., AMNH\_PBI 00103758) (fig. 3). This situation is also common in species of *Lopidella* (M. D. Schwartz, personal commun.). It is not known what is causing this situation, or if having this large ramus coming through the phallobase is causing any damage to the conjunctiva.

There is also some variation regarding the curvature and serration of the basal and

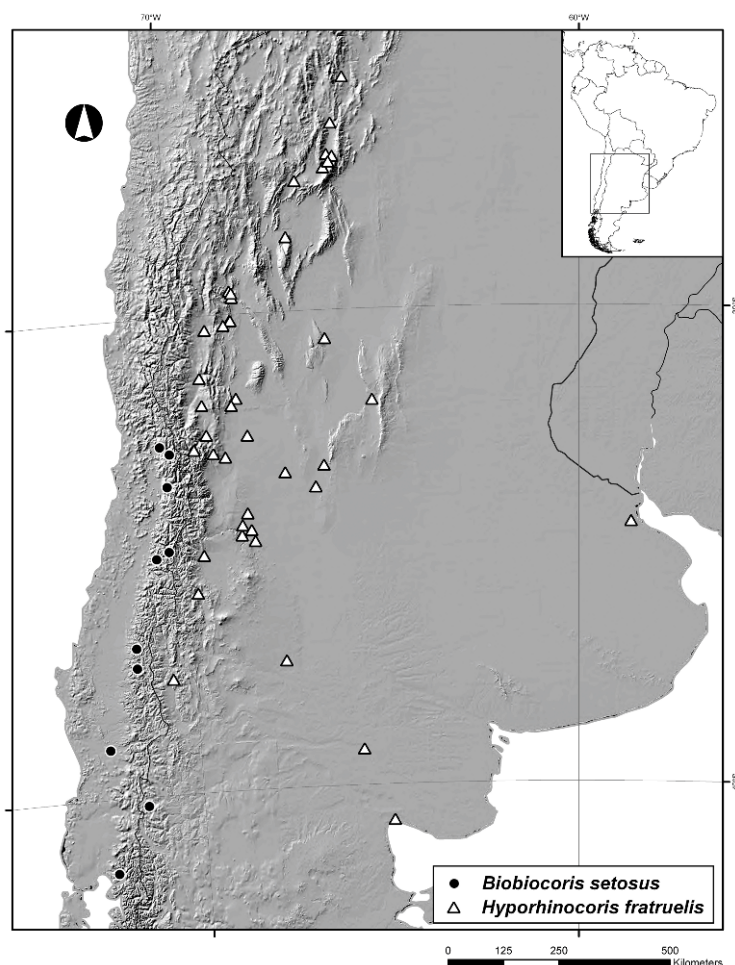


Fig. 4. Distribution map of *Biobocoris setosus* and *Hyporhinocoris fratrueilis*.

subbasal rami (fig. 3). This variation is found even in specimens of the same population and, therefore, is not considered species diagnostic.

I am placing *Biobocoris* in the *Orthotylus* species group of Orthotylini because of the complex, heavily sclerotized vesica (see Schuh, 1974: 278). Affinities of *Biobocoris* with other species of the *Orthotylus* group are unclear. Carvalho's decision (1985) to treat this taxon as a monotypic genus is accepted here (see also Schuh, 1995, 2006a). Future research, in particular on the phylogenetic relationships among members of the *Orthotylus* species group (Schuh, 1974), would help clarify the relationships of this taxon with other Orthotylinae.

Carvalho (1985) compared *Biobocoris* with *Melanotrichus* Reuter and *Incacoris* Carvalho. He distinguished *Biobocoris* from both genera only by head characters (Carvalho, 1985). In addition, *Incacoris* has a different vesical structure (Carvalho, 1961) and genital capsule. The aperture of the genital capsule in *Incacoris* is nearly vertical and circular, displaced to the right, with a dorsal process on the far left, next to a flat vertical area, and a small, acute process above the insertion of the left paramere (personal obs.). *Biobocoris* lacks any processes on either the aperture or the dorsal surface of the genital capsule, and the aperture occupies a central position on the genital capsule. In *Incacoris*, the left paramere is



elongate, apically notched, with a dorsal sensory lobe (Carvalho, 1961), and without any ventral processes as in *Biobiocoris*. Because some authors consider *Melanotrichus* as a synonym of *Orthotylus* Fieber (e.g., Kerzhner and Schuh, 1995), further comparisons of *Biobiocoris* with *Melanotrichus* or *Orthotylus* (s.l.) are not adequate until a comprehensive study of *Orthotylus* and related groups is made on a world basis.

The ventral margin of the left paramere has a process with two prongs (fig. 3). A similar structure of the left paramere is present in some species of the New Zealand endemic genus *Tridiplous* (Eyles, 2005), for instance *T. penmani* (his fig. 63). *Biobiocoris*, nonetheless, has a different vesica structure with the left spicule apically bifurcated, while in species of *Tridiplous* the left spicule has a subbasal prolongation that is apically bifurcated. No known Neotropical Orthotylinae have a left paramere with a ventral bifid process, or similar vesical structure (e.g., Carvalho, 1984, 1985; Carvalho and Costa, 1992a, 1992b).

**PARATYPES:** **CHILE: Bio-Bio [Region VIII: Biobio]:** El Abanico, [37.3333°S 71.5166°W], 30 Dec 1950, Ross and Michelbacher, 1♂ (AMNH\_PBI 00190645) (USNM). [**Libertador General Bernardo O'Higgins – Region VI: Colchagua:** Vegas del Flaco, Cordilleras de San Fernando, [34.95°S 70.4666°W], Nov 1957, L. E. Peña, 1♂ (AMNH\_PBI 00190646) (USNM).

**OTHER SPECIMENS EXAMINED: ARGENTINA: Neuquen:** Lago Lacar, Pucara, 40.1833°S 71.5°W, Jan 1952, N. Kormilev, 17♂ (AMNH\_PBI 00080088–AMNH\_PBI 00080104), 2♀ (AMNH\_PBI 00080105, AMNH\_PBI 00080106) (UCB). **CHILE: Araucania – Region IX: Malleco:** El Radal, 38.9833°S 72.4°W, 141 m, 28 Sep 1959, Unknown, 4♂ (AMNH\_PBI 00103592–AMNH\_PBI 00103595), 18♀ (AMNH\_PBI 00103622–AMNH\_PBI 00103639) (CNC). **Bio-Bio – Region VIII: Nuble:** Las Trancas, Chillan, 36.92136°S 71.49416°W, 01 Feb 1983, L. Escobar and Veas, 3♂ (AMNH\_PBI 00107640–AMNH\_PBI 00107642), 9♀ (AMNH\_PBI 00107644–AMNH\_PBI 00107652) (USNM); 07 Jan 1991, L. E. Peña, 15♂ (AMNH\_PBI 00190909–AMNH\_PBI 00190923), 27♀ (AMNH\_PBI 00190924–AMNH\_PBI

00190950) (USNM). Las Trancas, region andina, 36.92136°S 71.49416°W, 06 Feb 1966, L. E. Peña, 1♂ (AMNH\_PBI 00107643) (USNM). **Libertador General Bernardo O'Higgins – Region VI: Colchagua:** Vegas del Flaco, Cordilleras de San Fernando, 34.95°S 70.4666°W, 29 Nov 1959, 13♂ (AMNH\_PBI 00103579–AMNH\_PBI 00103591), 17♀ (AMNH\_PBI 00103605–AMNH\_PBI 00103621) (CNC); Nov 1957, L. E. Peña, 1♀ (AMNH\_PBI 00190647) (USNM). **Los Lagos – Region X: Llanquihue:** Hornohyincó [sic], S of Lago Chapo, 41.51865°S 72.45052°W, Nov 1968, L. E. Peña, 3♀ (AMNH\_PBI 00190906–AMNH\_PBI 00190908) (USNM). **Maule – Region VII: Curico:** La Jaula, los Quenes, 35.08333°S 70.8°W, 20 Jan 1991, L. E. Peña, 1♂ (AMNH\_PBI 00107600) (USNM). **Region Metropolitana De Santiago:** El Manzano, 34.1°S 71.85°W, 06 Feb 1983, Madariaga, 2♂ (AMNH\_PBI 00107630, AMNH\_PBI 00107631), 8♀ (AMNH\_PBI 00107632–AMNH\_PBI 00107639) (USNM). **Valparaíso – Region V:** C[err]o [de las] Vizcachas, 32.73333°S 70.51666°W, Dec 1982, R. Madariaga, 7♂ (AMNH\_PBI 00190885–AMNH\_PBI 00190891), 9♀ (AMNH\_PBI 00190894–AMNH\_PBI 00190902) (USNM); Dec 1982, J. Escobar, 2♂ (AMNH\_PBI 00190892, AMNH\_PBI 00190893), 3♀ (AMNH\_PBI 00190903–AMNH\_PBI 00190905) (USNM). Guardia Vieja, Aconcagua, 32.9°S 70.2833°W, 22 Nov 1958, L. E. Peña, 7♂ (AMNH\_PBI 00103572–AMNH\_PBI 00103578), 9♀ (AMNH\_PBI 00103596–AMNH\_PBI 00103604) (CNC).

### *Chileria* Carvalho

Type species: *Chileria araucana* Carvalho, 1985 (by original designation).

*Chileria* Carvalho, 1985: 291 [n. gen.]; Schuh, 1995: 97 [catalog].

**DIAGNOSIS:** Recognized by vesica with a single spicule (figs. 6–8); right portion of vesica with two rami (figs. 6–8); preapical single ramus of vesica directed cephalad, apically bifurcate, apex nearly reaching base of vesica (figs. 6–8); apical small ramus of vesica usually bifurcate with ventral portion long (figs. 6–8); genital capsule with a dorsal process on its lateral left side (figs. 5E, inset; 6–8), except in *Ch. araucana* (fig. 7); genital capsule with one or two tergal processes on each lateral margin of its aperture (figs. 5E–F,

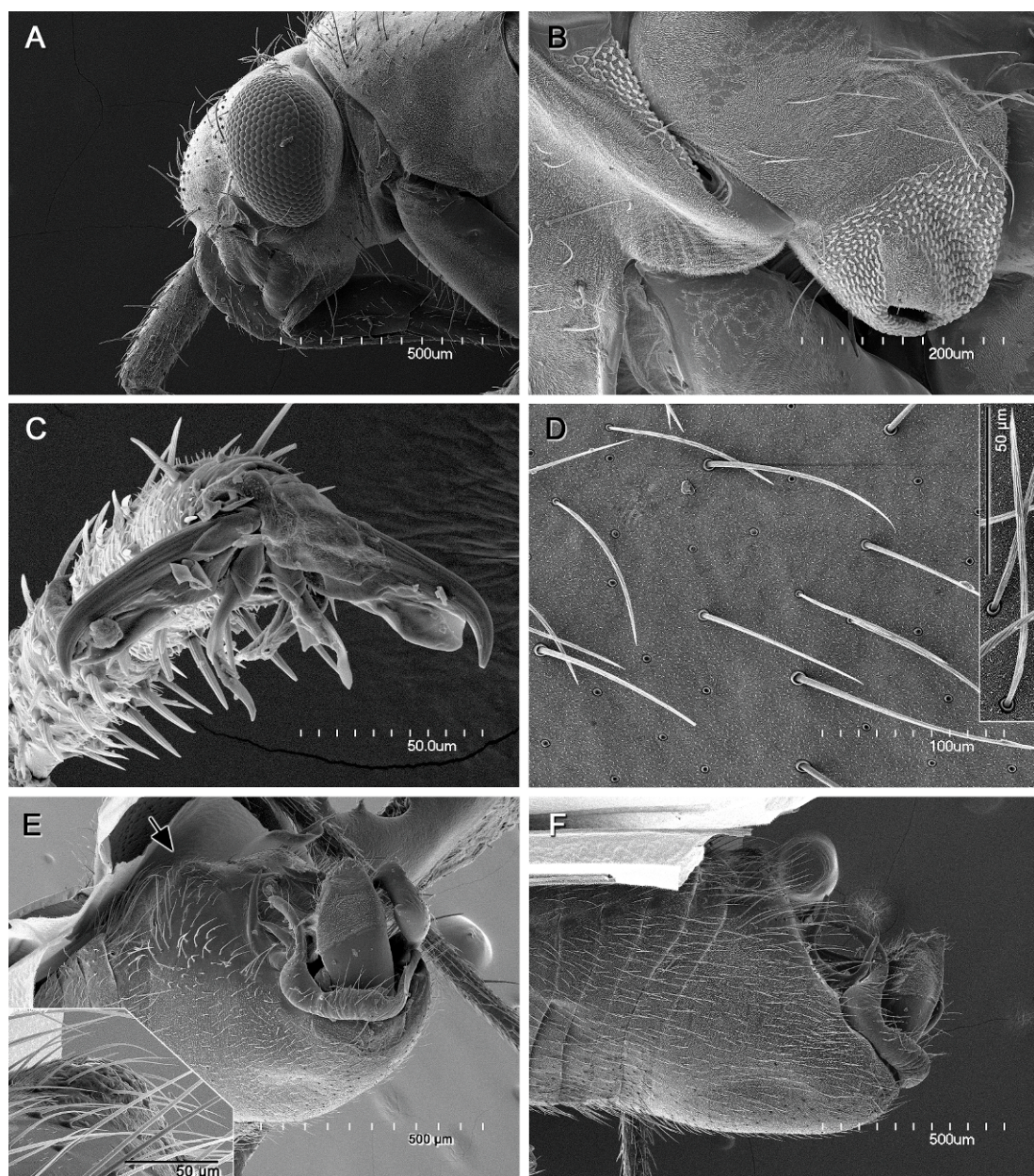


Fig. 5. *Chileria andina* (AMNH\_PBI 00195132). SEM of selected structures. **A.** Head, lateral view. **B.** Mesothoracic spiracle and metathoracic scent gland evaporative area. **C.** Pretarsus, apical view. **D.** Vestiture on hemelytron, with detail of sericeous setae on the inset. **E.** Genital capsule, ventroposterior view; arrow points to dorsal process; detail of lateral left dorsal process on the inset. **F.** Genital capsule, lateral view.

6–8); left paramere Y-shaped in lateral left view, dorsal portion narrowing apically, ventral portion directed medially and slightly curved (figs. 5E–F, 6–8); phallosome cylindri-

cal, sclerotized on all surfaces, with opening longitudinal, dorsal, and narrowly sinuate basally, wider apically, turned to the right at apex (figs. 6–8).



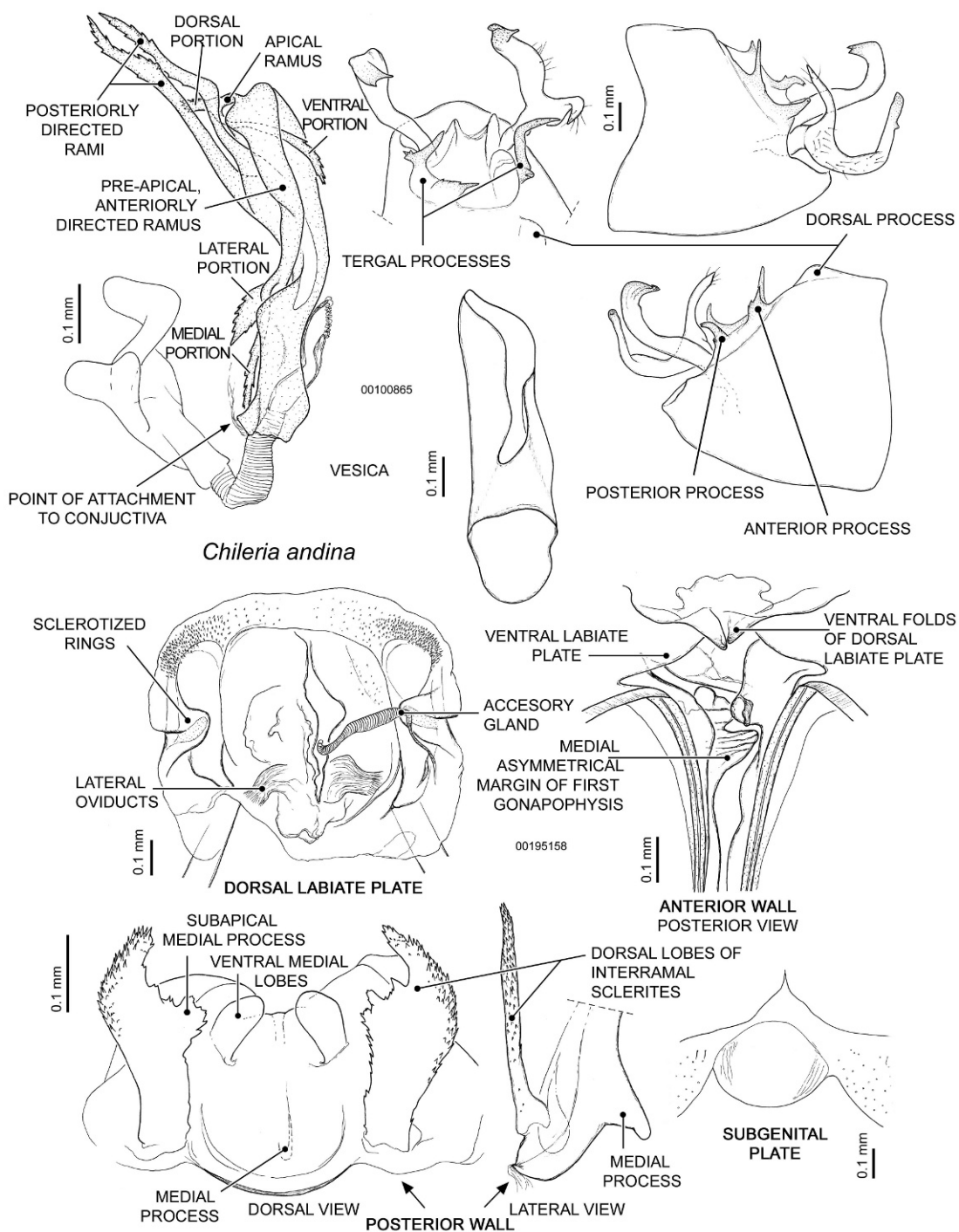


Fig. 6. *Chileria andina*. Male genitalia: vesica; genital capsule and parameres *in situ*; and phallosome. Female genitalia: dorsal labiate plate, dorsal view; anterior wall in posterior view; posterior wall, in dorsal and lateral view; subgenital plate, ventral view.

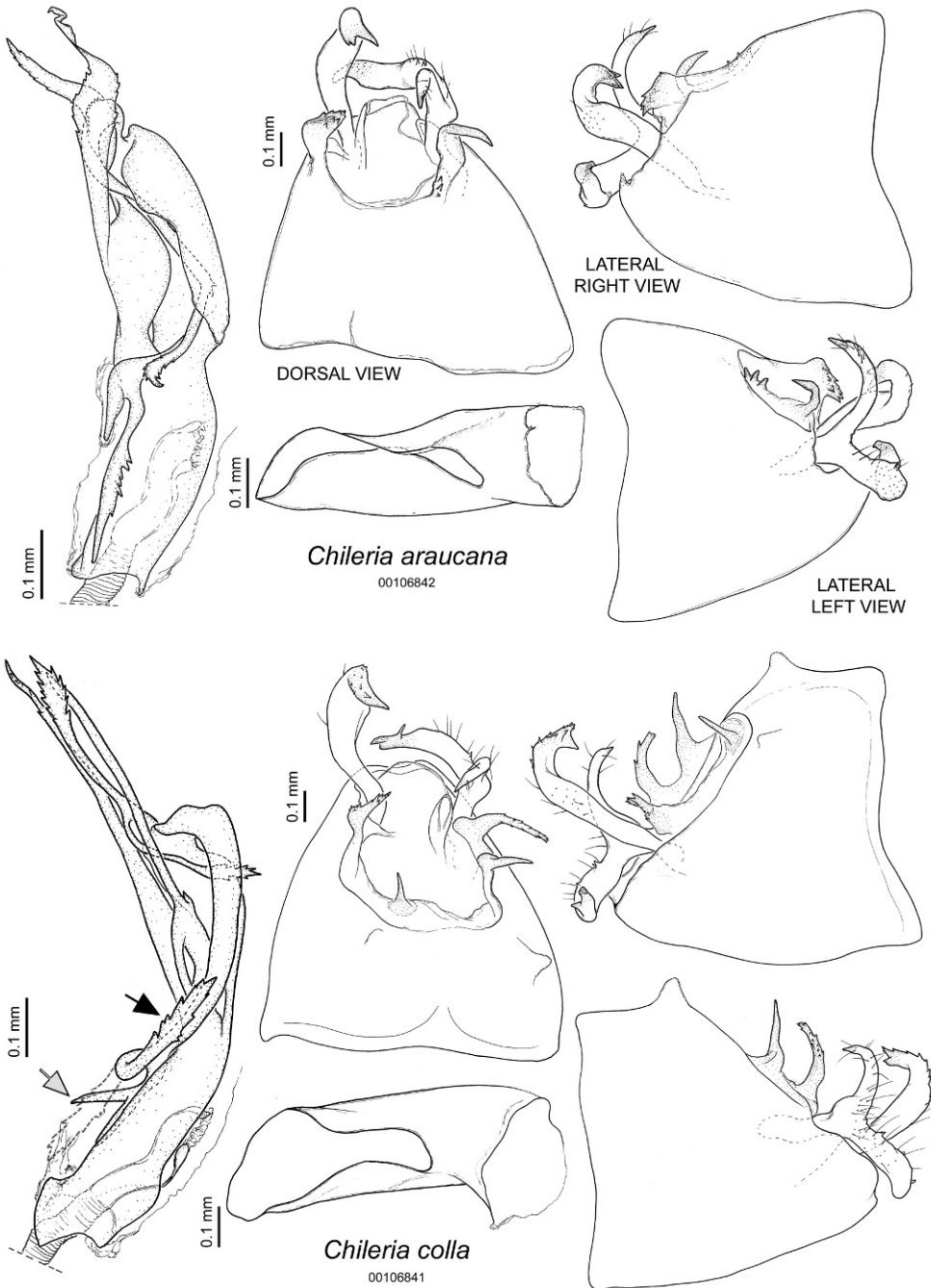


Fig. 7. *Chileria araucana* and *C. colla*. Male genitalia: vesica; genital capsule and parameres *in situ*; and phallotheca. *C. araucana* specimen (paratype) is teneral. The gray arrow on *C. colla* indicates where variation in serration on the short (lateral) portion of the anteriorly directed ramus occurs. Black arrow indicates position of longer (medial) portion of ramus in paratype, and dotted line indicates usual position of this portion of the ramus in other specimens.



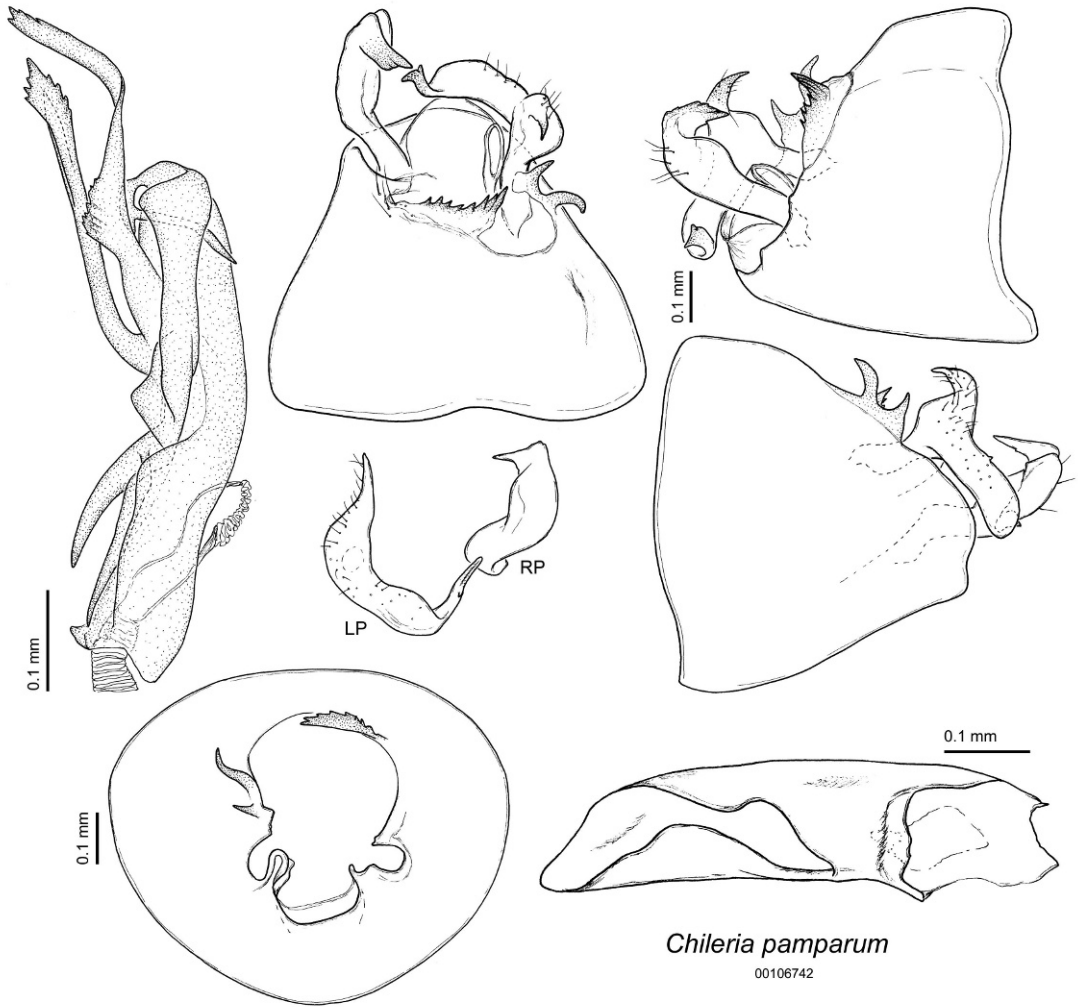


Fig. 8. *Chileria pamparum*. Male genitalia: vesica; genital capsule and parameres in situ; genital capsule without parameres, posterior view; left and right paramere, posterior view; and phallosome.

Carvalho (1985) considered *Chileria* close to *Saileria* due to “the general aspect [of the body] and the position of the eyes on the head”. He differentiated *Chileria* from *Saileria* by the “length of the cuneus, which is slightly longer than wide, the straight posterior margin of the pronotum, the strong long setae on the posterior tibiae, and the structure of the male genitalia”. The resemblance of *Chileria* with *Saileria* is superficial. In *Chileria*, the base of the eye is slightly produced laterally (fig. 1) adjoining the neck abruptly, whereas in *Saileria* (e.g., *S. bella* see below, fig. 2), the

base of the eye is not strongly produced laterally and is gently converging toward the base of the head (fig. 19A–B). The eyes in the male of *Chileria* are small relative to the size of the head and close to the anterior margin of the pronotum, the vertex is slightly convex, and the anteocular region of the head is about half as long as the length of an eye (fig. 5A). In *Saileria*, the eyes of the male are larger, more produced laterally, and removed from the anterior margin of the pronotum; the head has the vertex nearly flat, and the anteocular region is very short (fig. 19A–B). Carvalho

(1985) correctly pointed out the differences between the shapes of the posterior margin of the pronotum and genitalia in the two genera. In *Chileria*, the posterior margin of the pronotum is straight (fig. 1), whereas in *Saileria* it is emarginate medially (figs. 2, 19B). The vesica in *Chileria* is well sclerotized and ornamented with several rami (figs. 6–8), whereas in *Saileria* it is just a single, simple spicule (fig. 20). The structure of the genital capsule is also different; in *Chileria*, it is relatively large with the aperture small and reclined, and with various tergal processes on its margin (figs. 6–8). In *Saileria*, the genital capsule is relatively small compared with the abdomen, the aperture is nearly vertical and larger, the margin of the aperture has no tergal processes, and it has a right ventral projection directed caudad (figs. 19G–H, 20). A further difference is the vestiture, which in *Chileria* is composed of two types of setae, simple decumbent setae and flattened setae (fig. 5D). In *Saileria*, the vestiture is composed of only simple, long, semi-erect setae (fig. 19D).

**DISTRIBUTION:** *Chileria* is known from southern Bolivia to central Argentina and Chile (fig. 9).

**HOSTS ASSOCIATIONS:** Of the four species of *Chileria*, only two have specimens with associated plant records. *Ch. andina* is associated with species of *Flourensia* DC. (Asteraceae) (see below). *Chileria pamparum*, the most widely distributed species, have a few host-plant records, mainly from cultivated plants in no related groups as Fabaceae, Malvaceae, and Solanaceae. More host-plant information is needed for species of *Chileria* before any conclusion can be drawn about its plant associations.

**DISCUSSION:** Although resembling species of *Orthotylus* due to their complex and ramified vesica, all species of *Chileria* differ by sharing the distinct male genitalic structure described above, i.e., the Y-shaped left paramere and hook-shaped right paramere, and the structure of the vesica and phallosome (figs. 5E–F, 6–8). The dorsal left process on the genital capsule partially defines *Chileria*. Only in *Ch. araucana*, the type species, this process is absent. All species of *Chileria* also share a particular black pattern in the membrane of the hemelytra (fig. 1). This color

pattern was not mentioned in the original description of *Ch. araucana* (Carvalho, 1985), although it is partially evident in the discolored paratype examined (fig. 1). A similar color pattern is also present in *Cyrtotylus cruciatus* Carvalho and Carpintero, 1991, although it is not related to species of *Chileria* based on male genitalic structures.

Because no other known Orthotylinae in the Neotropical Region, or elsewhere, share the combination of characters mentioned above, I regard *Chileria* as a valid genus. I am also including *Chileria* in the *Orthotylus* species group of Schuh (1974).

The key to separate the species of *Chileria* provided below is intended for use only with male specimens. Females are better identified in association with males. Future examination of additional females, in particular of *Ch. araucana*, may offer new characters to improve species identification.

#### KEY TO THE SPECIES OF *CHILERIA*

1. Total length less than 3.8 mm; hemelytra with dorsal surface spotted green (fig. 1); right margin of aperture of genital capsule with one anterior tergal process, transversely elongate and strongly serrate (fig. 8) . . . . . *Ch. pamparum*
- Total length greater than 4.3 mm; hemelytra yellowish or green, not spotted (fig. 1); right margin of aperture of genital capsule with one or two tergal processes, anterior process either never strongly serrate or absent (figs. 6–7) . . . . . 2
2. Right margin of aperture of genital capsule with one posterior, knoblike process (fig. 7); left margin of aperture with a posterior process strongly curved laterally, anterior process as a group of three small spines (fig. 7) . . . . . *Ch. araucana*
- Right margin of aperture of genital capsule with two processes (figs. 6–7); left margin with two, well-defined processes (figs. 6–7) . . . . . 3
3. Dorsal greenish coloration of body evenly distributed on pronotum and hemelytra (fig. 1); dorsal process of genital capsule on left side not strongly produced, wide at base (fig. 6); anterior process on right margin of aperture of genital capsule transversely elongate, serrate (fig. 6); anterior process on left margin of aperture directed dorsally (fig. 6) . . . . . *Ch. andina*, sp. nov.

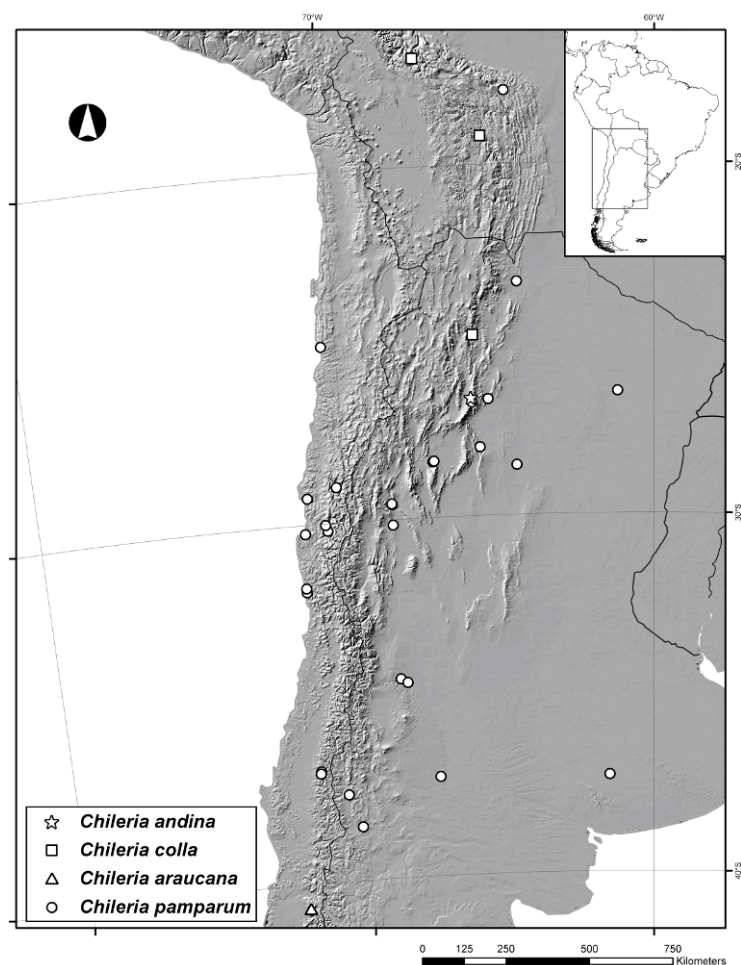


Fig. 9. Distribution map of *Chileria andina*, *C. araucana*, *C. colla*, and *C. pamparum*.

- Dorsal greenish coloration of body restricted mostly to medial areas of pronotum and hemelytra (fig. 1); dorsal process of genital capsule on left side strongly produced, narrow at base (fig. 7); anterior process on right margin of aperture of genital capsule as a single, straight, dorsally directed spine (fig. 7); anterior process on left margin of aperture directed laterally (fig. 7) . . . . .  
..... *Ch. colla*

*Chileria andina*, **sp. nov.**

Figures 1, 4–5, 9

DIAGNOSIS: Recognized by total length (table 1); homogeneous greenish dorsal coloration (fig. 1); anteriorly directed ramus of

vesica with medial portion longer than lateral portion, latter expanded preapically, both portions serrate (fig. 6); posteriorly directed rami of vesica subequal in length, apically serrate; apical ramus of vesica with dorsal portion short and serrate, ventral portion about three times as long as dorsal portion; genital capsule with two pairs of tergal processes on aperture margin; anterior process on right margin transversely elongate, serrate apically; posterior process on right margin projected medially, with small spines basally; anterior process on left margin simple, directed dorsally; posterior process on left margin simple, directed laterally.

*Chileria andina* is easily distinguished from all the other known species of *Chileria* by the

TABLE 1  
Measurements of *Chileria* and *Orthotylus*  
Cun=Cuneus; Clyp=Clypeus; Pron=Pronotum; Scut=Scutellum; IntOcDi= Interocular distance; Ant2=  
Antennal segment 2

Species		Length						Width			IntOcDi	Ant2
		Total	Cun-Clyp	Head	Pron	Scut	Cuneus	Head	Pron	Scut		
<i>Chileria andina</i> n. sp.												
Males (N=5)	Mean	4.78	3.11	0.42	0.56	0.42	0.78	0.85	1.15	0.62	0.46	1.23
	SD	0.13	0.10	0.03	0.03	0.03	0.05	0.01	0.05	0.03	0.01	0.08
	Range	0.32	0.26	0.05	0.08	0.06	0.12	0.03	0.12	0.07	0.02	0.18
	Min.	4.65	3.02	0.40	0.53	0.39	0.73	0.84	1.08	0.59	0.45	1.16
	Max.	4.97	3.27	0.45	0.61	0.45	0.85	0.87	1.20	0.66	0.46	1.33
Females (N=5)	Mean	4.53	3.07	0.42	0.58	0.42	0.69	0.88	1.17	0.59	0.51	1.22
	SD	0.10	0.05	0.04	0.02	0.01	0.01	0.02	0.03	0.02	0.00	0.04
	Range	0.26	0.12	0.09	0.06	0.02	0.02	0.04	0.07	0.06	0.01	0.11
	Min.	4.39	3.02	0.38	0.55	0.41	0.68	0.87	1.14	0.57	0.51	1.17
	Max.	4.65	3.14	0.47	0.61	0.43	0.70	0.90	1.21	0.63	0.52	1.28
<i>Orthotylus chullan</i> n. sp.												
Males (N=1)	Mean	3.03	2.26	0.26	0.49	0.38	0.42	0.82	1.02	0.47	0.40	0.92
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Min.	3.03	2.26	0.26	0.49	0.38	0.42	0.82	1.02	0.47	0.40	0.92
	Max.	3.03	2.26	0.26	0.49	0.38	0.42	0.82	1.02	0.47	0.40	0.92
Females (N=3)	Mean	3.05	2.22	0.24	0.45	0.34	0.51	0.81	0.99	0.45	0.39	0.83
	SD	0.19	0.13	0.01	0.01	0.04	0.01	0.02	0.06	0.04	0.01	0.08
	Range	0.37	0.23	0.02	0.02	0.07	0.01	0.04	0.11	0.07	0.02	0.17
	Min.	2.86	2.07	0.23	0.44	0.31	0.50	0.79	0.94	0.41	0.37	0.75
	Max.	3.23	2.30	0.25	0.46	0.38	0.51	0.83	1.05	0.48	0.40	0.91
<i>Orthotylus kakan</i> n. sp.												
Males (N=5)	Mean	3.18	2.21	0.28	0.47	0.37	0.55	0.78	0.99	0.46	0.37	0.84
	SD	0.23	0.15	0.03	0.03	0.03	0.06	0.03	0.05	0.03	0.01	0.06
	Range	0.54	0.37	0.09	0.07	0.07	0.15	0.07	0.11	0.08	0.04	0.17
	Min.	2.92	2.03	0.24	0.44	0.33	0.47	0.74	0.94	0.42	0.35	0.76
	Max.	3.46	2.39	0.33	0.51	0.41	0.62	0.80	1.05	0.50	0.39	0.93
Females (N=5)	Mean	3.30	2.26	0.31	0.48	0.36	0.54	0.80	1.00	0.47	0.39	0.78
	SD	0.18	0.14	0.04	0.02	0.03	0.02	0.02	0.04	0.03	0.01	0.06
	Range	0.45	0.34	0.10	0.04	0.08	0.05	0.05	0.11	0.06	0.01	0.15
	Min.	3.05	2.13	0.28	0.46	0.33	0.51	0.78	0.94	0.44	0.39	0.71
	Max.	3.50	2.47	0.38	0.49	0.40	0.56	0.82	1.05	0.51	0.40	0.86
<i>Orthotylus kikin</i> n. sp.												
Males (N=5)	Mean	3.45	2.34	0.30	0.51	0.37	0.56	0.85	1.04	0.49	0.39	0.90
	SD	0.12	0.07	0.02	0.02	0.01	0.02	0.01	0.03	0.02	0.01	0.02
	Range	0.31	0.17	0.06	0.04	0.03	0.05	0.03	0.08	0.05	0.03	0.04
	Min.	3.27	2.24	0.27	0.49	0.35	0.54	0.82	1.00	0.47	0.37	0.88
	Max.	3.58	2.41	0.33	0.54	0.39	0.59	0.85	1.07	0.52	0.40	0.93
Females (N=5)	Mean	3.37	2.38	0.32	0.50	0.36	0.53	0.87	1.09	0.50	0.42	0.88
	SD	0.05	0.06	0.03	0.02	0.01	0.03	0.02	0.03	0.04	0.02	0.03
	Range	0.12	0.14	0.08	0.06	0.03	0.09	0.04	0.07	0.10	0.05	0.07
	Min.	3.32	2.32	0.28	0.47	0.34	0.49	0.84	1.05	0.46	0.40	0.86
	Max.	3.44	2.46	0.35	0.53	0.37	0.57	0.89	1.13	0.56	0.45	0.92



structure of the male genitalia (fig. 6). The most similar species, *Ch. colla*, resembles *Ch. andina* in its general aspect, dorsal coloration, orange metasternum, and structure of the genital capsule with a pair of tergal processes on each margin of the aperture. *Chileria andina* can be distinguished from *Ch. colla* by the shape of the anterior process on the right margin of the aperture of the genital capsule, which is transverse and serrate (fig. 6). The shape of this anterior process is similar to that found in *Ch. pamparum*, but in *Ch. andina* the process is not as sclerotized and the denticles are not as produced as in *Ch. pamparum* (fig. 8).

**DESCRIPTION:** MALE: Elongate, large, total length 4.65–4.97. **COLORATION:** Overall coloration yellowish green with dark areas (fig. 1). **Head:** Clypeus yellow, sometimes green; frons and vertex with paired lateral, longitudinal, yellow areas, usually extending to base of eyes, area between longitudinal yellow stripes nearly white; mandibular plate green, apex faintly pale yellow; maxillary plate pale yellow on apical half; buccula nearly white; gena and gula green; eyes dark; labrum pale brown; labial segment I greenish, II–III pale brown, IV dark brown; antennae brown, segment I dark brown except dorsally, segment II dark brown, medially brown. **Thorax:** Calli on pronotum pale yellow; mesoscutum and scutellum greenish, sometimes mesoscutellum yellow laterally; proepisternum, proepimeron, mesepisternum, and mesepimeron greenish; metepisternum yellowish green; scent-gland efferent system greenish; mesosternum yellowish; metasternum pale orange. **Hemelytron:** Clavus green; corium greenish yellow, medially dark green; embolium anterior to cuneal fracture brownish; cuneus greenish; membrane translucent with black marking on anterior medial margin, a faded, dark, broad, longitudinal marking and inverted L-shaped dark marking on lateral margin behind cells, larger cell suffused with black, veins yellow. **Legs:** Coxae yellowish; trochanters and femora yellowish green; tibiae pale brown, apically dark; tarsi pale brown, last tarsal segment dark brown. **Abdomen:** Sternites mostly yellowish, with faded green areas. **Genitalia:** Genital capsule and proctiger yellowish; parameres yellowish, left paramere

apically dark brown. **SURFACE AND VESTITURE:** Surface dull, covered with microtrichia; vestiture on dorsum composed of two kinds of brown setae, simple decumbent setae (fig. 5D), and smaller, nearly flattened, decumbent setae with parallel margins (fig. 5D, inset); vertex, frons, and pronotum with sparse, whitish, sericeous setae. Specific structural setae are detailed below. **STRUCTURE:** **Head:** Transverse (fig. 1); clypeus broadly rounded, surface smooth (fig. 5A), barely visible from above (fig. 1); frons strongly convex; vertex flat, posterior margin not elevated; mandibular plate subquadrangular; maxillary plate slightly elongate; both plates apically rounded, surface smooth; buccula about half the length of labial segment I; gena covered with sparse simple setae; gula short (fig. 5A); eyes rounded in dorsal view, oval in lateral view, adjacent to anterior margin of pronotum, in lateral view about half the height of head, reaching dorsal margin of head; labrum small, narrow, triangular (fig. 5A); labium reaching posterior margin of mesosternum, but not extending to mesocoxae; labial segments I and II subequal in length, III and IV subequal in length and shorter than I; antennal segment I nearly as long as IV, the greatest in diameter, II about three times as long as I, diameter smaller than I, III about half as long as II, diameter slightly less than diameter of II, diameter of III and IV subequal. **Thorax:** Collar barely visible in dorsal view, mostly covered by anterior margin of pronotum (fig. 5A); pronotum nearly flat, trapezoidal, anterior margin gently emarginate, posterior angles broadly rounded, posterior margin straight; calli flat, barely differentiated from surrounding surface of pronotum; mesoscutum excavated medially; scutellum triangular, nearly equilateral, disc slightly convex; proepisternum narrow, not protruding laterally, glabrous; proepimeron slightly concave; mesepisternum, mesepimeron, and metepisternum covered with sparse, delicate, simple setae; mesothoracic spiracle drop-shaped, with a large area of mushroom-like cuticle dorsal to opening of spiracle on mesepimeron (fig. 5B); metathoracic scent-gland efferent system with peritreme located medially on evaporative area, not protruded, surface with similar dense macrotrichia as

remaining metepisternum; dorsal margin of evaporative area inclined, not reaching level of dorsal margin of adjacent metacoxa (fig. 5B); prosternum triangular, with carinate margins, beset with very small setae. *Hemelytron*: Margins subparallel, greatest width of hemelytra greater than width of pronotum at posterior margin; clavus elevated with respect to corium along claval suture; corium nearly flat; cuneus longer than wide. *Legs*: Coxae cylindrical; trochanters ovoid; pro- and mesofemora of subequal length, nearly cylindrical, gently tapering apically, slightly compressed laterally, covered with small, dark, bristlelike setae; metafemur longer than pro- and mesofemora, strongly compressed laterally, tapering basally and apically, dorsally covered with short dark setae; tibiae cylindrical, uniformly covered with short, dark, simple setae, and sparse medium-sized simple, dark setae; pro- and mesotibiae about 1.35 times longer than respective femora; metatibia 1.53 times longer than metafemur; first tarsal segment the shortest, second and third subequal in length; pretarsus as in fig. 5C. *Abdomen*: Short, surface of abdomen covered with long, sparse, medium-sized, simple setae. *Genitalia*: Genital capsule relatively large, about half as long as total length of abdomen (figs. 5E–F, 6), triangular, apically broadly truncate in dorsal view (fig. 6), prominent process on left dorsal surface anterior to dorsal margin of aperture (fig. 5E, arrow), not strongly produced dorsally, base wide (fig. 5E, inset; 6); aperture oval, reclined, dorsal anterior margin well defined; two tergal processes on lateral left margin of aperture, anterior one straight and directed upward, posterior one curved laterally (figs. 5E–F, 6); two tergal processes on right margin of aperture, anterior one short and transverse with margin serrate, posterior one directed medially and strongly curved at base (fig. 6); proctiger barely surpassing apex of genital capsule; cuplike sclerite U-shaped, not reaching apex of genital capsule (fig. 6); left paramere Y-shaped, dorsal prolongation curved and directed cephalad, apically acute (figs. 5E–F, 6), ventral prolongation curved and directed medially, bulbous at base, preapically emarginate, preapical process acute and directed posteriorly, apex rounded (fig. 6); right paramere hook-shaped in lateral

view, small round protuberance anterior to dorsoventrally flattened apex, acute process on apex directed medially (fig. 6); phallosome cylindrical, well sclerotized on all surfaces, curved dorsally in lateral view, opening dorsal and longitudinal, directed to the right apically (fig. 6); vesica with single spicule, left portion of vesica with two rami directed caudad, both flat and serrate apically, right portion with cephalad ramus apically bifurcate into two portions, one strongly flattened, the other elongate, both serrate apically; apical ramus of vesica with one portion directed dorsally and a longer portion directed ventrally, apically serrate; basal portion of spicule of vesica enclosing dorsally the sclerotized part of ductus seminis; dorsal basal right area of spicule slightly curved upward, as point of attachment to conjunctiva; sclerotized part of ductus seminis long (fig. 6).

*FEMALE*: Very similar to male in structure, vestiture, and coloration, but smaller; total length 4.39–4.65. *STRUCTURE*: *Genitalia* (fig. 6): Subgenital plate shorter than wide, apex broadly curved; base of ovipositor located anterior to longitudinal midpoint of abdomen; interrampal sclerite of posterior wall not heavily sclerotized, poorly defined; dorsal lobe of interrampal sclerite with lateral margin strongly curved subapically, apical half of lateral margin with numerous microtrichia, apex acutely rounded, medial margin serrate and with a subapical process; dorsal margin of medial sclerite of posterior wall, curved, simple, without microtrichia; medial sclerite with a medial process, laterally compressed, apically rounded, directed posteriorly; ventral area of medial sclerite with a pair of flat, rounded lobes directed medially; dorsal labiate plate with medial sclerotized area, longitudinally divided, and forming a pair of ventral folds; sclerotized rings elongate, rectangular, proximal margin with numerous microtrichia; anterior wall with medial margins of first gonapophyses asymmetrical.

*DISTRIBUTION*: Known only from a single area to the east of Amaichá de Valle, Argentina (fig. 9).

*HOSTS*: *Flourensia blakeana* Dillon (Asteraceae). Some of the specimens bear host labels of *F. fiebrigii* Blake, probably a misidentification. *Flourensia fiebrigii* occurs only in north-

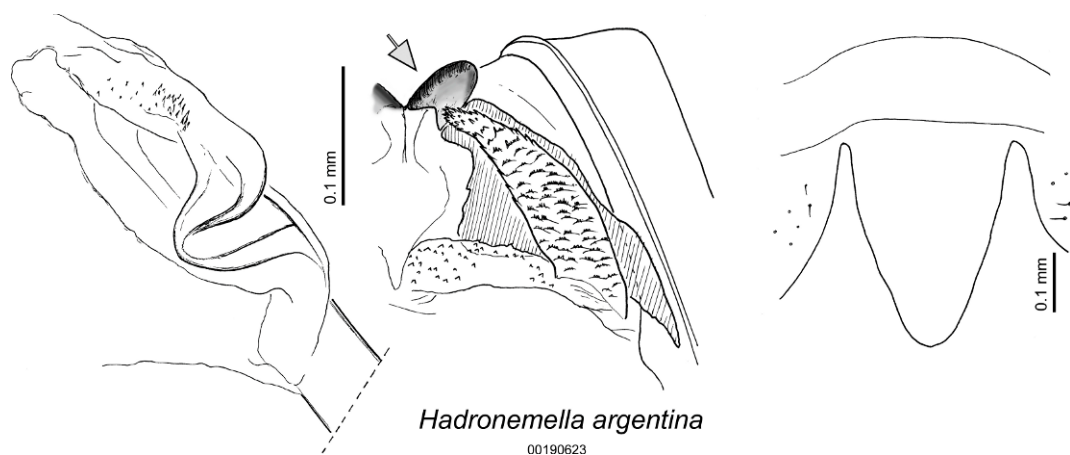


Fig. 10. *Hadronemella argentina*. Female genitalia: sclerotized rings on dorsal labiate plate, dorsal view; posterior wall with dorsal lobes of interramal sclerites in dorsal view, interramal sclerite dashed; and subgenital plate, ventral view. Arrow on posterior wall indicates anterior sclerotized prolongation of medial margin of second gonapophysis.

ernmost Argentina (Jujuy), as well as in some dry valleys in southern Bolivia (Dillon, 1984), north of where *Ch. andina* was collected. *Flourensia blakeana* is present in the sandy dry areas near Amaichá del Valle (Dillon, 1981) and in eastern Catamarca (Dillon, 1984).

**ETYMOLOGY:** The name of the new species refers to the Andes mountain range in which *Ch. andina* is found.

**DISCUSSION:** The female of *Ch. andina* has a pair of ventral medial lobes on the medial sclerite, ventral to the dorsal lobes of the interramal sclerite (fig. 6). Smaller lobes are also present in *Ch. colla* (e.g., AMNH\_PBI 00190959). Homologous structures in *Ch. pamparum* (e.g., AMNH\_PBI 00195191) are not lobelike but nearly straight, although they do have an invagination with a flaplike appearance. Other Orthotylini have anterior projections between the second gonapophyses, ventral to the interramal sclerites (e.g., *Hadronemella argentina* Carvalho and Wallerstein, 1978; fig. 10, arrow; *Lopidea staphyleae* Knight, 1917 [Davis, 1955: fig. 15]), but these projections are extensions of the sclerotized medial margins of the second gonapophyses, and are neither lobelike nor invaginated. Some undescribed Australian species of *Orthotylus* also have lobelike structures in the posterior wall, but those are apparently behind and close to the insertion of

the dorsal lobe of the interramal lobe (*C. Symonds*, personal commun.), not located ventrally and medially as in *Ch. andina*. As far as I am aware, structures similar to the ventral medial lobes are not known or have not been documented for any other Orthotylinae (e.g., Slater, 1950; Davis, 1955).

The medial sclerite of the posterior wall has a blunt, laterally compressed process directed posteriorly, which lies above the bulbous base of the second gonapophyses. This medial process is present in all the species of *Chileria* (except *Ch. araucana*, for which females have not been examined). A similar structure is present in *Lopidea robiniae* Uhler, 1861 (personal obs.), in which it is considerably smaller and shaped as a small prominence, not as a laterally compressed tubercle, but noticeable nonetheless when examining the medial sclerite in dorsal view. I consider these structures as potentially homologous in *Chileria* and *Lopidea*. *Lopidea robiniae* also shares with species of *Chileria* the medial sclerotized folds on the ventral surface of the dorsal labiate plate. Similar medial sclerotized areas on the dorsal labiate plate, nonetheless, are present in other members of the *Orthotylus* group (e.g., *O. marginalis* Reuter), although it is not clear whether they are homologous because of their structure. Because I have not examined females of *Ch. araucana*, it is not possible to say whether the medial ventral



lobes and the medial posterior process are present. If the medial posterior process is present in *Ch. araucana* as a laterally compressed tubercle, this structure should be considered a synapomorphy for *Chileria*.

**HOLOTYPE (MALE): ARGENTINA: Tucuman:** 25 km SE of Quilmes, 26.62126°S 65.84041°W, 2507 m, 01 Mar 2006, T. Henry and D. Forero, *Flourensia blakeana* Dillon (Asteraceae), det. L. Iharlegui VOUCHER-LP, Holotype *Chileria andina* n. sp. Forero (red label), 1♂ (AMNH\_PBI 00195153) (IFML).

**PARATYPES: ARGENTINA: Tucuman:** 25 km SE of Quilmes, 26.62126°S 65.84041°W, 2507 m, 01 Mar 2006, T. Henry and D. Forero, *Flourensia blakeana* Dillon (Asteraceae), det. L. Iharlegui VOUCHER-LP, 21♂ (AMNH\_PBI 00195132–AMNH\_PBI 00195152), 22♀ (AMNH\_PBI 00195154–AMNH\_PBI 00195175) (AMNH); 15♂ (AMNH\_PBI 00185727–AMNH\_PBI 00185741), 19♀ (AMNH\_PBI 00185742–AMNH\_PBI 00185760) (USNM). Ampimpa, 17 Km E of Amaicha del Valle in Route 307, 26.64861°S 65.81583°W, 2755 m, 21 Feb 1993, R. T. Schuh and J. T. Polhemus, *Flourensia fiebrigii* Blake (Asteraceae), 30♂ (AMNH\_PBI 00100860–AMNH\_PBI 00100866, AMNH\_PBI 00194755–AMNH\_PBI 00194760, AMNH\_PBI 00194764–AMNH\_PBI 00194770, AMNH\_PBI 00194774–AMNH\_PBI 00194783), 32♀ (AMNH\_PBI 00100867–AMNH\_PBI 00100872, AMNH\_PBI 00194721–AMNH\_PBI 00194736, AMNH\_PBI 00194740–AMNH\_PBI 00194745, AMNH\_PBI 00194749–AMNH\_PBI 00194752) (AMNH), 2 nymphs (AMNH\_PBI 00194753, AMNH\_PBI 00194754) (AMNH); 3♂ (AMNH\_PBI 00194761–AMNH\_PBI 00194763), 3♀ (AMNH\_PBI 00194737–AMNH\_PBI 00194739) (IFML); 3♂ (AMNH\_PBI 00194771–AMNH\_PBI 00194773), 3♀ (AMNH\_PBI 00194746–AMNH\_PBI 00194748) (USNM).

### *Chileria araucana* Carvalho

Figures 1, 7, 9

*Chileria araucana* Carvalho, 1985: 291 [n. sp.]; Schuh, 1995: 97 [catalog].

**DIAGNOSIS** (fig. 7): Recognized by the long apical ramus of the vesica, as long as the posteriorly directed rami, reaching the point of bifurcation of the anteriorly directed ramus;

anteriorly directed ramus with portions of unequal length, longer one twice as long as shorter one, longer one serrate on ventral margin; genital capsule with right margin of aperture only with one posterior tergal process, knoblike; left margin of aperture with anterior processes grouped as three small spines; posterior process simple, strongly curved laterally; dorsal left side of genital capsule nearly flat, without a protuberant dorsal process.

*Chileria araucana* is easily recognized among *Chileria* species by the structure of the male genitalia, in particular the genital capsule (fig. 7). *Chileria araucana* is similar to *Ch. pamparum* in having just one process on the right margin of the aperture of the genital capsule (fig. 8). Nonetheless, the structure of the process in *Ch. araucana* is more similar to that of *Ch. colla*, which is directed medially and denticulate distally (fig. 7). In *Ch. araucana* the process is knoblike (fig. 7) and in *Ch. colla* it is more slender (fig. 7). The vesica of *Ch. araucana* is unique among the species of *Chileria* in having a long ventral portion of the apical ramus reaching the point of bifurcation of the anteriorly directed rami (fig. 7). In all the remaining species of *Chileria* this ramus is at most half as long as in *Ch. araucana*.

**DISTRIBUTION:** The only examined specimen is from Los Lagos (Region X) in Chile (fig. 9). Present also in Argentina and Bolivia (Carvalho, 1985), but see discussion below.

**HOSTS:** Unknown for this species.

**DISCUSSION:** The teneral paratype is from Osorno, Chile, and although not topotypic with the holotype, it is from the same region in Chile as the holotype (Carvalho, 1985), the two localities being less than 70 km apart from each other. Carvalho (1985) mentioned that *Ch. araucana* is also distributed in Argentina and Bolivia, and that the body coloration varies from pale yellow to greenish. Because most of the species of *Chileria* have relatively restricted distributional ranges, and those localities of *Ch. araucana* from Argentina and Bolivia overlap other species of *Chileria*, and because the dorsal aspect and coloration of the species of *Chileria* is similar (e.g., fig. 1), it is possible that the paratype series of *Ch. araucana* may be a mixture of several species. These paratypes, which were

unavailable to me for study, are deposited in the California Academy of Sciences (cf. Carvalho, 1985).

**PARATYPE (MALE): CHILE:** [Los Lagos – Region X]: **Osorno:** 30 Km E of Puyehue, [40.66256°S 72.26109°W], 23 Jan 1951, Ross and Michelbacher, Paratype *Chileria araucana* Carvalho det., 1♂ (AMNH\_PBI 00106842) (USNM).

### *Chileria colla* Carvalho and Carpintero

Figures 1, 7, 9

*Chileria colla* Carvalho and Carpintero, 1991: 33 [n. sp.]; Schuh, 1995: 97 [catalog].

**DIAGNOSIS** (fig. 7): Recognized by the erect, spinelike anterior process on the right margin of the aperture of the genital capsule; posterior process of the right margin of the aperture directed medially, with small spines; left margin of aperture with anterior process simple, directed laterally, and posterior process slightly denticulate, directed laterally and longer than anterior process; vesica with apical ramus with the two portions apically expanded, dorsal portion long, slightly longer than ventral portion; anteriorly directed ramus of vesica with shorter (lateral) portion from strongly serrate to nearly bifurcate.

*Chileria colla* is very similar in dorsal coloration (fig. 1) and vesica structure (fig. 7) to the new species *Ch. andina*. *Chileria colla* can be distinguished from *Ch. andina* by the shape of the anterior right tergal process of the aperture of the genital capsule, which is a simple, erect spine (fig. 7), whereas in *Ch. andina* this tergal process is transversely elongate and serrate (fig. 6). The tergal processes of the left margin are similar, but in *Ch. colla* the anterior process is directed laterally (fig. 7), whereas in *Ch. andina* this process is directed dorsally (fig. 6). The structure of the vesica is also similar in the two species but in *Ch. colla* the dorsal portion of the apical rami is much longer (fig. 7) than in *Ch. andina* (fig. 6).

**DISTRIBUTION:** *Chileria colla* is distributed from Bolivia to northern Argentina (Salta) (fig. 9). Bolivia is a new country record for this species.

**HOSTS:** Not known for this species.

**DISCUSSION:** The examined paratype is topotypic with the holotype (Carvalho and Carpintero, 1991). This paratype has the longer (medial) portion of the anteriorly directed ramus (fig. 7, black arrow) slightly turned caudad. Another one of the male paratypes from the same locality has its genitalia dissected and glued to a card, in which the same portion of the ramus is directed cephalad (fig. 7, dotted line). The Bolivian specimens examined also have this ramus directed cephalad, but the right portion of the posteriorly directed rami is serrate, not bifurcate as in the Argentinean paratype examined (fig. 7, gray arrow). I consider these differences intraspecific variations because of the same structure of the tergal processes on the genital capsule (fig. 7).

**PARATYPES: ARGENTINA: Salta:** El Alisal, [24.85°S 65.6833°W], Jan 1990, Carpintero, Paratype *Chileria colla* Carvalho det. 1990, (on same pin four specimens) 3♂ (AMNH\_PBI 00106841, AMNH\_PBI 00107623–AMNH\_PBI 00107624), 1♀ (AMNH\_PBI 00107625) (USNM).

**OTHER SPECIMENS EXAMINED: ARGENTINA: Salta:** Tacuile, 25.51666°S 66.41667°W, 23 Jan 1968–27 Jan 1968, Golbach, Teran, Willink, 1♂ (AMNH\_PBI 00185726) (USNM). **BOLIVIA: Chuquisaca:** Sucre, Salancachi, 19.18333°S 65.23333°W, 23 Feb 1976, L. E. Peña, 3♂ (AMNH\_PBI 00185680–AMNH\_PBI 00185682), 1♀ (AMNH\_PBI 00185684) (AMNH); 9♂ (AMNH\_PBI 00185675–AMNH\_PBI 00185679, AMNH\_PBI 00191149–AMNH\_PBI 00191152), 2♀ (AMNH\_PBI 00185683, AMNH\_PBI 00191153) (USNM). **La Paz:** Inquisivi, Yungas, 16.91492°S 67.15061°W, 05 Dec 1984, L. E. Peña, 5♂ (AMNH\_PBI 00190951–AMNH\_PBI 00190955), 6♀ (AMNH\_PBI 00190956–AMNH\_PBI 00190961) (USNM).

### *Chileria pamparum* (Berg), new combination

Figures 1, 8, 9

*Conostethus? pamparum* Berg, 1883: 76 [n. sp.].

*Lygus (Lygus) aeruginosus* Berg, 1892: 92 [n. sp.]; Carvalho and Carpintero, 1992: 88 [synonym].

*Orthotylus pamparum*: Carvalho and Drake, 1943: 523 [list, n. comb.]; Carvalho, 1958: 106 [catalog]; Carvalho and Fontes, 1973: 499 [redescription, male genitalia]; Schuh, 1995: 166 [catalog].

*Saileria chilena* Carvalho and Carpintero, 1991: 778 [n. sp.]. NEW SYNONYM.

**DIAGNOSIS:** Recognized by its relatively small size (fig. 1); green-spotted dorsum (fig. 1); anteriorly directed ramus of vesica with a median dorsal flap, apex with two portions of subequal length (fig. 8); left (medial) ramus of posteriorly directed rami of vesica with a median, dorsally serrate flap, apex curved dorsally; right (lateral) ramus of posteriorly directed rami apically bifid, with medial portion expanded toward the apex; apical ramus of vesica with dorsal portion small and rounded, ventral portion simple, not serrate, about twice as long as dorsal portion; genital capsule with a single anterior tergal process on the right margin of aperture, close to dorsal margin, transversely elongate and strongly serrate; tergal processes on left side of genital capsule small, anterior one strongly curved laterally, hooklike, posterior one shorter and slightly curved laterally.

*Chileria pamparum* is easily distinguished from other species of *Chileria* by its relatively small size (fig. 1) and particular structure of the vesica. *Chileria pamparum* is similar to *Ch. araucana* in having only one tergal process on the right margin of the aperture of the genital capsule (figs. 7, 8). In *Ch. pamparum* the process is transversely elongate and located anteriorly (fig. 8), whereas in *Ch. araucana* it is knoblike and located posteriorly (fig. 7). The right tergal process of *Ch. pamparum* is similar to the anterior tergal process on the right margin of the aperture of *Ch. andina* (fig. 6), but in the latter the process is less heavily sclerotized and not strongly serrated as in *Ch. pamparum* (fig. 6). In addition, the right margin of the aperture of the genital capsule of *Ch. andina* has two processes (fig. 6), not one as in *Ch. pamparum* (fig. 8).

**DISTRIBUTION:** *Ch. pamparum*, widespread in Argentina (Carpintero and Carvalho, 1993; Melo et al., 2004), is also present in Chile, and here newly recorded from Bolivia (fig. 9). Carvalho and Fontes (1973) recorded *Ch. pamparum* from Paraguay. I have not examined specimens from that country.

**HOSTS:** *Solanum tuberosum* L. (Solanaceae), *Medicago sativa* L. (Fabaceae) (Carpintero and Carvalho, 1993), and an unidentified Malvaceae. Both records given by Carpintero

and Carvalho (1993)—potato and alfalfa—are not likely to be natural hosts of *Ch. pamparum*. Accurate host-plant documentation is needed for *Ch. pamparum*.

**DISCUSSION:** *Saileria chilena* was described from two females from Coquimbo, Chile, without discussing its generic placement (Carvalho and Carpintero 1991). I was able to associate males and females that agree in size, color pattern, and shape of head and pronotum with the figure provided by Carvalho and Carpintero (1991: 778, fig. 46), and from the same area where *S. chilena* was described, allowing for examination of male genitalic structures. Male genitalia indicate that what Carvalho and Carpintero (1991) designated as “*S. chilena*” is, in fact, the same as *Ch. pamparum* (e.g., Carvalho and Fontes, 1973: 500 [as *Orthotylus pamparum*], their figs. 15–17). *Saileria bella* (Van Duzee, 1916), the type species of *Saileria*, has a simple sclerotized vesical spicule (fig. 20). Other *Saileria* species also have simple vesical spicules (e.g., *S. irrorata*, *S. mexicana*, *S. compsus*, Carvalho, 1985; Henry, 1980, 1985). In the examined males of “*S. chilena*”, the vesica is heavily sclerotized (*Ch. pamparum*, fig. 8). Furthermore, *Saileria* includes species with delicate hemelytra and eyes removed from the anterior margin of the pronotum (Hsiao, 1945) (see *Saileria bella* below, fig. 2), which is not the situation in “*S. chilena*” (*Ch. pamparum*, fig. 1). The hemelytral coloration of *Ch. pamparum* may vary from nearly uniform bright or pale green, to green-spotted. All species of *Saileria* also have a green-spotted dorsum (e.g., *S. bella*, fig. 2), which is probably why Carvalho and Carpintero (1991) described their species in *Saileria*. The habitus illustration of the female holotype of *S. chilena* (Carvalho and Carpintero, 1991: 778) is consistent with the hemelytral color pattern of males and females of *Ch. pamparum* from Argentina, Bolivia, and Chile. After examining large series of specimens across the distributional range of this species, I consider *S. chilena* a junior synonym of *Ch. pamparum*. *Saileria* includes 12 species (Schuh, 1995; Carvalho and Costa, 1994). Some of these species may well not be in *Saileria* (e.g., *S. fluminensis* Carvalho, 1990, probably in the *Orthotylus* species group; and *S. sulina*



Carvalho, 1989, in the *Zanchius* species group, but not congeneric with *Saileria*) following the concept of Hsiao (1945), but this issue needs further study.

*Conostethus pamparum* was transferred to *Orthotylus* by Carvalho and Drake (1943). Carvalho and Fontes (1973) provided drawings of the parameres and vesica for *O. pamparum*, but some of the structures were misinterpreted (e.g., the vesica) or not illustrated (e.g., the genital capsule). Detailed drawings of the male genitalia (fig. 8) are provided in this paper to facilitate its recognition and for future analysis of additional Neotropical Orthotylini. The shape of the left and right parameres, the presence of a dorsal left protuberance on the genital capsule, and the particular structure of the vesica, are also shared with other species of *Chileria* (figs. 5–7). Therefore, I regard *Co. pamparum* as belonging to *Chileria*, with the consequent new combination *Chileria pamparum* (Berg, 1883).

**HOLOTYPE (MALE):** [ARGENTINA]: **Buenos Aires:** Chascomús [35.5667°S 58.0167°W], Spegazzini col., “Typus” male, MLP No. 1615, 1♂ (MLP).

**HOLOTYPE OF SYNONYM:** [CHILE]: **Coquimbo** [– **Region IV: Elqui Province**]: S. Vicuña, Oct 1983, L. E. Peña, Holotypus *Saileria chilena* det. Carvalho, MLP No. 2637, Col. Carv. no. 238 (MLP).

**OTHER SPECIMENS EXAMINED:** **ARGENTINA:** **Buenos Aires:** La Colina, 37.3333°S 61.5333°W, 12 Sep 1938, C. J. Drake, 1♂ (AMNH\_PBI 00190677), 1♀ (AMNH\_PBI 00190682) (USNM). **Catamarca:** Arroyo El Pintado, 28.05°S 65.5833°W, 1968, L. E. Peña, 2♀ (AMNH\_PBI 00190680, AMNH\_PBI 00190681) (USNM). **Chaco:** Pa[mpa] d'[el] Infierno, 26.5191°S 61.1607°W, 27 Aug 1988, L. E. Peña, 6♂ (AMNH\_PBI 00190666–AMNH\_PBI 00190671) (USNM). **La Rioja:** Guandacol, 42 km SW of Villa Union, 29.5674°S 68.5071°W, 28 Nov 1993, J. G. Rozen, 2♀ (AMNH\_PBI 00180623, AMNH\_PBI 00180624) (AMNH). Los Robles, 28.4166°S 67.1166°W, 30 Nov 1983, L. E. Peña, 16♂ (AMNH\_PBI 00191008–AMNH\_PBI 00191023), 38♀ (AMNH\_PBI 00191024–AMNH\_PBI 00191061) (USNM). San Blas, 28.4°S 67.0833°W, 12 Nov 1991, L. E. Peña, 1♂ (AMNH\_PBI 00107591), 2♀ (AMNH\_PBI

00107592, AMNH\_PBI 00107593) (USNM). Santa Clara, 29.55°S 68.5167°W, 07 Nov 1991, L. E. Peña, 6♂ (AMNH\_PBI 00107586–AMNH\_PBI 00107590, AMNH\_PBI 00190674), 2♀ (AMNH\_PBI 00107594, AMNH\_PBI 00107595) (USNM). **Mendoza:** Cochico, 37.2666°S 67.3833°W, 09 Sep 1987, L. E. Peña, 2♂ (AMNH\_PBI 00190675, AMNH\_PBI 00190676), 2♀ (AMNH\_PBI 00190678, AMNH\_PBI 00190679) (USNM). N of San Rafael, 34.4903°S 68.5563°W, 06 Dec 1983, L. E. Peña, 1♂ (AMNH\_PBI 00190967) (USNM). San Rafael, 34.6°S 68.3333°W, 06 Dec 1983, L. E. Peña, 1♂ (AMNH\_PBI 00190672), 1♀ (AMNH\_PBI 00190673) (USNM). **Neuquen:** EL Huecu, 37.6167°S 70.6°W, 04 Feb 1991, L. E. Peña, 12♂ (AMNH\_PBI 00106739–AMNH\_PBI 00106750), 7♀ (AMNH\_PBI 00106751–AMNH\_PBI 00106757) (USNM); 16 Feb 1995–17 Feb 1995, L. E. Peña, 6♂ (AMNH\_PBI 00190698–AMNH\_PBI 00190703), 10♀ (AMNH\_PBI 00190704–AMNH\_PBI 00190713) (USNM). Rio Agrio, N of Zapala, 38.5208°S 70.1922°W, 09 Dec 1983, L. E. Peña, 3♂ (AMNH\_PBI 00190968–AMNH\_PBI 00190970), 2♀ (AMNH\_PBI 00190993, AMNH\_PBI 00190994) (USNM). **Salta:** 6 km SW of Pichanal, 23.3549°S 64.2584°W, 09 Nov 1993, J. G. and B. L. Rozen, 1♂ (AMNH\_PBI 00180627) (AMNH). **San Juan:** El Huaco, 30.15°S 68.5166°W, 22 Jan 1995, L. E. Peña, 2♂ (AMNH\_PBI 00107605, AMNH\_PBI 00107606) (USNM). **Santiago del Estero:** Beltran, 28.5833°S 64.4166°W, 28 Feb 1992, L. E. Peña, 1♀ (AMNH\_PBI 00190488) (USNM). **Tucuman:** 35 km SE of Quilmes, 26.68°S 65.8134°W, 2958 m, 01 Mar 2006, T. Henry and D. Forero, Malvaceae, 9♂ (AMNH\_PBI 00195176–AMNH\_PBI 00195184), 10♀ (AMNH\_PBI 00195185–AMNH\_PBI 00195194) (AMNH). Cadillal, 26.6833°S 65.2666°W, 07 Nov 1991, L. E. Peña, 6♂ (AMNH\_PBI 00190683–AMNH\_PBI 00190688), 9♀ (AMNH\_PBI 00190689–AMNH\_PBI 00190697) (USNM). **BOLIVIA:** **Santa Cruz:** Comarapa, 17.9°S 64.4833°W, 1800 m, 14 Dec 1984, L. E. Peña, 2♂ (AMNH\_PBI 00190648, AMNH\_PBI 00190649), 6♀ (AMNH\_PBI 00107628–AMNH\_PBI 00107629, AMNH\_PBI 00190650–AMNH\_PBI 00190653) (USNM). **CHILE:** **Antofagasta – Region II: Antofagasta:** N of Paposo, 24.964°S 70.451°W, 30 Oct 1983, L. E. Peña, 2♀ (AMNH\_PBI 00190995, AMNH\_PBI 00190996) (USNM). **Atacama – Region III:** Pinte,

W [sic] of Vallenar, 28.98335°S 70.27644°W, 25 Oct 1980, L. E. Peña, 1 ♂ (AMNH\_PBI 00190962), 1 ♀ (AMNH\_PBI 00190976) (USNM). **Bio-Bio – Region VIII: Nuble:** Las Trancas, Chillan, 36.92136°S 71.49416°W, 17 Mar 1983–20 Mar 1983, L. E. Peña, 2 ♂ (AMNH\_PBI 00190965, AMNH\_PBI 00190966), 1 ♀ (AMNH\_PBI 00190979) (USNM). Shangri-La, 36.98099°S 71.50932°W, Mar 1984, D. Veas, 1 ♂ (AMNH\_PBI 00190963) (USNM). **Coquimbo – Region IV: Choapa Province:** N of los Vilos, 31.89036°S 71.48757°W, 24 Sep 1982, N.Z.E., 1 ♂ (AMNH\_PBI 00190964), 2 ♀ (AMNH\_PBI 00190977, AMNH\_PBI 00190978) (USNM). **Elqui Province:** 36 km S of Coquimbo, 30.24979°S 71.3877°W, 04 Oct 1994, Rozen, Quinter, Ascher, 2 ♂ (AMNH\_PBI 00180625, AMNH\_PBI 00180626) (AMNH). El Pangué, 30.2°S 70.65°W, 1900 m, 20 Oct 1991, L. E. Peña, 1 ♀ (AMNH\_PBI 00190980) (USNM). NE of Choros Bajos, 29.24628°S 71.2382°W, 20 Oct 1983, L. E. Peña, 5 ♂ (AMNH\_PBI 00190971–AMNH\_PBI 00190975), 11 ♀ (AMNH\_PBI 00190997–AMNH\_PBI 00191007) (USNM). Vicuña, 30.03194°S 70.70806°W, 17 Oct 1991, L. E. Peña, 12 ♀ (AMNH\_PBI 00190981–AMNH\_PBI 00190992) (USNM). 14 km N of Los Vilos, 31.7801°S 71.48934°W, 150 m, 06 Nov 1981, R. T. Schuh and N. I. Platnick, 2 ♀ (AMNH\_PBI 00180628, AMNH\_PBI 00180629) (AMNH).

*Hadronemella argentina* (Carvalho and Wallerstein)

Figures 1, 10

*Hadronemisca argentina* Carvalho and Wallerstein, 1978: 523 [n. sp.]; Schuh, 1995: 117 [catalog].

*Hadronemella argentina*: Carvalho, 1984: 51 [new combination].

**DIAGNOSIS:** Recognized by the black dorsal coloration with claval suture pale or whitish, and a pale spot on the anterior portion of cuneus (fig. 1); male genitalia with a single, simple spicule (Carvalho and Wallerstein, 1978: fig. 2).

*Hadronemella argentina* can be recognized among the species included in *Hadronemella* by the coloration and the simple structure of the male genitalia. Other species of *Hadronemella* from Argentina are dark, but not as dark as *H. argentina* (personal obs.).

The vesica, with a simple spicule (Carvalho and Wallerstein, 1978: fig. 2), is shared with just a few species of *Hadronemella* (see Carvalho, 1984; Carvalho and Carpintero, 1991; Carvalho and Costa, 1992b).

**DESCRIPTION: FEMALE: STRUCTURE: Genitalia** (fig. 10): Subgenital plate longer than wide, apex rounded; base of ovipositor located anteriorly to longitudinal midpoint of abdomen; posterior wall with interrampal sclerite triangular, well sclerotized, apex strongly curved medially; dorsal margin of posterior wall with scattered microtrichia; dorsal lobe of interrampal sclerite elongate, gently curved medially, narrowing apically, covered with very small microtrichia, arranged in a scalelike pattern; medial sclerite indistinct; prolongation of medial margins of second gonapophyses produced as a rounded anterior sclerotized process ventral to interrampal sclerite (fig. 10, arrow); dorsal labiate plate not sclerotized; sclerotized rings elongate, subrectangular, anterior portion with microtrichia, lateral recurved portion well sclerotized; ventral labiate plate not sclerotized, without conspicuous tubercles or processes; anterior wall with inner margins of first gonapophyses symmetrical, not sclerotized.

**DISTRIBUTION:** *Hadronemella argentina* was originally described from San Luis Province (Carvalho and Wallerstein, 1978). Carpintero and Carvalho (1993) listed this species additionally from Buenos Aires Province without specific localities. The distribution is extended in this paper to Catamarca.

**HOSTS:** No host plants have been documented yet for this species.

**DISCUSSION:** Schuh (1995) listed this taxon under *Hadronemisca* Carvalho, 1973, although Carvalho (1984) had transferred it to *Hadronemella*. I propose to include *Hadronemella* in the *Orthotylus* species group of Schuh (1974).

*Hadronemella* Carvalho, 1984, is an ill-defined genus. All of the species included (Schuh, 1995, 2006a) are morphologically diverse (see Carvalho, 1984; Carvalho and Carpintero, 1991; Carvalho and Costa, 1992b), in particular regarding male genitalic structure. *Hadronemella* is probably not monophyletic, an issue that a revision of the genus should address. Nonetheless, species of

*Hadronemella* are not common in collections, and series of males and associated females are rare. Because of this paucity of material and because females have not been illustrated to date, I decided to illustrate the female of *H. argentina* given the abundance of specimens associated with males from a single locality.

The female of *H. argentina* has symmetrical medial margins on the first gonapophyses. Such condition is also found in *Mecomma ambulans* (Fallen, 1807) (Pluot-Sigwalt and Matocq, 2006), some species of *Araucanocoris* Carvalho (personal obs.), and in members of the *Hadronema* group (Forero, 2008). In other members of the *Orthotylus* species group, like some species of *Orthotylus* (e.g., *O. chilensis*, *O. chullan*, *O. kakan*, *O. kikin*, fig. 16) and species of *Lopidea* (Davis, 1955; personal obs.), the medial margins of the first gonapophyses are highly asymmetrical. It is not known if the symmetrical condition is a symplesiomorphic character in Orthotylini, which extent in the nominotypical tribe has been poorly documented.

**SPECIMENS EXAMINED:** **ARGENTINA: Catamarca:** Punta Balasto, 26.96666°S 66.13333°W, 2155 m, 10 Feb 1983, L. E. Peña, 3 ♂ (AMNH\_PBI 00190577–AMNH\_PBI 00190578, AMNH\_PBI 00190583), 4 ♀ (AMNH\_PBI 00190641–AMNH\_PBI 00190644) (AMNH); 17 ♂ (AMNH\_PBI 00190564–AMNH\_PBI 00190576, AMNH\_PBI 00190579–AMNH\_PBI 00190582), 57 ♀ (AMNH\_PBI 00190584–AMNH\_PBI 00190640) (USNM).

### *Hyporhinocoris fratrueis* (Berg)

Figures 1, 4, 11–13

*Capsus* (*Deraeocoris*) *fratrueis* Berg, 1879: 289 [n. sp.]. *Deraeocoris fratrueis*: Carvalho, 1957: 65 [new status, catalog].

*Hyporhinocoris fratrueis*: Carvalho and Carpintero, 1992: 91 [n. comb.]; Schuh, 1995: 123 [catalog].

*Hyporhinocoris tomentosus* Reuter, 1909: 18 [n. gen., n. sp.]; Carvalho, 1958 [catalog]; Carvalho and Afonso, 1977: 9 [list]; Schuh, 1995: 123 [catalog]. **NEW SYNONYM.**

**DIAGNOSIS:** Recognized by the labium inserted posteriorly on the head, resulting in a very short gula (figs. 11A, C); dorsum covered with simple decumbent setae and dense sericeous setae (fig. 12B); strong sexual di-

morphism, males with large protruding eyes (figs. 1A, B, 11A, B) and elongate body shape (fig. 1A, B), females with smaller eyes (figs. 1C, D, 11C, D) and ovoid body shape (fig. 1C, D); genital capsule of male with a medial, ventral, flattened prolongation, apically directed to the left (figs. 11E; F, arrow; 13, white arrows); left paramere compressed dorsoventrally, apex with a small process directed ventrally, sensory lobe short and blunt, directed caudad (fig. 13, arrow); right paramere ovoid, shorter than left paramere, wide basally, apex as a small round process (fig. 13); phallosome cylindrical, its opening nearly vertical, in posterior view with margins sinuate (figs. 11E, F, 13); vesica with two spicules, right one curved medially and with numerous apical spines, left one apically bifurcated (fig. 13); secondary gonopore opening ventrally slightly to the right (fig. 13).

*Hyporhinocoris fratrueis* is easily distinguished from other Neotropical Orthotylini by its strong sexual dimorphism (fig. 1A–D), and by the structure of the male genitalia.

**DISTRIBUTION:** *Hyporhinocoris fratrueis* is known only from Argentina, occurring mostly on the Monte Desert (fig. 4). The distribution of *H. fratrueis* closely follows those of its hosts (see Ezcurra et al., 1991: fig. 3).

**HOSTS:** *Hyporhinocoris fratrueis* is associated with *Larrea divaricata* Cav. and *L. cuneifolia* Cav. (Zygophyllaceae).

**DISCUSSION:** Berg (1879) described *Capsus* (*Deraeocoris*) *fratrueis* based on two specimens from “Rio Colorado” in the southern part of the Buenos Aires Province. Reuter (1909) described the new genus and species *Hyporhinocoris tomentosus* from an undetermined locality in Argentina, and placed it in the Orthotylinae. *Capsus fratrueis* was placed in Deraeocorinae by Carvalho (1957), but the structure of the mesothoracic spiracle, evaporatory area (fig. 12A), parempodia (fig. 12C, D), and male genitalia (fig. 13) clearly place this taxon in the Orthotylinae (e.g., Reuter, 1909; Carvalho and Carpintero, 1992).

Carvalho and Carpintero (1992) transferred *Capsus fratrueis* Berg, placed until then in Deraeocorinae, to *Hyporhinocoris* and designated a female neotype from Santa Fé Province. They failed, however, to discuss their action and to compare *H. fratrueis* with



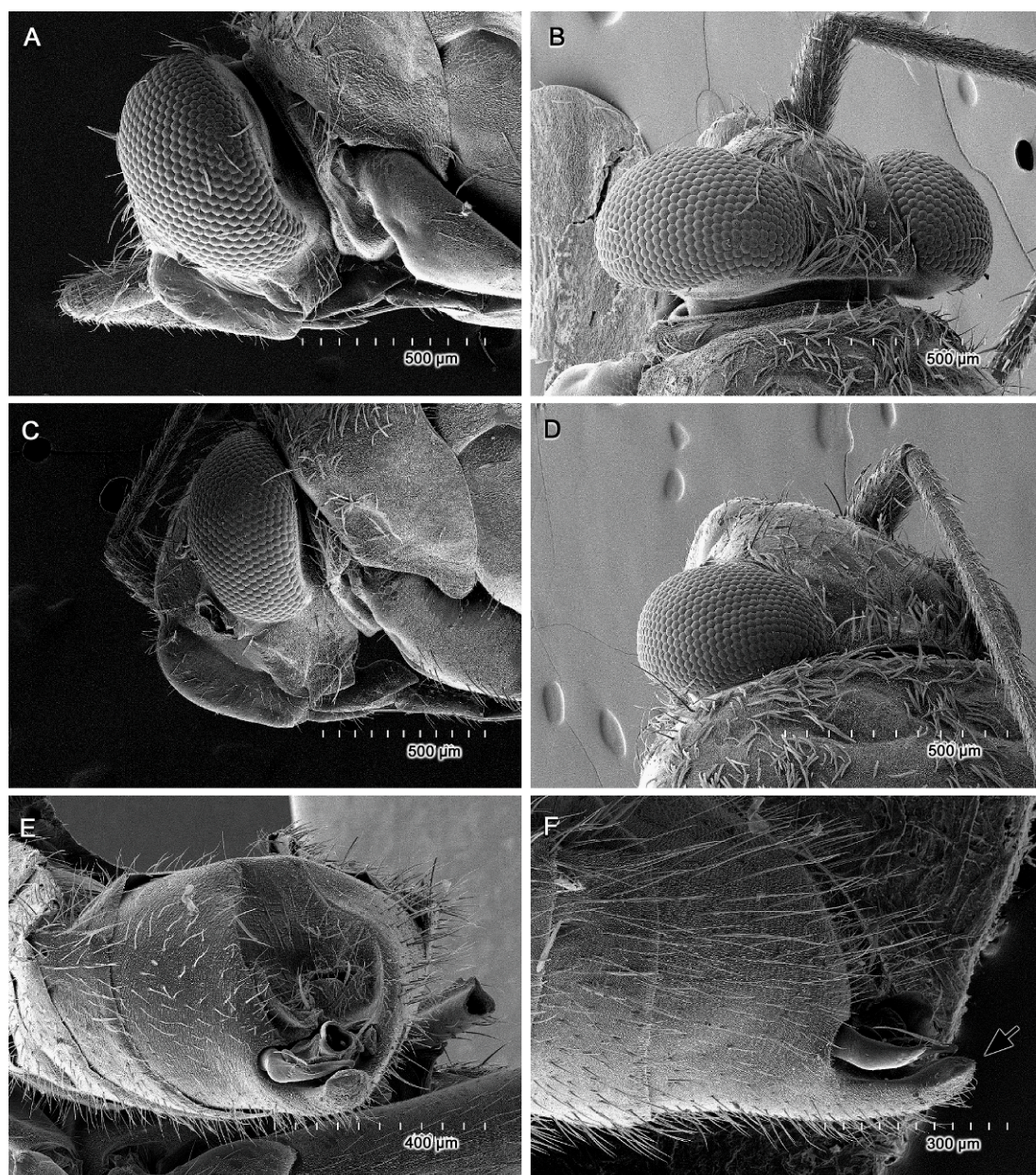


Fig. 11. *Hyporhinocoris fratruei* (AMNH\_PBI 00194890, male; AMNH\_PBI 00194910, female). SEM of selected structures. **A.** Head in lateral view, male. **B.** Head in dorsolateral view, male. **C.** Head in lateral view, female. **D.** Head in dorsolateral view, female. **E.** Genital capsule, posterior view. **F.** Genital capsule, lateral left view. Arrow points to medial, ventral process.

*H. tomentosus*, considering the two as valid species.

Variation may be found in coloration and hemelytral length (fig. 1A–D), even in speci-

mens collected at the same locality at the same time (e.g., AMNH\_PBI 00107379–AMNH\_PBI 00107380, AMNH\_PBI 00189457–AMNH\_PBI 00189461, AMNH\_PBI 00194846–AMNH\_PBI 00194847).



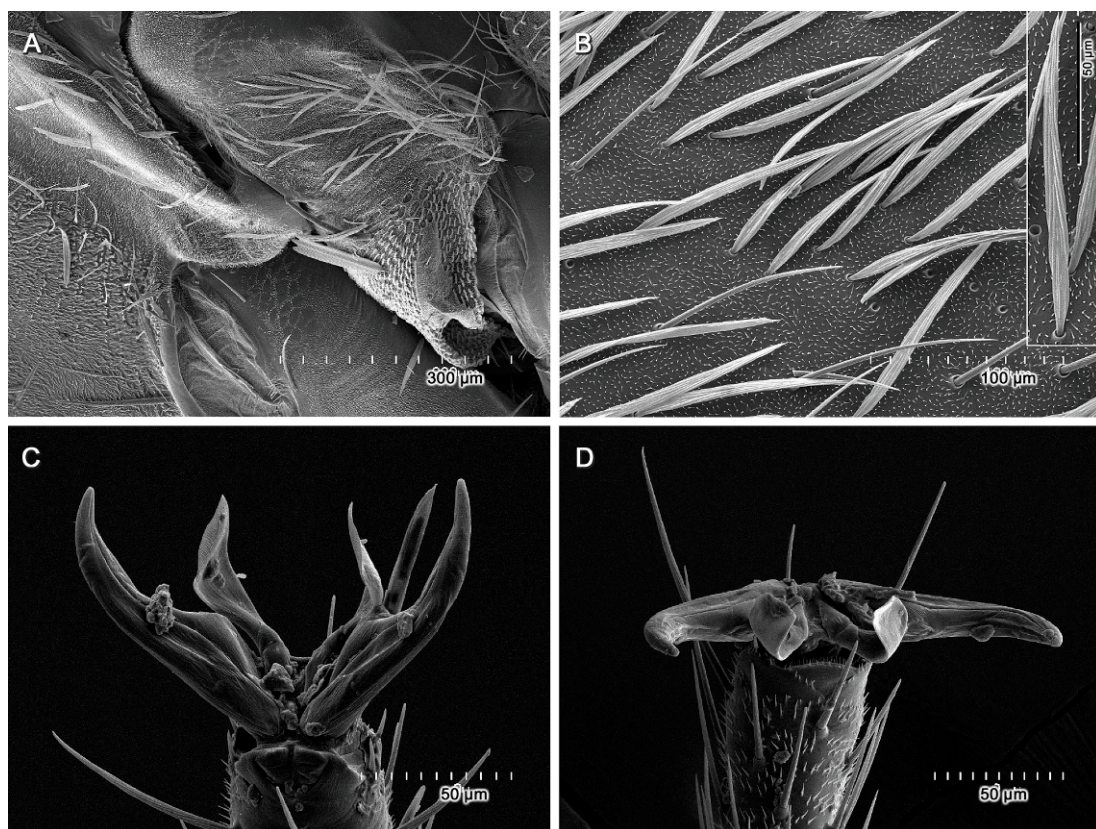


Fig. 12. *Hyporhinocoris fratruei*, male (AMNH\_PBI 00194890). SEM of selected structures. **A.** Mesothoracic spiracle and metathoracic scent gland evaporative area. **B.** Vestiture on hemelytron, with detail of sericeous setae on the inset. **C–D.** Pretarsus in dorsal and ventral views respectively.

PBI 00194847, AMNH\_PBI 00194875–AMNH\_PBI 00194876). Despite this variation, dissection and study of several specimens from the recent PBI fieldwork and from museum collections demonstrated that male and female genitalic structures are uniform across the geographic range of this species, even between host plants. Because the examined specimens of different color variants, from across the geographic range, and from different host plants, which did not exhibit any male or female genitalic differences, I consider that *Capsus fratruei* represents the same species as *Hyporhinocoris tomentosus*.

**NEOTYPE FEMALE** (photo examined): “**Argentina:** Santa Fe, D[e]partament[o] Garay, Col. Macías, J.M. Viana, XI-1942”; “*Hyporhinocoris fratruei* (Berg, 1879) Det. Carpintero”, 1♀ (MACN) (designated by Carvalho and Carpintero, 1992).

**SYNTYPES** [of *Hyporhinocoris tomentosus*]: “**Republica Argentina**”: [unknown locality], D. Jensen-Haarup, *Hyporhinocoris tomentosus* det. Reuter, 1♂ (AMNH\_PBI 00099707), 3♀ (MZH).

**OTHER SPECIMENS EXAMINED:** **ARGENTINA:** **Buenos Aires:** Buenos Aires, 34.5875°S 58.6725°W, J.C.M. Carvalho, 1♂ (AMNH\_PBI 00107627) (USNM). **Catamarca:** 3 km SW of San Jose, 26.81945°S 66.06931°W, 1996 m, 02 Mar 2006, T. Henry and D. Forero, *Larrea cuneifolia* Cav. (Zigophyllaceae), det. L. Iharlegui VOUCHER-LP, 6♂ (AMNH\_PBI 00194826, AMNH\_PBI 00194829, AMNH\_PBI 00194846–AMNH\_PBI 00194849), 16♀ (AMNH\_PBI 00194850–AMNH\_PBI 00194865) (AMNH). Hualfin, 27.23333°S 66.83333°W, Feb 1993, L. E. Peña, 6♂ (AMNH\_PBI 00107484–AMNH\_PBI 00107489), 17♀ (AMNH\_PBI

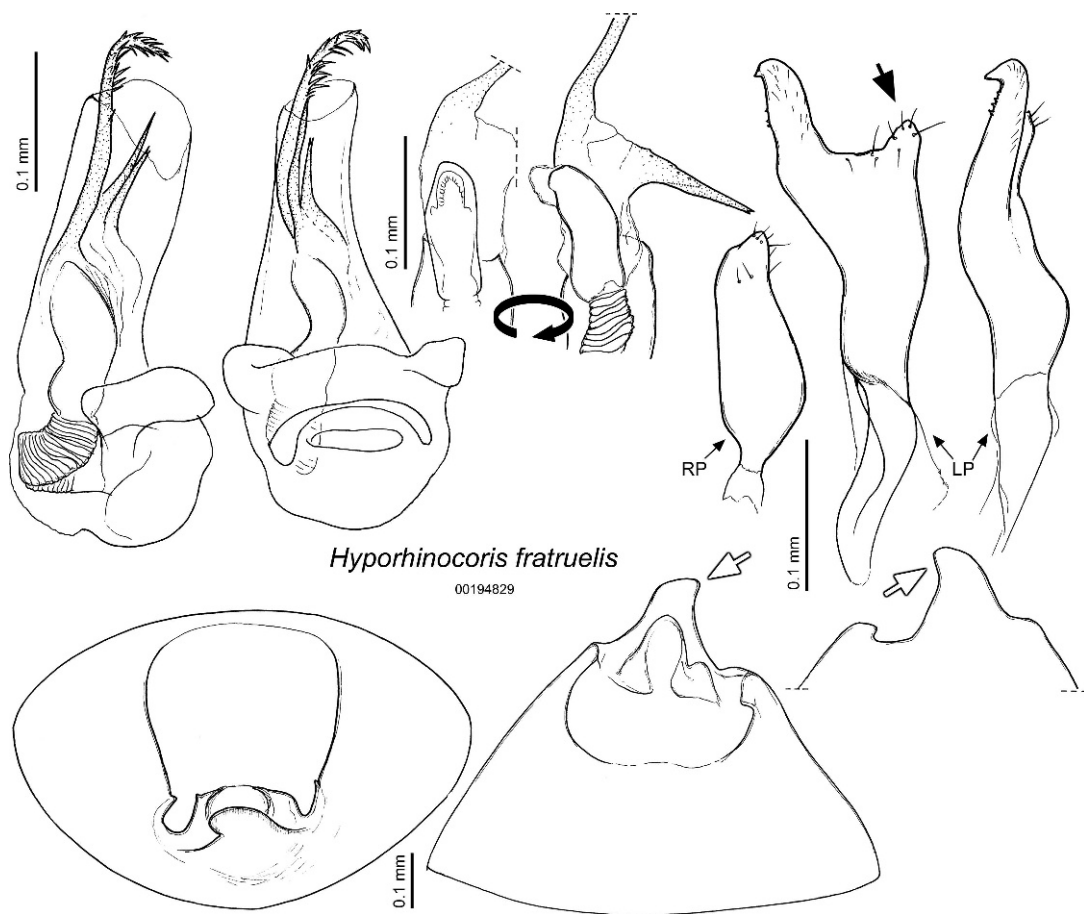


Fig. 13. *Hyporhinocoris fratruei*. Male genitalia: aedeagus in lateral and dorsal views; vesica extended showing detail of secondary gonopore, ventrolateral and dorsal views; right paramere, dorsal view; left paramere, dorsal and lateral left views; genital capsule, posterior and dorsal views; and detail of apex of genital capsule, ventral view. Black arrow points to sensory lobe of left paramere. White arrows point to medial, ventral process of genital capsule.

00107382-AMNH\_PBI 00107398) (USNM). Punta Balasto, 26.96666°S 66.13333°W, 2155 m, 25 Feb 1992, L. E. Peña, 13♂ (AMNH\_PBI 00107426-AMNH\_PBI 00107438), 13♀ (AMNH\_PBI 00107399-AMNH\_PBI 00107411) (USNM); Feb 1993, L. E. Peña, 9♂ (AMNH\_PBI 00107445-AMNH\_PBI 00107453) (USNM); 10 Feb 1983, L. E. Peña, 30♂ (AMNH\_PBI 00107454-AMNH\_PBI 00107483), 22♀ (AMNH\_PBI 00107559-AMNH\_PBI 00107580) (USNM). Santa Maria, 26.6825°S 66.04379°W, 12 Feb 1983, L. E. Peña, 2♂ (AMNH\_PBI 00107490, AMNH\_PBI 00107491), 22♀ (AMNH\_PBI 00107533-AMNH\_PBI 00107554) (USNM). **Cordoba:** 1 mi E of Villa Dolores, on route 15, 31.94743°S 65.15513°W,

02 Dec 1976, Unknown, *Larrea divaricata* (Zygophyllaceae), 2♀ (AMNH\_PBI 00190729, AMNH\_PBI 00190730) (USNM). **La Pampa:** N of Puelen, 37.3667°S 67.6167°W, 04 Nov 1987, L. E. Peña, 7♂ (AMNH\_PBI 00190753-AMNH\_PBI 00190759), 6♀ (AMNH\_PBI 00190763-AMNH\_PBI 00190768) (USNM). **La Rioja:** 33 mi SW of Villa Union, Pedregoso River, on Route 40, 29.65663°S 68.50129°W, 27 Nov 1976, Unknown, *Larrea divaricata* (Zygophyllaceae), 1♂ (AMNH\_PBI 00190722) (USNM). Guandacol, 29.52095°S 68.55786°W, 02 Dec 1983, L. E. Peña, 7♂ (AMNH\_PBI 00191062-AMNH\_PBI 00191066, AMNH\_PBI 00191098-AMNH\_PBI 00191099) (USNM). Guandacol, 42 km SW of Villa Union,



- 29.5674°S 68.5071°W, 29 Nov 1993, J. G. Rozen, 2♂ (AMNH\_PBI 00102768, AMNH\_PBI 00102769) (AMNH). Olta, 30.6167°S 66.2667°W, 05 Feb 1992, L. E. Peña, 1♂ (AMNH\_PBI 00107424), 1♀ (AMNH\_PBI 00107416) (USNM). South of San Blas, 28.42184°S 67.10755°W, 30 Nov 1983, L. E. Peña, 3♂ (AMNH\_PBI 00191112–AMNH\_PBI 00191114), 2♀ (AMNH\_PBI 00191125, AMNH\_PBI 00191126) (USNM). **Mendoza:** 40 km N of San Rafael, 34.24165°S 68.40841°W, 07 Dec 1983, L. E. Peña, 1♂ (AMNH\_PBI 00191115) (USNM). 5 mi E of Punta de Vacas, 32.84997°S 69.66363°W, 05 Feb 1951, Ross & Michelbacher, 1♂ (AMNH\_PBI 00107626) (USNM). 9 mi E of La Paz, on route 7, 33.42362°S 67.40468°W, 20 Nov 1976, Unknown, *Larrea divaricata* (Zygophyllaceae), 1♂ (AMNH\_PBI 00190724) (USNM). Bardas Blancas, 35.86361°S 69.80021°W, 08 Dec 1983, L. E. Peña, 6♂ (AMNH\_PBI 00191116–AMNH\_PBI 00191121), 8♀ (AMNH\_PBI 00191127–AMNH\_PBI 00191134) (USNM). C[ues]ta [de los] Terneros, 34.7°S 68.58333°W, 04 Dec 1983, L. E. Peña, 5♂ (AMNH\_PBI 00191068–AMNH\_PBI 00191072), 3♀ (AMNH\_PBI 00191075–AMNH\_PBI 00191077) (USNM). El Sosneado, 35.07827°S 69.58347°W, 07 Dec 1983, L. E. Peña, 15♂ (AMNH\_PBI 00191083–AMNH\_PBI 00191097), 12♀ (AMNH\_PBI 00191100–AMNH\_PBI 00191111) (USNM). Mendoza to Cachueta, 33.03766°S 68.88609°W, 1125 m, 28 Dec 1981, R. T. Schuh and B. M. Massie, *Larrea cuneifolia* (Zygophyllaceae), det. V. A. Funk, 1♀ (AMNH\_PBI 00102771) (AMNH). N of San Rafael, 34.49031°S 68.55632°W, 06 Dec 1983, L. E. Peña, 3♂ (AMNH\_PBI 00191122–AMNH\_PBI 00191124) (USNM). Potrerillos, 32.95°S 69.1833°W, 1219 m, 16 Mar 1920–20 Mar 1920, Cornell Univ. Biological Expedition, 22♂ (AMNH\_PBI 00189450–AMNH\_PBI 00189471), 22♀ (AMNH\_PBI 00189472–AMNH\_PBI 00189493) (CUIC). Rio Mendoza, 32.60269°S 68.30129°W, 1600 m, 05 Dec 1983, L. E. Peña, 1♂ (AMNH\_PBI 00191067) (USNM). S of E[stanci]a Leoncito, N of Uspallata, 31.91646°S 69.39812°W, 2000 m, 04 Dec 1983, L. E. Peña, 2♂ (AMNH\_PBI 00191073, AMNH\_PBI 00191074), 5♀ (AMNH\_PBI 00191078–AMNH\_PBI 00191082) (USNM). San Rafael, 34.6°S 68.3333°W, 05 Mar 1983, L. E. Peña, 2♂ (AMNH\_PBI 00107422, AMNH\_PBI 00107423), 5♀ (AMNH\_PBI 00107417–AMNH\_PBI 00107421) (USNM); 06 Dec 1983, L. E. Peña, 4♂ (AMNH\_PBI 00190725–AMNH\_PBI 00190728), 3♀ (AMNH\_PBI 00190733–AMNH\_PBI 00190735) (USNM). Uspallata, 32.55°S 69.3333°W, 2500 m, 07 Mar 1983, L. E. Peña, 5♂ (AMNH\_PBI 00190714–AMNH\_PBI 00190718), 3♀ (AMNH\_PBI 00190719–AMNH\_PBI 00190721) (USNM). [Las] Malvinas, 34.83333°S 68.25°W, 10 Nov 1987, L. E. Peña, 3♂ (AMNH\_PBI 00190747–AMNH\_PBI 00190749), 2♀ (AMNH\_PBI 00190760, AMNH\_PBI 00190761) (USNM). **Neuquen:** EL Huecu, 37.6167°S 70.6°W, 04 Feb 1991, L. E. Peña, 1♂ (AMNH\_PBI 00107601), 4♀ (AMNH\_PBI 00107599, AMNH\_PBI 00107602–AMNH\_PBI 00107604) (USNM). **Rio Negro:** Choele Choel, 39.26666°S 65.68333°W, 119 m, 08 Nov 1987, L. E. Peña, 3♂ (AMNH\_PBI 00190750–AMNH\_PBI 00190752), 1♀ (AMNH\_PBI 00190762) (USNM). San Antonio Oeste, 40.73333°S 64.93333°W, 06 Nov 1987, L. E. Peña, 1♂ (AMNH\_PBI 00133850) (USNM). **Salta:** Bridge over Rio Calchaqui on rt 40, near Payogastilla, 25.69941°S 66.03103°W, 1780 m, 03 Mar 2006, T. Henry and D. Forero, *Larrea divaricata* Cav. (Zygophyllaceae), det. Field ID, 13♂ (AMNH\_PBI 00194866–AMNH\_PBI 00194878), 8♀ (AMNH\_PBI 00194879–AMNH\_PBI 00194886) (AMNH). La Viña, 25.03333°S 65.6°W, 24 Oct 1983, A. Ugarte P., 3♂ (AMNH\_PBI 00133849, AMNH\_PBI 00190736–AMNH\_PBI 00190737) (USNM). **San Juan:** 10 mi N of [San Jose de] Jachal, on route 40, 30.15749°S 68.59317°W, 27 Nov 1976, Unknown, *Larrea divaricata* (Zygophyllaceae), 1♀ (AMNH\_PBI 00190732) (USNM). 30 km S of San Juan, 31.8079°S 68.53639°W, 31 Oct 1991, L. E. Peña, 24♂ (AMNH\_PBI 00107496–AMNH\_PBI 00107518, AMNH\_PBI 00190738), 4♀ (AMNH\_PBI 00107555–AMNH\_PBI 00107558) (USNM). Calingasta, 31.3386°S 69.415°W, 1515 m, 19 Jan 1995–20 Jan 1995, L. E. Peña, 1♂ (AMNH\_PBI 00190746) (USNM). La Cienega, 30.15°S 68.56667°W, 1287 m, 06 Mar 1992, L. E. Peña, 1♂ (AMNH\_PBI 00107425), 4♀ (AMNH\_PBI 00107412–AMNH\_PBI 00107415) (USNM). Las Flores, 30.3242°S 69.2108°W, 20 Jan 1995, L. E. Peña, 2♂ (AMNH\_PBI 00190744, AMNH\_PBI 00190745) (USNM). Los Berros, 31.9511°S 68.6622°W, 30 Oct 1991, L. E. Peña, 4♂ (AMNH\_PBI 00107492–AMNH\_PBI 00107495) (USNM). [San Jose de] Jachal, 30.2425°S 68.7458°W, 02 Nov 1991, L. E. Peña, 19♂ (AMNH\_PBI 00107519–AMNH\_PBI 00107532, AMNH\_PBI 00190739–AMNH\_PBI 00190743)

(USNM). **San Luis:** 4 mi W of San Luis, on route 7, 33.30335°S66.41826°W, 20 Nov 1976, Unknown collector, *Larrea divaricata* (Zygophyllaceae), 1 ♂ (AMNH\_PBI 00190723), 1 ♀ (AMNH\_PBI 00190731) (USNM). Beasley (sic), 33.75°S 66.65°W, 04 Mar 1983, L. E. Peña, 29 ♂ (AMNH\_PBI 00107355–AMNH\_PBI 00107381, AMNH\_PBI 00107596–AMNH\_PBI 00107597), 51 ♀ (AMNH\_PBI 00107305–AMNH\_PBI 00107354, AMNH\_PBI 00107598) (USNM). **Tucuman:** 25 km SE of Quilmes, 26.62126°S 65.84041°W, 2507 m, 01 Mar 2006, T. Henry and D. Forero, *Larrea divaricata* Cav. (Zygophyllaceae), det. L. Iharlegui VOUCHER-LP, 20 ♂ (AMNH\_PBI 00194828, AMNH\_PBI 00194830, AMNH\_PBI 00194887–AMNH\_PBI 00194904), 22 ♀ (AMNH\_PBI 00194905–AMNH\_PBI 00194926), 1 nymph (AMNH\_PBI 00194927) (AMNH).

*Orthotylus chilensis* Carvalho and Fontes

Figures 2, 14A, E, 15A, E, I, 16A, 18

*Orthotylus chilensis* Carvalho and Fontes, 1973: 495 [n. sp.]; Carvalho, 1985: 277 [male genitalia, distribution]; Schuh, 1995: 153 [catalog].

**DIAGNOSIS:** Recognized by the elongate right anterolateral process on the genital capsule (fig. 15I, arrow), posterior process not enlarged (fig. 15I); apex of left paramere with a thick, anteriorly directed process (fig. 14E); dorsal process of left paramere in medial view with margin slightly concave (fig. 15E); anterior portion of the basalmost rami of the right spicule expanded distally with apex slightly concave (fig. 14A, large arrow); apex of right spicule with preapical, dorsally directed rami and a single, posteriorly directed ramus (fig. 14A); medial margin of first gonapophysis of anterior wall in female with large, dorsal left sclerotized area (fig. 16A).

*Orthotylus chilensis* is very similar to the new species *O. chullan*, *O. kakan*, and *O. kikin* in its dorsal coloration (fig. 2) and external morphology, sharing a common pattern of male and female genitalic structure (figs. 14–16). Male and female genitalia, however, also have good characters to separate the species (figs. 14A, E, 15A, E, I, 16A). *Orthotylus chilensis* can be distinguished from these three

species by the shape of the anterior right process of the genital capsule (fig. 15I), which is not strongly enlarged in any of the three new species (fig. 15J–L). *Orthotylus chilensis* is most similar to *O. kikin* sharing a similar structure of the vesica (fig. 14B), parameres (fig. 14F), and posterior wall of the female (fig. 16B), but can be distinguished by the basalmost portion of the basal rami of the right spicule expanded toward the apex, with its margin slightly concave (fig. 14A), which in *O. kikin* is not expanded but deeply cleft (fig. 14B). The apex of the vesica in *O. chilensis* has only one ramus (fig. 14A), whereas in *O. kikin* the apex of the vesica has a dorsal ramus and a ventral, bifurcated ramus with a long pedicel (fig. 14B). The anterior right process of the genital capsule is not as enlarged in *O. kikin* (fig. 15J) as in *O. chilensis* (fig. 15I). The anterior wall in *O. chilensis* and *O. kikin* is very similar (figs. 16A, B), but in *O. chilensis* the dorsalmost area of the left margin has a large quadrangular sclerotized area (fig. 16A, arrow), which in *O. kikin* is small and medially concave (fig. 14B, arrow).

**DISTRIBUTION:** *Orthotylus chilensis* is found in the “Valle Central”, in areas around Santiago in the Metropolitan Region and in Maule (fig. 18). *Orthotylus chilensis* is largely sympatric with *O. kikin* and *O. chullan* (fig. 18).

**HOSTS:** *Orthotylus chilensis* is associated with *Proustia pungens* Poepp. ex Less. (Asteraceae) and with an unidentified Scrophulariaceae.

**DISCUSSION:** Carvalho (1985) illustrated the vesica and the genital capsule of *O. chilensis* from specimens of the same collection event as the female holotype (i.e., “Santiago, Chile, Kuschel col.” [Carvalho and Fontes, 1973]). Carvalho (1985) cited additional localities for this species, but did not mention where the illustrated specimens came from. I am assuming that the male examined by him is part of the same collection event as the female holotype, because he listed this locality first in his list of material examined (Carvalho, 1985: 277). Even though his illustrations of the vesica are highly schematic (Carvalho, 1985: figs. 70–73), his drawings allow identification of *O. chilensis*. Key characters are the anterior right prolongation on the genital capsule and

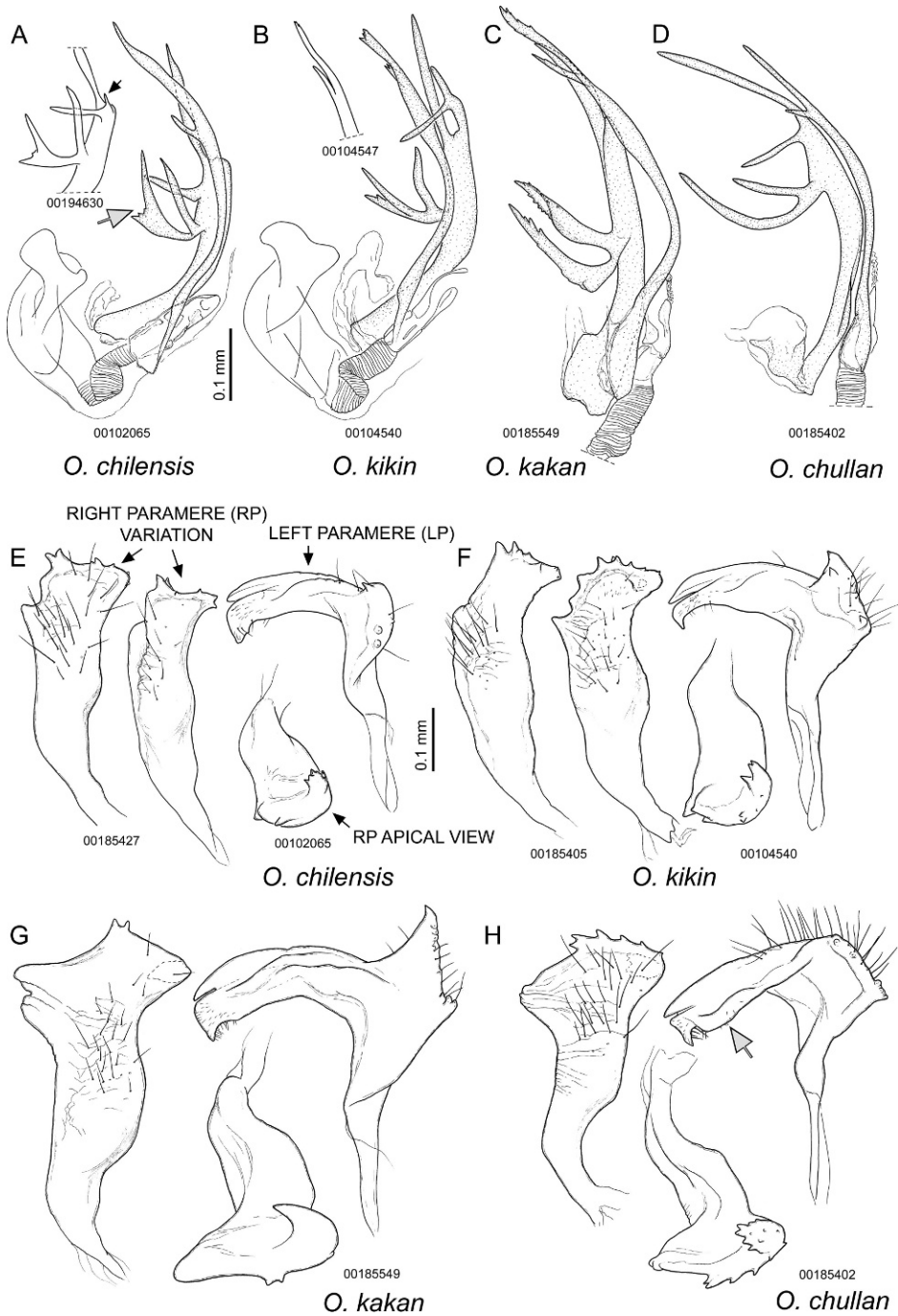


Fig. 14. *Orthotylus* spp. Male genitalia. A–D. Vesica. A. The small arrow indicates variation at apex of right spicule; the large arrow points to the anterior portion of basal rami; B. outline drawing shows variation at apex of left spicule. E–H. Right and left parameres, in lateral and apical, and dorsal views respectively. E, F. Variation among right parameres. H. Arrow shows elevated dorsal ridge.



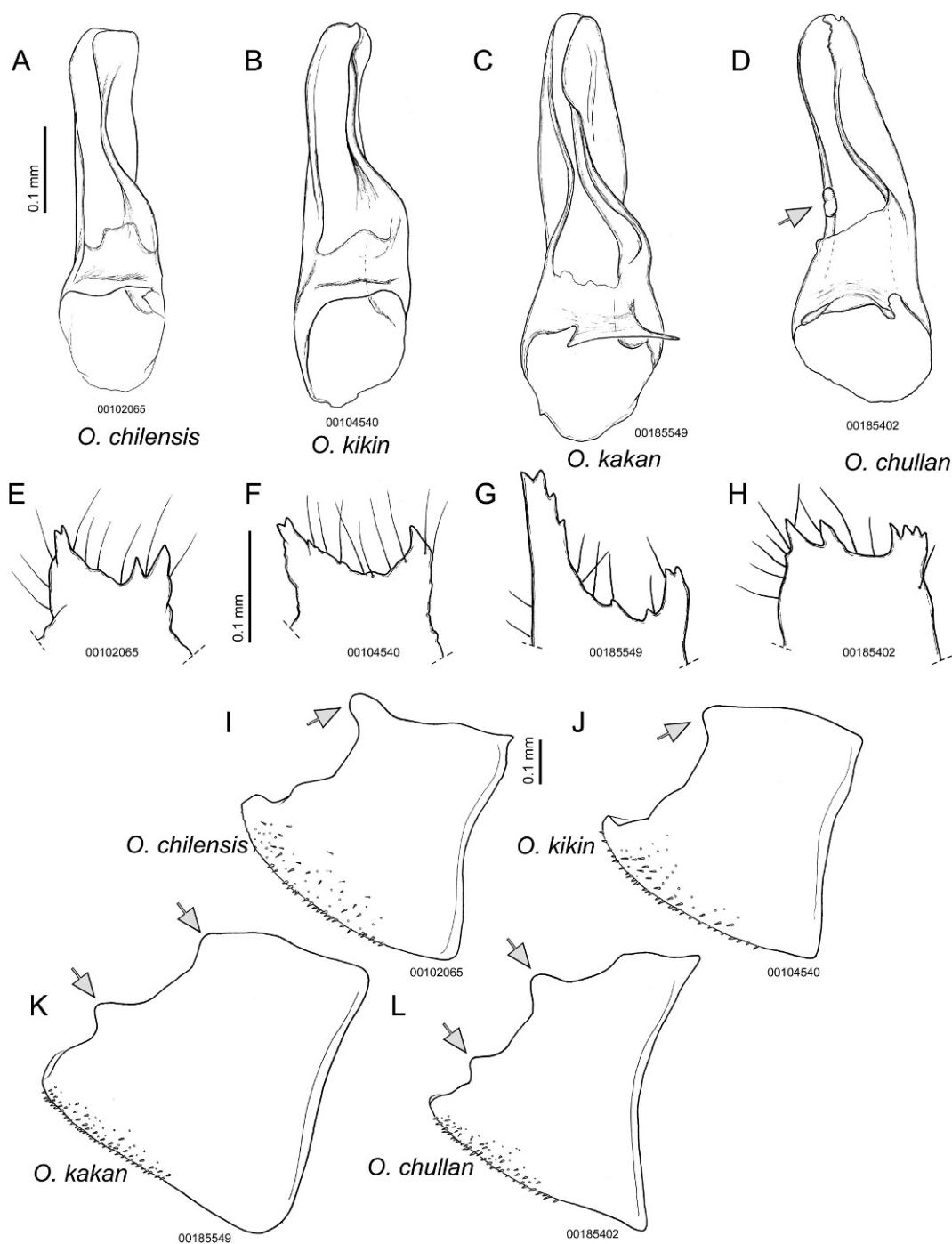


Fig. 15. *Orthotylus* spp. Male genitalia. A–D. Phallotheca; arrow in D points to dorsal process on right margin. E–H. Dorsal process of left paramere, medial view. I–L. Genital capsule, lateral right view; arrow indicate processes on aperture margin.

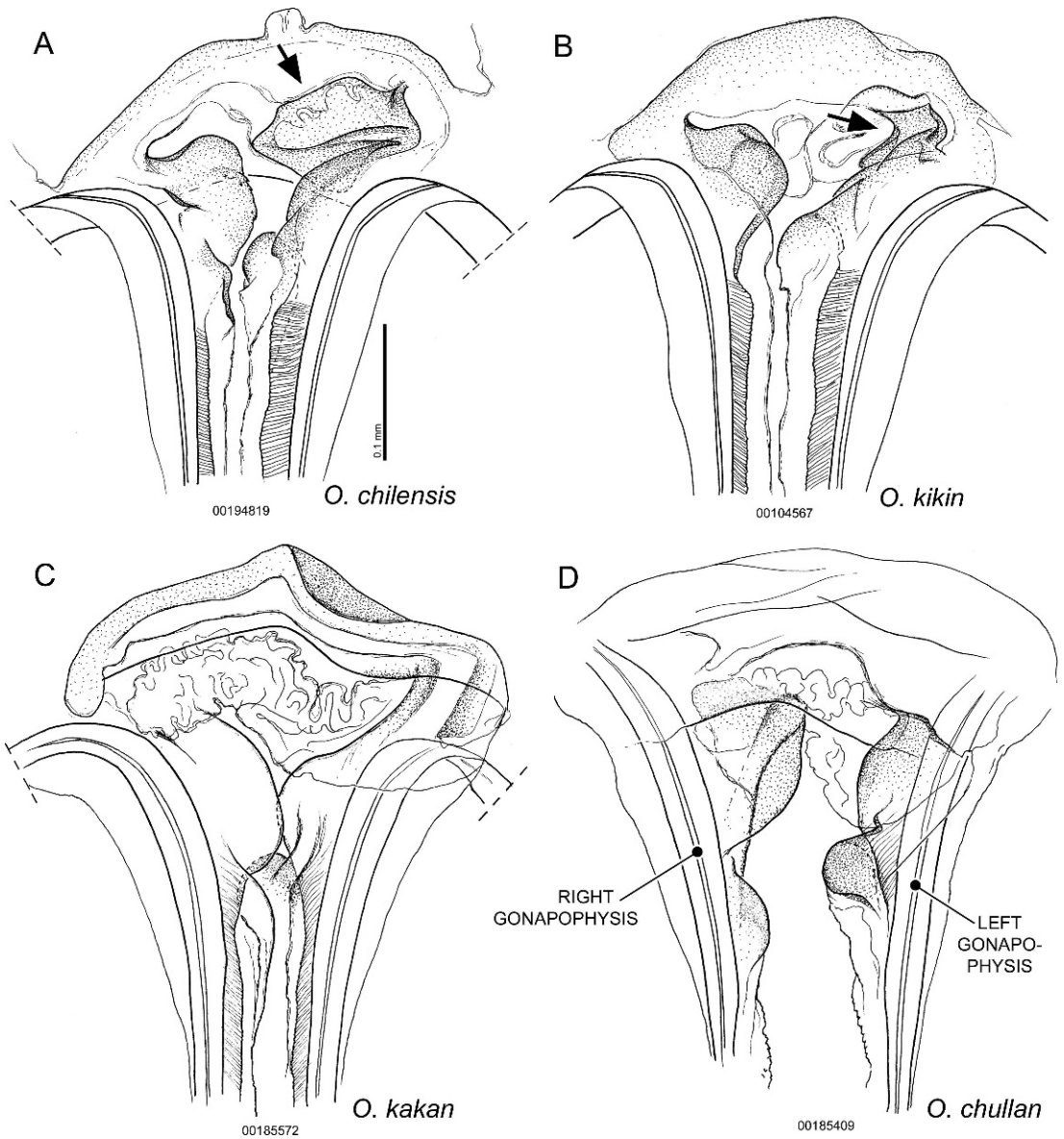


Fig. 16. *Orthotylus* spp. A–D. Female genitalia: anterior wall showing asymmetrical medial margins of first gonapophyses and various degrees of sclerotization, anterior view.

the apex of the right spicule (Carvalho, 1985: figs. 70, 73). More accurate drawings of the parameres, vesica, phallosome, and genital capsule are here provided (figs. 14A, E, 15A, E, I arrow) to facilitate comparisons with the closely related new taxa described below. Females also have species-specific characters that allow species identification

(fig. 16A). Examination of the female paratypes could have confirmed the association of the specimens at hand with *O. chilensis*. Unfortunately, I was unable to locate those paratypes, and dissection of the female holotype did not seem advisable.

Some specimens of *O. chilensis* (e.g., AMNH\_PBI 00194630) bear a small prolon-

gation near the base of the preapical rami on the right spicule (fig. 14A, inset, arrow). This variation occurs in specimens from the same locality and is not correlated with any other morphological character.

*Orthotylus chilensis* and all other closely related species from Chile are tentatively placed in *Orthotylus* until a broader study of the genus can be made. Similar approaches to this problem have been taken elsewhere (e.g., Polhemus, 2002, 2004).

**HOLOTYPE FEMALE: CHILE: [Metropolitana de Santiago: Santiago:]** Santiago, Nov 1952, Kuschel, "*Orthotylus chilensis* n. sp." J.C.M. Carvalho det., 1♀ (AMNH\_PBI 00071380) (USNM).

**OTHER SPECIMENS EXAMINED: CHILE: Maule – Region VII: Curico:** Curico, 34.98333°S 71.23333°W, Sep 1909, M.J. Rivera, *Proustia pungens* (Asteraceae), 5♂ (AMNH\_PBI 00185425–AMNH\_PBI 00185429), 4♀ (AMNH\_PBI 00185430–AMNH\_PBI 00185433) (USNM). **Metropolitana De Santiago: Santiago:** 17 Km W of Maipu, near Rinconada, 33.51653°S 70.9504°W, 10 Nov 1981, R. T. Schuh and N. I. Platnick, (Scrophulariaceae), 2♂ (AMNH\_PBI 00194629, AMNH\_PBI 00194631), 40♀ (AMNH\_PBI 00194784–AMNH\_PBI 00194823) (Scrophulariaceae), 2♂ (AMNH\_PBI 00102064, AMNH\_PBI 00102065), 2♀ (AMNH\_PBI 00102066, AMNH\_PBI 00102067) (Scrophulariaceae), 5♂ (AMNH\_PBI 00194587–AMNH\_PBI 00194590, AMNH\_PBI 00194630), 38♀ (AMNH\_PBI 00194591–AMNH\_PBI 00194628) (AMNH). Cerro el Carmen, Quilicura, 33.35°S 70.71667°W, 18 Oct 1983, Irarrazaval, 7♂ (AMNH\_PBI 00185511–AMNH\_PBI 00185517), 27♀ (AMNH\_PBI 00107607, AMNH\_PBI 00185518–AMNH\_PBI 00185543) (USNM). Renca, 33.4°S 70.7333°W, Oct 1953, L. E. Peña, 8♂ (AMNH\_PBI 00194713–AMNH\_PBI 00194720), 11♀ (AMNH\_PBI 00194702–AMNH\_PBI 00194712) (AMNH). 7 km N of Tilti, 33.02025°S 70.93333°W, 620 m, 03 Nov 1994, S. Oygur & E. Barrera, 7♂ (AMNH\_PBI 00194559–AMNH\_PBI 00194565), 20♀ (AMNH\_PBI 00194566–AMNH\_PBI 00194585), 1 nymph (AMNH\_PBI 00194586) (AMNH). **Unknown Locality:** "ex Edwyn C. Reed Chilean collection, Sinop. Hem. Chile", Unknown collector, 2♂ (AMNH\_PBI 00191164, AMNH\_PBI 00191165) (USNM).

*Orthotylus chullan*, sp. nov.

Figures 2, 14D, H; 15D, H, L; 16D, 18

**DIAGNOSIS:** Recognized by the right anterior process of the genital capsule slightly larger than right posterior process (fig. 15L, arrows); apex of left paramere with an acute, anteriorly directed process (fig. 14H); dorsal process of left paramere in medial view with margin nearly flat, with two caudal spines, and an anterior, wide, denticulate dorsal tubercle (fig. 15H); transverse dorsal margin of left paramere elevated (fig. 14H); right paramere with a wide, subapical projection directed medially (fig. 14H); anterior portion of basalmost rami of right spicule simple, gently curved posteriorly (fig. 14D); apex of right spicule with a preapical, anterodorsally directed ramus and a single, dorsoposteriorly directed ramus (fig. 14D); phallosome with basal right margin of opening with a blunt, dorsally directed tubercle (fig. 15D, arrow); area dorsal to the sclerotized medial margins of first gonapophysis of anterior wall of females not sclerotized (fig. 16D).

*Orthotylus chullan* is very similar in external appearance to *O. chilensis*, *O. kakan*, and *O. kikin* (fig. 2). *Orthotylus chullan* is easily distinguished from these three species by the delicate, relatively simple structure of the vesica (fig. 14D), the parameres (figs. 14H, 15H), and the structure of the anterior wall of the female (fig. 16D). The left paramere is unique in having an elevated transverse ridge nearly reaching the apex of the paramere (fig. 14H, arrow). In *O. chilensis*, *O. kakan*, and *O. kikin*, the dorsal apical half of the left paramere has an elevated ridge, which does not reach the apex of the paramere (fig. 14E–G). Furthermore, the dorsal medial process of the left paramere in *O. chullan* has its margin straight with an anterior, denticulate process (fig. 15H), whereas in the other three species the margin is gently or strongly concave (fig. 15E–G). The right paramere is similar to that of *O. kakan* (fig. 14G), but in *O. chullan* the dorsal anterior process, which is directed medially, is globose and tuberculate (fig. 14H, apical view), not as in *O. kakan*, which is a simple, spinelike tubercle (fig. 14G, apical view). The genital capsule of *O. chullan* (fig. 15L) is very similar to that of *O. kakan*



(fig. 15K) in having the right posterior process enlarged, but in *O. chullan* the anterior process is slightly larger than the posterior process (fig. 15L, arrows), whereas in *O. kakan* the posterior process is larger than the anterior process (fig. 15K, arrows). *Orthotylus chullan* is the only species of the four that possesses a tubercle on the right margin of the opening of the phallotheca (fig. 15D). In the other three species the margin is entire (fig. 15A–C). The area dorsal to the medial margins of the first gonapophyses of the female is not sclerotized in *O. chullan* (fig. 16D), whereas in *O. chilensis*, *O. kakan*, and *O. kikin* this dorsal area is sclerotized (fig. 16A–C).

**DESCRIPTION:** MALE: Elongate ovoid; total length 3.03. **COLORATION:** Overall coloration dark brown (fig. 2). **Head:** Clypeus shiny; vertex with paired whitish markings next to eyes, nearly reaching each other (fig. 2); mandibular and maxillary plates brown, shiny; buccula pale; labial segments I–II pale brown, III–IV not visible. **Thorax:** Mesoscutum with small, lateral, paired reddish-brown markings; proepimeron whitish on ventral angle. **Hemelytron:** Brown, darker at base of clavus and corium; embolium pale; membrane pale brown, veins brown. **Legs:** Brown; tarsi dark brown. **SURFACE AND VESTITURE:** Surface dull; dorsum covered with decumbent, simple, dark setae, and whitish sericeous setae; gena and dorsal area of metepisternum with longer, whitish, simple setae. **STRUCTURE:** **Head:** Transverse; anteocular region short; clypeus barely visible from above, not protruding, gently curved; frons curved; vertex nearly flat; posterior margin of vertex demarcated but not raised; mandibular plates broad and apically rounded; maxillary plates subrectangular, narrower than mandibular plates; buccula short; gena short, nearly as high as maxillary plate; gula very short; eyes hemispherical, surpassing dorsal margin of head in lateral view, posterior surface nearly flat, adjacent to anterior margin of pronotum; labrum triangular, slightly elongate; labial segment I reaching anterior margin of prosternum, II reaching apex of procoxa, III and IV not visible; antennal segment I short, the widest; II the longest, smaller in diameter than I; III about one-half length of II, of subequal diameter; IV

the shortest, subequal in diameter to III.

**Thorax:** Collar a narrow carina, barely visible dorsally; pronotum nearly flat, anterior margin slightly concave, posterior margin straight, lateral margins straight in dorsal view, rounded laterally, wider than long, anterior and posterior angles round, broad; calli impressed transversely, slightly elevated with respect to pronotal surface; mesoscutum visible dorsally, narrow; scutellum equilateral, disc nearly flat, gently curving to lateral margins; proepisternum not projecting laterally, coxal sulcus deeply impressed; proepimeron concave; mesepisternum nearly flat, slightly concave on mesepimeral suture; mesepimeron elevated with respect to mesepisternum, spiracle oblong; metepisternum with evaporatory area developed, peritreme not elevated. **Hemelytron:** Margins subparallel; cuneus 1.6 times as long as wide. **Legs:** Coxae cylindrical; femora slightly compressed anteroposteriorly, covered with numerous dark, spinelike setae, profemur shorter than meso- and metafemur; tibiae cylindrical, straight, pro- and mesotibia subequal in length, metatibia longer; tarsi subequal in length, metatarsus slightly longer. **Abdomen:** Sparsely covered with short, simple, whitish setae. **Genitalia:** Genital capsule broadly triangular, ventral surface with stout, short setae (fig. 15L); caudal margin in dorsal view sharply triangular, acute; aperture ovoid, reclined, margin well sclerotized; lateral right anterior process triangular, posterior process triangular, smaller than anterior process (fig. 15L, arrows), the latter adjacent to the right paramere socket; cuplike sclerite not surpassing caudal margin of genital capsule, S-shaped in dorsal and posterior views; paramere sockets located horizontally at same level; left paramere inverted L-shaped in dorsal view, apex with vertical, deep cleft, and with acute, anteriorly directed process (fig. 14H); apical half of paramere fitting right cavity formed by cuplike sclerite; transverse dorsal margin of left paramere elevate (fig. 14H), margin of dorsal process in medial view nearly flat, posteriorly with two spines and a cephalad, wide, denticulate dorsal tubercle (fig. 15H); right paramere elongate, expanded and flattened toward the apex in posterolateral view, with a medial, wide, subapical projection, dorsal margin with a

series of spines, dorsal anterior process in apical view globose and tuberculate, directed medially (fig. 14H); phallotheca cylindrical, well-sclerotized, opening dorsal, longitudinal; left margin of phallotheca slightly sinuate, right margin nearly straight, with a subbasal blunt process (fig. 15D, arrow); vesica with two spicules (fig. 14D); left spicule curved dorsally, with a small preapical ramus (fig. 14D); right spicule with three simple, non-denticulate rami, basally with expanded dorsal area connecting to the conjunctiva, anterior portion of basalmost rami curved posteriorly, posterior portion directed dorsally, preapical ramus directed anterodorsally, apical ramus directed dorsoposteriorly (fig. 14D).

**FEMALE:** Similar in coloration and structure to the male; total length 2.86–3.23. **COLORATION:** As in male (fig. 2), except the following. **Head:** Vertex with whitish markings prolonged into frons; posterior margin of vertex, and medial area of frons with insertions of setae dark brown; mandibular plate pale brown, maxillary plate brown, apically dark brown; gena pale brown, gula darker than gena; labial segments I–II whitish, III–IV dark brown. **Thorax:** Anterior margin of pronotum and longitudinal marking whitish; scutellum apically whitish, apical half with longitudinal diffuse whitish marking; proepisternum and propimeron brown, on ventral margin whitish; mesepisternum and metepimeron brown; peritreme paler than surrounding evaporative area; metepisternum brown. **Hemelytron:** Brown; embolium and narrow longitudinal adjacent area whitish; cuneus laterally whitish. **Legs:** Pale brown; coxae apically whitish. **Abdomen:** Brown; ovipositor dark brown. **SURFACE AND VESTITURE:** As in male. **STRUCTURE:** As in male, except the following. **Head:** Labium reaching mesocoxa (not visible in male, see above). **Genitalia:** Subgenital plate as long as wide, apex rounded; base of ovipositor located anteriorly to longitudinal midpoint of abdomen; interramal dorsal sclerite elongate, subrectangular, nearly touching each other dorsally, dorsal margin, next to insertion of interramal dorsal lobe, with microtrichia; dorsal lobe of interramal sclerite covered by microtrichia, strongly curved medially on lateral margin, apex

acute, medial margin deeply emarginate, subapical lobe large, apex acute; medial sclerite small, rounded, well sclerotized, not reaching dorsal margin of posterior wall; dorsal labiate plate without central sclerotized areas; sclerotized rings elongate, subrectangular, anterior portion with numerous microtrichia; anterior wall with inner margins of first gonapophyses asymmetrical, well sclerotized, left margin with ventral lobe rounded and dorsal lobe attenuate (fig. 16D), right margin with ventral lobe narrow, rounded, and dorsal lobe broadly curved, flaplike, both lobes well sclerotized (fig. 16D); area dorsal to medial margins of first gonapophyses not sclerotized (fig. 16D).

**DISTRIBUTION:** *Orthotylus chullan* is known only from a single locality in the “Valle Central”, in the Santiago area (fig. 18).

**HOSTS:** Unknown.

**ETYMOLOGY:** This species is named from the Quechua (Qheswa Simi) *ch'ullan*, “odd” or “without pair”, due to the uniqueness and paucity of specimens found.

**DISCUSSION:** *Orthotylus chullan* is only known from four specimens, one male and three females. Despite the scarcity of specimens, I am describing these as new because of several distinctive characters exhibited by *O. chullan* (see diagnosis), all of which easily distinguish this species from the other three related species *O. chilensis*, *O. kakan*, and *O. kikin*.

**HOLOTYPE MALE:** [CHILE: **Metropolitana De Santiago**]: Pudahuel, [33.43333°S 70.83333°W], Oct 1979, L. E. Peña, Holotype *Orthotylus chullan* n.sp. D. Forero det., 1♂ (AMNH\_PBI 00185402) (USNM).

**PARATYPES:** CHILE: **Metropolitana De Santiago**: Pudahuel, 33.43333°S 70.83333°W, Oct 1979, L. E. Peña, 3♀ (AMNH\_PBI 00185409–AMNH\_PBI 00185411) (USNM).

*Orthotylus kakan*, sp. nov.

Figures 2, 14C, G, 15C, G, K, 16C, 18

**DIAGNOSIS:** Recognized by the right, lateral, anterior process of the genital capsule smaller than the posterior process (fig. 15K, arrows); apex of left paramere with a broad, anteriorly directed process (fig. 14G); dorsal process of left paramere in medial view with

margin strongly concave, with caudal portion at least two times as long as anterior portion (fig. 15G); right paramere with a wide, sub-apical projection directed medially (fig. 14G); vesica with anterior portion of basalmost rami of right spicule flattened and denticulate at margin, posterior portion flattened anteroposteriorly, expanded and denticulate on apical half (fig. 14C); apex of right spicule rounded, with a posteriorly directed ramus inserted dorsally (fig. 14C); left spicule with longer apical ramus slightly expanded apically and denticulate (fig. 14C); medial margins of first gonapophyses of anterior wall of females weakly sclerotized (fig. 16C); area dorsal to first gonapophyses with a strongly sclerotized medial area (fig. 16C).

*Orthotylus kakan* is easily distinguished from the other most similar species (*O. chilensis*, *O. chullan*, and *O. kikin*) (fig. 2) by the structure of the vesica (fig. 14C) and by the elongate caudal portion of the dorsal process of the left paramere (fig. 15G). *Orthotylus kakan* is the only species of the four closely related ones (see above) in which the posterior ramus of the basalmost rami is flattened and denticulate apically (fig. 14C). In all of the other species, this ramus is nearly cylindrical and simple (fig. 14A, B, D). The dorsal process of the left paramere is unique among the closely related species in having the posterior portion strongly elevated with respect to the anterior portion (fig. 15G). In *O. chilensis* and *O. kikin* the two portions are about the same size (fig. 15E, F), and in *O. chullan* the margin is straight with the anterior portion bearing a large, denticulate tubercle (fig. 15H). The right paramere of *O. kakan* (fig. 14G) is similar to that of *O. chullan* (fig. 14H), but in *O. kakan* the medially directed, dorsal anterior process, is a simple, spinelike tubercle (fig. 14G, apical view), whereas in *O. chullan* is globose and tuberculate (fig. 14H, apical view). The genital capsule of *O. kakan* (fig. 15K) is very similar to that of *O. chullan* (fig. 15L) in having an enlarged posterior right process, but in *O. kakan* the anterior process is less pronounced than the posterior process (fig. 15K, arrows), whereas in *O. chullan* the anterior process is slightly more enlarged than the posterior process (fig. 15L, arrows). Females of *O.*

*kakan* can be easily distinguished from *O. chilensis*, *O. chullan*, and *O. kikin*, by the slightly sclerotized medial margins of the first gonapophyses and by the heavy medial sclerotization dorsal to the gonapophyses (fig. 16C). In *O. chilensis* and *O. kikin*, this dorsal area is uniformly sclerotized (fig. 16A, B), and in *O. chullan* it is weakly sclerotized (fig. 16D).

**DESCRIPTION:** MALE: Elongate ovoid; total length 2.92–3.46. **COLORATION:** Overall coloration dark brown, nearly black, very similar to *O. chullan* (see above) (fig. 2), except as follows. **Head:** Mandibular and maxillary plates dark brown; labrum brown; labial segments I–II pale brown, III–IV dark brown. **Thorax:** Pronotum sometimes with a short, faint, medial longitudinal whitish line; scutellum sometimes with apex faintly whitish. **Hemelytron:** Cuneus brown, sometimes reddish brown medially. **Legs:** Coxae dark brown, whitish apically; trochanters whitish; femora pale brown, with brown irregular areas; tibiae pale brown; tarsi dark brown. **Abdomen:** Dark brown, nearly black. **Genitalia:** Genital capsule dark brown; proctiger and parameres brown. **SURFACE AND VESTITURE:** Similar to *O. chullan* (see above). **STRUCTURE:** Similar to *O. chullan* (see above), except as follows. **Genitalia:** Genital capsule similar to *O. chullan* (see above), but right anterolateral process smaller than right posterior process (fig. 15K, arrows); cuplike sclerite as in *O. chullan* (see above); parameres as in *O. chullan* (fig. 14G), but left paramere with margin of dorsal process in medial view strongly concave, distal portion of dorsal process at least twice as long as proximal portion (fig. 15G); transverse dorsal margin of left paramere not elevate (fig. 14G); apex of left paramere with anteriorly directed process wide (fig. 14G); right paramere with medially directed, anterodorsal process as a spine-like tubercle (fig. 14G); phallosome as in fig. 15C; vesica with two spicules (fig. 14C); right spicule with basal expanded area quadrangular, connected with conjunctiva, basalmost rami with anterior ramus flattened laterally, denticulate apically, posterior ramus flattened anteroposteriorly, expanded and strongly denticulate on apical half (fig. 14C); apex of right spicule rounded,



apical ramus inserted dorsally, directed posteriorly, slightly curved dorsally (fig. 14C); left spicule slightly expanded basally, strongly curved at midpoint, slightly expanded before bifurcation of rami, longer ramus flattened, slightly expanded and strongly denticulate apically (fig. 14C).

**FEMALE:** Similar in structure and coloration to male; total length 3.05–3.50. **COLORATION:** As in male (fig. 2), except the following. **Head:** Paired whitish markings on vertex extending anteriorly on frons, reaching ventral surface of eyes. **Thorax:** Pronotum usually with longitudinal whitish line, interrupted between calli, sometimes line faded; scutellum usually with longitudinal whitish line, sometimes faded. **SURFACE AND VESTITURE:** As in male. **STRUCTURE:** As in male, except the following. **Genitalia:** Similar to *O. chullan* (see above), but lobes of medial margins of first gonapophyses not well sclerotized, except ventral left lobe (fig. 16C); area dorsal to medial margins of first gonapophysis with a heavily sclerotized medial portion (fig. 16C).

**DISTRIBUTION:** *Orthotylus kakan* is found in the “Norte Chico” region in the northern part of Chile between the rivers Copiapó and Aconcagua, including the regions of Atacama (III) and Coquimbo (IV), roughly between 27° and 32°S (fig. 18). *Orthotylus kakan* shares this area of distribution with *O. tafoensis*.

**HOSTS:** Unknown.

**ETYMOLOGY:** The name refers to the extinct Kakán language spoken by the Diaguita people, who inhabited Chile in the semiarid northern region.

**DISCUSSION:** Specimens of *O. kakan* have a uniform vesical structure (fig. 14C), whereas the shape of the parameres can be slightly variable, in particular the medial process of the right paramere (fig. 14G), as it occurs also in *O. chilensis*, *O. chullan*, and *O. kikin* (fig. 14E, F, H).

**HOLOTYPE (MALE): CHILE: [Coquimbo – Region IV]: Elqui [Province]:** Vicuña, [30.03194°S 70.70806°W], 17 Oct 1991, L. E. Peña, Holotype *Orthotylus kakan* n.sp. D. Forero det., 1 ♂ (AMNH\_PBI 00185554) (USNM).

**PARATYPES: CHILE: Atacama – Region III: Chañaral:** Los Loros, Aceit., 27.83333°S 70.1°W, 01 Nov 1980, L. E. Peña, 3 ♀

(AMNH\_PBI 00185421–AMNH\_PBI 00185423) (USNM). **Coquimbo – Region IV: Choapa Province:** Auco, Illapel, 31.48333°S 71.1°W, 01 Sep 1984, G. Carrasco, 3 ♂ (AMNH\_PBI 00185403–AMNH\_PBI 00185405), 1 ♀ (AMNH\_PBI 00185412) (USNM). **Elqui Province:** El Pangué, 30.2°S 70.65°W, 1900 m, 02 Nov 1980, L. E. Peña, 2 ♂ (AMNH\_PBI 00185413, AMNH\_PBI 00185414), 4 ♀ (AMNH\_PBI 00185417–AMNH\_PBI 00185420) (USNM). Vicuña, 30.03194°S 70.70806°W, 17 Oct 1991, L. E. Peña, 2 ♂ (AMNH\_PBI 00185545, AMNH\_PBI 00185548), 2 ♀ (AMNH\_PBI 00185582, AMNH\_PBI 00185594) (AMNH); 17 ♂ (AMNH\_PBI 00185544, AMNH\_PBI 00185546–AMNH\_PBI 00185547, AMNH\_PBI 00185549–AMNH\_PBI 00185553, AMNH\_PBI 00185555–AMNH\_PBI 00185563), 30 ♀ (AMNH\_PBI 00185564–AMNH\_PBI 00185581, AMNH\_PBI 00185583–AMNH\_PBI 00185593, AMNH\_PBI 00185595) (USNM).

*Orthotylus kikin*, sp. nov.

Figures 2, 14B, F, 15B, F, J, 16B, 18

*Orthotylus chilensis* Carvalho and Afonso, 1977: 13 (in part) [misidentification, vesica and left paramere, figs. 1, 3].

**DIAGNOSIS:** Recognized by the triangular, right, anterior process of the genital capsule (fig. 15J, arrow), posterior process not enlarged (fig. 15J); apex of left paramere with an acute, anteriorly directed process (fig. 14F); dorsal process of left paramere in medial view with margin slightly concave (fig. 15F); anterior portion of the basalmost rami of the right spicule deeply cleft apically (fig. 14B); apex of right spicule with a dorsal, single, posteriorly directed ramus and a ventral, apically bifurcated ramus (fig. 14B); medial margin of first gonapophysis of anterior wall of females with sclerotized left dorsal part as an inverted C-shaped area (fig. 16B).

*Orthotylus kikin* is most similar to *O. chilensis* (figs. 2, 14A, E, 15A, E, 16A), and it is easily distinguished from it by the structure of the vesica (fig. 14B), and genital capsule (fig. 15J). The genital capsule of *O. kikin* shares with *O. chilensis* a pronounced right anterior process and a nearly inconspicuous posterior process (figs. 15I, J, arrows).

*Orthotylus kikin* has the anterior process as a triangular prolongation (fig. 15J, arrow), whereas *O. chilensis* has it as a lobate, tonguelike prolongation (fig. 15I, arrow). The apex of the vesica of *O. kikin* has two rami (fig. 14B), whereas in *O. chilensis* it has a preapical ramus and an apical one (fig. 14A). The ventral apical ramus of *O. kikin* (fig. 14B) cannot be confused with the preapical ramus of *O. chilensis* (fig. 14A) due to the position of the insertion and the long pedicel of the former. Furthermore, the vesica of *O. kikin* has the anterior portion of the basal rami deeply cleft (fig. 14B), whereas in *O. chilensis* it is gently concave and expanded apically (fig. 14A). The dorsal process of the left paramere in *O. kikin* and *O. chilensis* is very similar, with a slightly concave margin (figs. 15E, F). Some degree of intraspecific variability in the left paramere with respect to the degree of development of the spines present on its dorsal process occurs both in *O. kikin* and *O. chilensis*, similar to the variability of the right paramere (fig. 14E, F). The structure of the dorsal process is not diagnostic for *O. kikin* in respect to *O. chilensis*. Nonetheless, the apical process of the left paramere is narrow and acute in *O. kikin* (fig. 14F) and wider in *O. chilensis* (fig. 14E). Most of the specimens of *O. kikin* are easily distinguished from the other three closely related species (*O. chilensis*, *O. chullán*, and *O. kakan*) (fig. 2) by the dark brown embolium (figs. 2A, B) that is whitish in the other species. Nonetheless, in a few female specimens of *O. kikin*, the embolium is whitish as in *O. chilensis* (e.g., AMNH\_PBI 00105556) (fig. 2C). Because coloration is a variable character, male and female genitalic dissections are needed to identify *O. kikin*.

**DESCRIPTION:** MALE: Elongate ovoid; total length 3.27–3.58. **COLORATION:** Overall coloration dark brown, very similar to *O. chullán* (see above) (fig. 2), except as follows. **Head:** Mandibular and maxillary plates dark brown; labrum brown; labial segments I–II pale brown, III–IV dark brown. **Thorax:** *Hemelytron:* Embolium brown; cuneus sometimes medially reddish brown. **Legs:** Similar to *O. kakan* (see above), but femora without irregular brown areas. **Abdomen:** Dark brown, nearly black. **Genitalia:** Genital capsule dark

brown; proctiger and parameres brown. **SURFACE AND VESTITURE:** Similar to *O. chullán* (see above). **STRUCTURE:** Similar to *O. chullán* (see above), except as follows. **Genitalia:** Genital capsule similar to *O. chullán* (see above), but anterior right process triangular (fig. 15J, arrow), posterior right process not enlarged (fig. 15J); cuplike sclerite as in *O. chullán* (see above); parameres as in *O. chullán* (see above) (fig. 14F), but transverse dorsal margin of left paramere not elevated (fig. 14F); left paramere with dorsal process in medial view concave, anterior and posterior portion of dorsal process about the same height (fig. 15F); right paramere with medial subapical projection small, round or acute (fig. 14F); dorsal anterior process of right paramere small, denticulate, directed medially (fig. 14F, apical view); phallosome as in fig. 15B; vesica with two spicules (fig. 14B); right spicule with basal portion not greatly expanded, connected with conjunctiva, basal-most rami with anterior ramus bifurcate, deeply cleft medially, posterior ramus shorter than anterior, directed caudally (fig. 14B); apex of right spicule with dorsal ramus nearly straight, directed posteriorly, ventral ramus with long pedicel, bifurcate apically (fig. 14B); left spicule gently curved at midpoint, gently swollen before bifurcation of rami, rami apically denticulate or not (fig. 14B).

**FEMALE:** Similar in structure and coloration to male; total length 3.32–3.44. **COLORATION:** As in male (fig. 2), except the following. **Thorax:** *Hemelytron:* Embolium sometimes whitish, not brown. **SURFACE AND VESTITURE:** As in male. **STRUCTURE:** As in male (fig. 2), except the following. **Genitalia:** Similar to *O. chullán* (see above), but dorsal portion of left margin of first gonapophyses as an inverted C-shaped sclerotized area (fig. 16B), area dorsal to medial margins of first gonapophyses evenly sclerotized (fig. 16B).

**DISTRIBUTION:** *Orthotylus kikin* is found in the “Valle Central”, in areas around Santiago in the Metropolitan Region, and in the Araucanía Region in the south (fig. 18). The distribution pattern of *O. kikin* is largely sympatric with that of *O. chilensis*, although *O. kikin* is found farther south than *O. chilensis*.

HOSTS: Unknown.

ETYMOLOGY: The species name is taken from the Quechua (Qheswa Simi) *kikin*, which means “very similar”, due to the similarity of *O. kikin* with *O. chilensis*.

DISCUSSION: Carvalho and Afonso (1977: figs. 1–4) illustrated the vesica and parameres for this species but misidentified it as *O. chilensis*. Examination of a series of males and females of *O. chilensis* collected near Santiago (the type locality) and the illustration provided by Carvalho (1985) (see Discussion above under *O. chilensis*), support the hypothesis that the species concept of *O. chilensis* of Carvalho and Fontes (1973) is different from the one used by Carvalho and Afonso (1977).

Even when some degree of intraspecific variability is acknowledged in vesical structure (fig. 14B), the differences between *O. chilensis*, the most similar species (see Diagnosis), and these specimens are such, that I consider these specimens as a new species.

HOLOTYPE (MALE): [CHILE: Araucania – Region IX: Malleco]: El Radal, [38.9833°S 72.4°W], 900 m, 28 Sep 1957–30 Sep 1957, [Unknown collector], Holotype *Orthotylus kikin* n.sp. D. Forero det., 1 ♂ (AMNH\_PBI 00104529) (CNC).

PARATYPES: CHILE: Araucania – Region IX: Malleco: El Radal, 38.9833°S 72.4°W, 900 m, 28 Sep 1957–30 Sep 1957, Unknown collector, 2 ♂ (AMNH\_PBI 00104531, AMNH\_PBI 00104532), 2 ♀ (AMNH\_PBI 00104558, AMNH\_PBI 00104559) (AMNH); 25 ♂ (AMNH\_PBI 00104520–AMNH\_PBI 00104528, AMNH\_PBI 00104530, AMNH\_PBI 00104533–AMNH\_PBI 00104547), 32 ♀ (AMNH\_PBI 00104548–AMNH\_PBI 00104557, AMNH\_PBI 00104560–AMNH\_PBI 00104577, AMNH\_PBI 00104579–AMNH\_PBI 00104582) (CNC). Metropolitana De Santiago: Chacabuco: (Rd) between La Dormida and Tiltit, 33.0615°S 70.9986°W, 700 m, 13 Nov 1982–18 Nov 1982, L. E. Peña, 2 ♂ (AMNH\_PBI 00185398, AMNH\_PBI 00185399), 3 ♀ (AMNH\_PBI 00185406–AMNH\_PBI 00185408) (USNM). Santiago: El Canelo, 33.58333°S 70.45°W, Nov 1979–Dec 1979, L. E. Peña, 1 ♂ (AMNH\_PBI 00185401) (USNM). La Obra, 33.59869°S 70.50021°W, Jan 1979, L. E. Peña, 1 ♂ (AMNH\_PBI 00185400) (USNM).

*Orthotylus tafoensis* Kerzhner and Schuh

Figures 2, 17–18

*Orthotylus nigrescens* Carvalho and Fontes, 1973: 497 [n. sp.]; Schuh, 1995: 172 [catalog, as synonym of *O. virens* (Fallén, 1807)].

*Orthotylus tafoensis* Kerzhner and Schuh, in Schuh, 1995: 171 [replacement name].

DIAGNOSIS: Recognized by the elongate, sickle-shaped right paramere reaching the left paramere socket (fig. 17); strongly curved left paramere, apically enlarged, with a vertical central cleft (fig. 17); paramere sockets with dorsal, flattened lobes (fig. 17); phallosome with a dorsal, curved opening, an apical left medially directed prolongation, and a basal, lateral right weakly sclerotized area (fig. 17, arrow); and vesica with a single spicule with four rami, three of the rami directed caudad, one directed cephalad (fig. 17).

*Orthotylus tafoensis* is easily recognized among Neotropical Orthotylini by the dark coloration (fig. 2) and the structure of the male genitalia (fig. 17). *Orthotylus tafoensis* may be confused with the four *Orthotylus* species treated above (i.e., *O. chilensis*, *O. chullan*, *O. kakan*, and *O. kikin*) due to its dark coloration (fig. 2), but in males of those four species the head has a pair of whitish marks on the vertex next to the eyes that are absent in males of *O. tafoensis* (fig. 2). Females of *O. tafoensis* are very similar in coloration to *O. chilensis*, *O. chullan*, *O. kakan*, and *O. kikin*, but they are more ovoid and short winged (fig. 2). *Orthotylus tafoensis* is further separated from those species by the long and curved right paramere, whereas in the other four species it is elongate and approximately subrectangular (fig. 14E–H). The flattened foliaceous lobes located dorsal to the paramere sockets (fig. 17) are unique and are not found in any other known species of Orthotylini.

DISTRIBUTION: *Orthotylus tafoensis* is found in the “Norte Chico” region in the northern part of Chile between the rivers Copiapó and Aconcagua, approximately between 27° and 32°S (fig. 18).

Host: *Heliotropium stenophyllum* Hook. & Arn. (Boraginaceae).

DISCUSSION: Carvalho and Fontes (1973) described *Orthotylus nigrescens* as a new



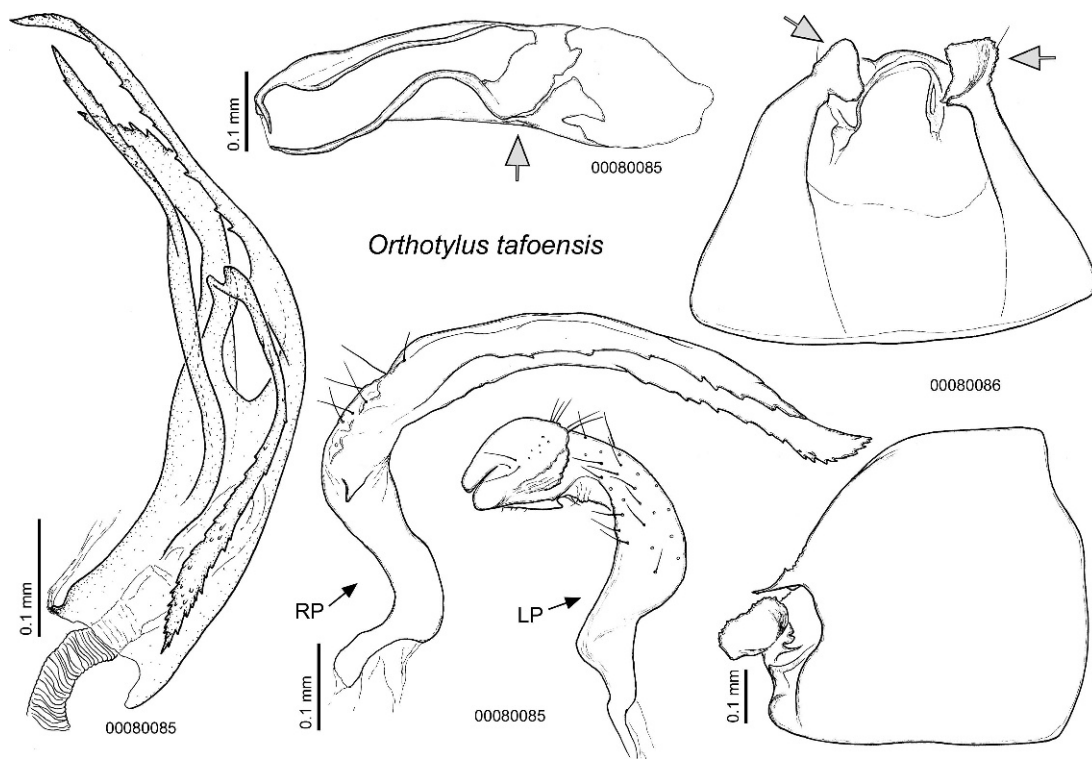


Fig. 17. *Orthotylus tafoensis*. Male genitalia: vesica, lateral left view; phallosome, dorsal view; genital capsule, dorsal and lateral right views; and right and left parameres, dorsal view.

species from “Eltofo” (misspelling of El Tofo), Coquimbo, Chile. Stichel (1933) named three forms from Europe of *Orthotylus virens* (Fallén, 1807), a Palearctic species: *O. virens fuscescens*, *O. virens lutescens*, and *O. virens nigrescens*. Carvalho (1958) regarded these three forms as synonyms of *O. virens*. Schuh (1995: 172) incorrectly listed *O. nigrescens* Carvalho and Fontes as a synonym of *O. virens nigrescens* Stichel 1933, rather than as a homonym. Kerzhner and Schuh (2001) stated that *O. tafoensis* is the replacement name for *O. nigrescens* Carvalho and Fontes, and that the latter should be removed from synonymy of *O. virens*, as in Schuh’s catalog (1995). *Orthotylus tafoensis* was supposedly proposed by Kerzhner and Schuh (1995) (see Schuh, 1995: 171), although the replacement name was never included in that paper. Nonetheless, because it is clearly indicated in Schuh’s catalog (1995: 171) that *O. tafoensis* is the replacement name for *O. nigrescens* Carvalho and Fontes, it is considered valid, and takes

the authorship of Kerzhner and Schuh and the date of publication of the catalog (ICZN, 1999: article 60.3).

The right paramere usually has a subbasal concavity on its ventral serrate margin (fig. 17). Sometimes this excavation is strongly concave, shaped as a bottle opener. This variation is not related to any variation of the vesica, and occurs in specimens from the same locality.

**PARATYPES:** **CHILE: Coquimbo** [– **Region IV**]: El Tofo, [29.45°S 71.21667°W], Oct 1952, [Unknown collector], 1♂ (AMNH\_PBI 00070019), 1♀ (AMNH\_PBI 00070020) (USNM).

**OTHER SPECIMENS EXAMINED:** **CHILE: Atacama – Region III: Chañaral:** Los Loros, Aceit., 27.8333°S 70.1°W, 01 Nov 1980, L. E. Peña, 4♂ (AMNH\_PBI 00191135–AMNH\_PBI 00191138), 1♀ (AMNH\_PBI 00191143) (USNM). **Copiapo:** 100 km S of Copiapo, 28.284°S 70.26077°W, 01 Oct 1980, L. E. Peña, 1♀ (AMNH\_PBI 00191148) (USNM).

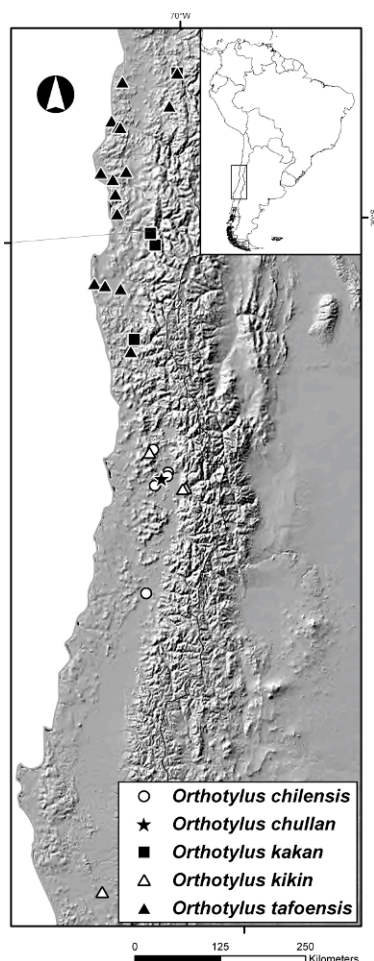


Fig. 18. Distribution map of *Orthotylus chilensis*, *O. chullan*, *O. kikin*, *O. kakan*, and *O. tafoensis*.

Total, 27.9°S 70.96667°W, 21 Oct 1980, L. E. Peña, 41 ♂ (AMNH\_PBI 00185434–AMNH\_PBI 00185474), 36 ♀ (AMNH\_PBI 00185475–AMNH\_PBI 00185510) (USNM). **Huasco:** N of Huasco, 28.43184°S 71.18589°W, 12 Nov 1980, L. E. Peña, 2 ♀ (AMNH\_PBI 00191144, AMNH\_PBI 00191145) (USNM). Q[uebrada] Chorrillos, SW of Freirina, 28.52454°S 71.09042°W, 12 Oct 1980, L. E. Peña, 26 ♂ (AMNH\_PBI 00185596–AMNH\_PBI 00185621), 23 ♀ (AMNH\_PBI 00185622–AMNH\_PBI 00185644) (USNM). Q[uebrada] El Salto, S of Freirina, 28.5318°S 71.05236°W, 28 Oct 1980, L. E. Peña, 4 ♂ (AMNH\_PBI 00191139–AMNH\_PBI 00191142), 3 ♀ (AMNH\_PBI 00185668, AMNH\_PBI 00191146–AMNH\_PBI 00191147)

(USNM). [Road] Los Loritos – Carrizalillo, 29.14071°S 71.41987°W, 20 Oct 1983, L. E. Peña, 25 ♂ (AMNH\_PBI 00185368–AMNH\_PBI 00185392), 5 ♀ (AMNH\_PBI 00185393–AMNH\_PBI 00185397) (USNM). **Coquimbo – Region IV:** **Choapa Province:** Hacienda Illapel, S Coquimbo, 31.64796°S 71.17145°W, Oct 1954, L. E. Peña, 16 ♂ (AMNH\_PBI 00104741–AMNH\_PBI 00104756), 19 ♀ (AMNH\_PBI 00104757–AMNH\_PBI 00104775) (CNC). **Elqui Province:** 19–21 Km N La Serena, 29.72719°S 71.21516°W, 200 m, 01 Nov 1981–04 Nov 1981, R. T. Schuh and N. I. Platnick, *Heliotropium stenophyllum* Hook & Arn. (Boraginaceae), 27 ♂ (AMNH\_PBI 00102068–AMNH\_PBI 00102069, AMNH\_PBI 00194632–AMNH\_PBI 00194655, AMNH\_PBI 00194685), 25 ♀ (AMNH\_PBI 00102070–AMNH\_PBI 00102071, AMNH\_PBI 00194656–AMNH\_PBI 00194678), 6 NYMPHS (AMNH\_PBI 00194679–AMNH\_PBI 00194684) (AMNH). NE of Choros Bajos, 29.24628°S 71.2382°W, 20 Oct 1983, L. E. Peña, 3 ♂ (AMNH\_PBI 00185645–AMNH\_PBI 00185647) (USNM). **Limari Province:** Parque Nacional Fray Jorge, 30.66666°S 71.66667°W, 21 Jun 1968, L. and C. W. O'Brien, Light Trap, 1 ♂ (AMNH\_PBI 00080086) (UCB). Socos, 30.7089°S 71.4994°W, 142 m, Nov 1957, L. E. Peña, 1 ♂ (AMNH\_PBI 00107032), 3 ♀ (AMNH\_PBI 00107033–AMNH\_PBI 00107035) (USNM). 20 km S of Ovalle, 30.77113°S 71.2532°W, 01 Oct 1967, C. W. O'Brien, 2 ♂ (AMNH\_PBI 00080084, AMNH\_PBI 00080085), 1 ♀ (AMNH\_PBI 00080087) (UCB). Cerro Los Cristales, 29.15°S 71.01666°W, 1600 m, 29 Sep 1980, 1 ♂ (AMNH\_PBI 00070021) (USNM); 30 Sep 1980, L. E. Peña, 14 ♂ (AMNH\_PBI 00185648–AMNH\_PBI 00185661), 6 ♀ (AMNH\_PBI 00185662–AMNH\_PBI 00185667) (USNM).

*Platyscytus youngi* (Carvalho),  
new combination

*Saileria youngi* Carvalho, 1953: 574 [n. sp.]; Carvalho, 1958: 131 [catalog]; Schuh, 1995: 192 [catalog].

**DISCUSSION:** Carvalho (1953) described a new species of *Saileria* from Panama. In the description, he mentioned that the phallus was of “Phylinae type”. Nevertheless, he did not discuss the placement for his species, and just mentioned that the genitalia of *S. youngi* were different from *S. bella* without further explanation. Carvalho (1953: fig. 2) illustrated the

genital capsule, with the aedeagus in situ, and the left paramere (Carvalho 1953: figs. 4–5). In the holotype, the genital capsule is elongate and the phallosome is protruding to the left as in other Phylinae. Both the vesica and the left paramere suggest a phylina species. In *S. youngi* the head is transverse, with its posterior margin curved, the eyes are adjacent to the pronotum, and the posterior margin of the pronotum is emarginated. Because of this structure of the head and pronotum, I propose to transfer *S. youngi* to *Platyscytus* (Phylinae: Phylini) as *Platyscytus youngi*, new combination. All but one of the paratypes (AMNH\_PBI 00133861) are not *P. youngi* but an unidentified—probably undescribed—species of *Saileria*, because of eye sexual dimorphism, green blotches on the hemelytra, and rounded anterior margin of the pronotum with the posterior margin excavated.

Maldonado and Carvalho (1981) provided a key for *Platyscytus*. Run through their key, *P. youngi* appears to be close to *P. paulistanus* and *P. venezuelanus* due to overall pale coloration without markings. *P. youngi* is distinguished from these two by the coloration of the antenna, which is pale in *P. youngi* but with dark markings in the other two species. Three other species of *Platyscytus* are known from Panama: *P. blantoni*, *P. englemani*, and *P. hemiruber* (Schuh, 2006a). Each of these species has various color markings on the hemelytra, whereas *P. youngi* has a uniformly yellowish dorsum without any conspicuous markings.

*Platyscytus* is very similar in external appearance to *Amazonophilus* Carvalho and Costa, *Platyscytisca* Costa and Henry (Costa and Henry, 1999; Henry and Costa, 2003), *Rondonisca* Carvalho and Costa, and *Rondonoides* Carvalho and Costa (personal obs.). Costa and Henry (1999) noted that *Platyscytus* is probably not a monophyletic taxon and it may be composed of at least three different species groups, whose relationships to *Amazonophilus* and *Platyscytisca* are unclear. The new combination of *P. youngi* highlights the need for a revision of *Platyscytus* and related genera.

**HOLOTYPE (MALE): PANAMA: Pan[ama] Province:** Tocumen, [9.0833°N 79.3833°W], 14 Apr 1952, F. S. Blanton, *Saileria youngi*

n.sp. det Carvalho 1953, Type No. 62001 U.S.N.M., *Platyscytus youngi* (Carvalho) Det. D. Forero, 1 ♂ (AMNH\_PBI 00133860) (USNM).

**PARATYPE: PANAMA: Panama:** Tocumen, [9.0833°N 79.3833°W], 14 Apr 1952, F. S. Blanton, Paratype *Saileria youngi* n.sp. Carvalho det. 1953, *Platyscytus youngi* (Carvalho) Det. D. Forero, 1 adult sex unknown (AMNH\_PBI 00133861) (USNM).

**ADDITIONAL SPECIMENS EXAMINED: Saileria sp. [Orthotylinae: Orthotylini]: PANAMA: Cocle:** El Retiro, 8.4833°N 80.15°W, 10 Nov 1952, F. S. Blanton, Paratype *Saileria youngi* n.sp. Carvalho det. 1953, *Saileria* sp. D. Forero det. 2007, 1 adult sex unknown (abdomen missing) (AMNH\_PBI 00133936) (USNM). **Panama:** Tocumen, 9.0833°N 79.3833°W, 14 Apr 1952, F. S. Blanton, Paratype *Saileria youngi* n.sp. Carvalho det. 1953, *Saileria* sp. D. Forero det. 2007, 1 ♂ (AMNH\_PBI 00133932), 2 ♀ (AMNH\_PBI 00133933, AMNH\_PBI 00133934), 1 adult sex unknown (abdomen missing) (AMNH\_PBI 00133935) (USNM); 1 ♂ (AMNH\_PBI 00175156) (MNRJ).

### *Saileria bella* (Van Duzee)

Figures 2, 19–20

*Hyalochloria bella* Van Duzee, 1916: 217 [n. sp.].

*Saileria bella*: Hsiao, 1945: 27 [new genus, as type species]; Carvalho, 1958: 131 [catalog]; Henry, 1976a: 31 [key]; Henry and Wheeler, 1988: 446 [catalog]; Schuh, 1995: 191 [catalog].

**DIAGNOSIS:** Recognized by the delicate body (fig. 2); hyaline hemelytra (fig. 2); greenish, quadrate spots on hemelytra (fig. 2); male with eyes surpassing dorsal margin of head (fig. 19A); eyes not close to anterior margin of pronotum (fig. 19B); pretarsus as in figs. 5C, 19E–F; metepisternal scent gland as in figs. 5B, 19C; genital capsule with opening nearly vertical (fig. 20), anterior margin well sclerotized, without tergal processes (fig. 20); genital capsule with ventral, posteriorly directed prolongation (figs. 19H, 20); aedeagus simple, phallosome cylindrical, narrow, apically nearly circular (figs. 19G, 20); vesica with a single spicule, about one-half the length of the phallosome (fig. 20); left paramere



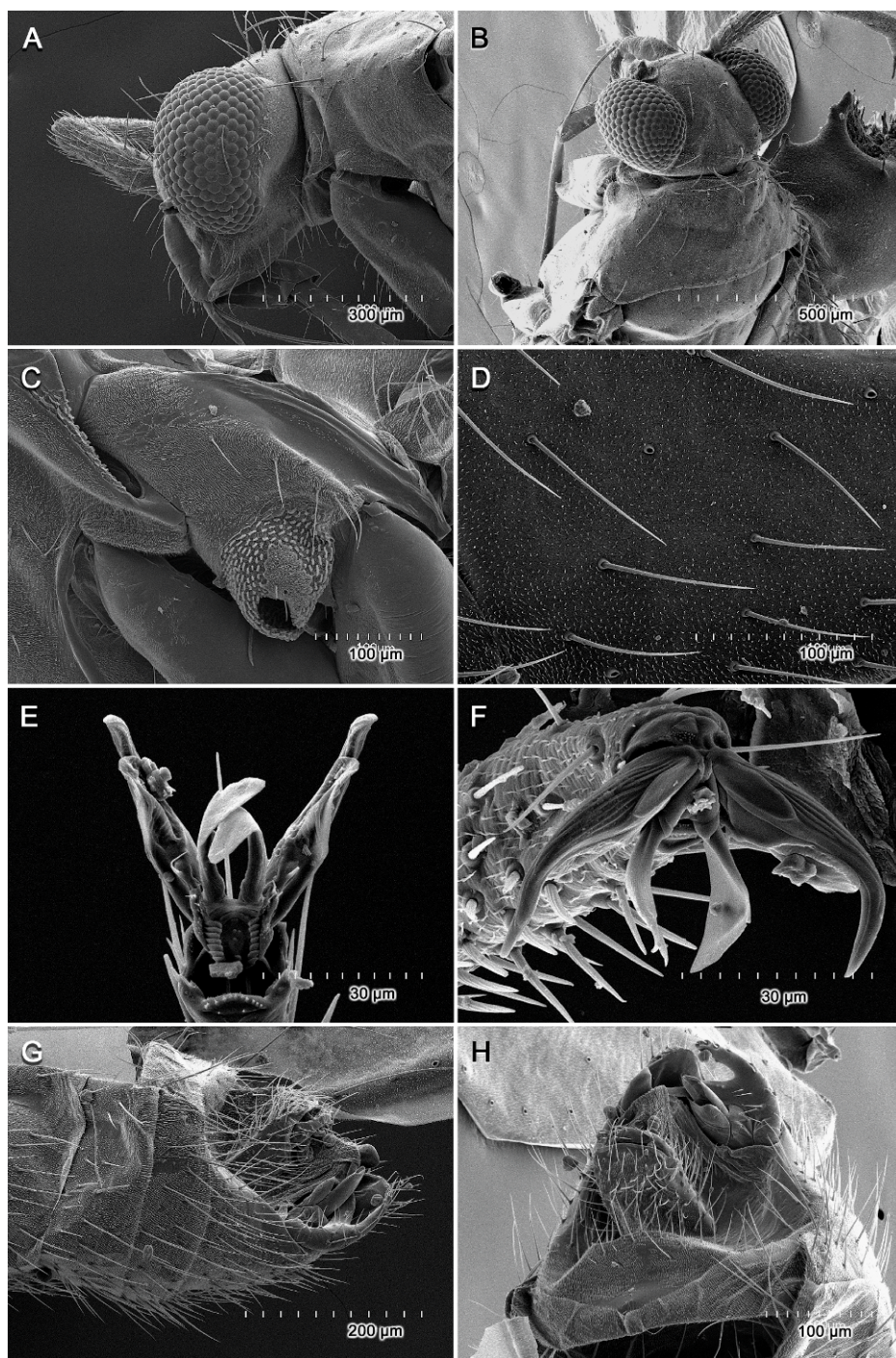


Fig. 19. *Saileria bella*, male (AMNH\_PBI 00102886). SEM of male selected structures. **A.** Head, lateral view. **B.** Head and pronotum, dorsolateral view. **C.** Mesothoracic spiracle and metathoracic scent gland evaporative area. **D.** Vestiture on hemelytron. **E–F.** Pretarsus, ventral and apical views respectively. **G–H.** Genital capsule, dorsolateral and dorsal views respectively.

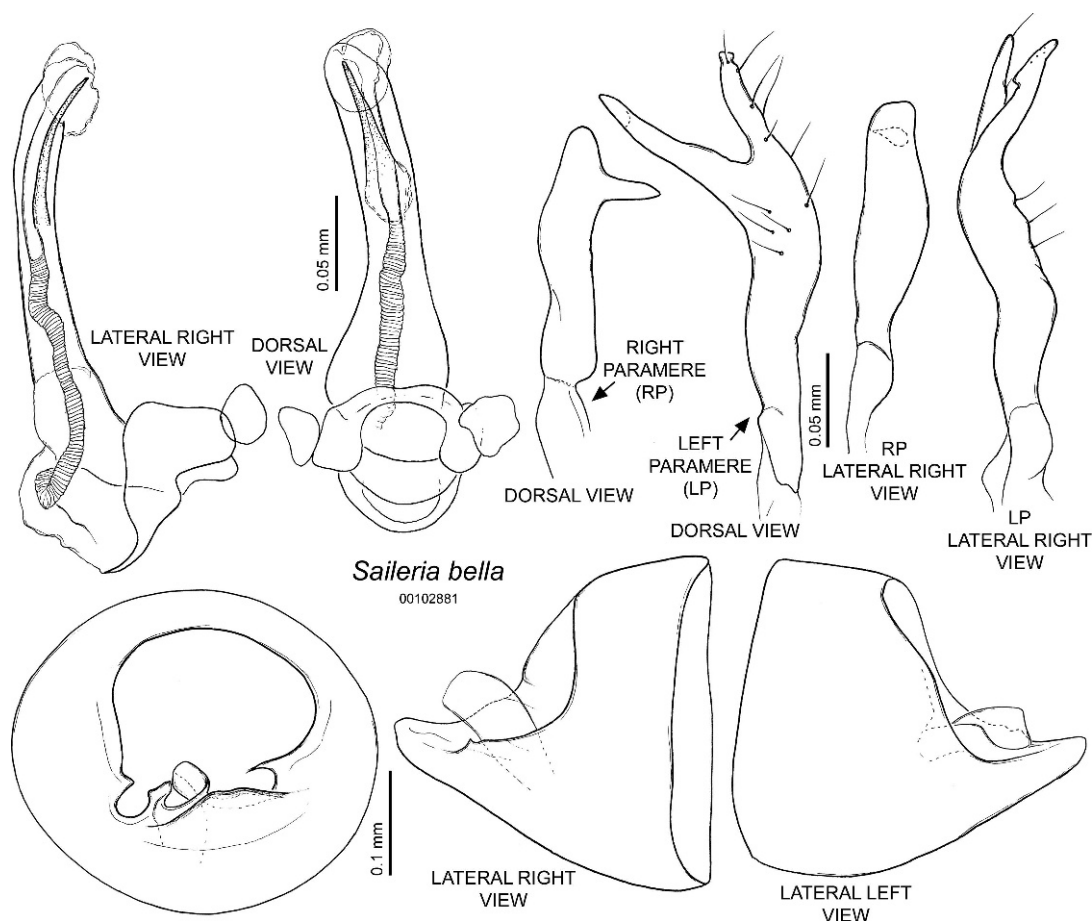


Fig. 20. *Saileria bella*. Male genitalia: vesica, right and left parameres, and genital capsule.

bifurcated, apex notched (fig. 20); right paramere rodlike, with a medially directed projection (fig. 20).

**HOSTS:** *Saileria bella* is associated with *Eriodictyon crassifolium* Benth., *Eriodictyon tomentosum* Benth., and an unidentified species of *Eriodictyon* (Hydrophyllaceae). A few specimens were associated with *Fremontodendron californicum* (Torr.) Coville (Sterculiaceae), and *Rhamnus californica* Eschsch. (Rhamnaceae).

**DISTRIBUTION:** *Saileria bella* is only known from southern California (see below).

**DISCUSSION:** *Saileria bella*, the type species of *Saileria*, has a simple aedeagus, with a single reduced vesical spicule. The other taxa treated in this paper that were previously included in *Saileria* (i.e., *Ch. pamparum*, as “*S.*

*chilena*”, and *P. youngi*, as “*S. youngi*”) show no relationship with *S. bella*, neither regarding head and pronotum structure, nor male genitalia structure. *Saileria mexicana* Carvalho, 1985, has a very similar head and paramere structure (see Carvalho, 1985: figs. 130–132), and thus is probably congeneric with *S. bella*. *Saileria irrorata* Henry, 1976, a species from the eastern United States, has two vesical spicules and slightly different paramere structure (Henry, 1976a, 1980). Head and pronotum structure of *S. irrorata*, nonetheless, is very similar to *S. bella*. Some of the other species of *Saileria* not treated in this paper may not be congeneric with *S. bella* but still be part of the *Zanchius* group (e.g., *S. carmelitana* Carvalho, *S. sulina* Carvalho), whereas others may belong in other



Orthotylini genera (e.g., *S. fluminensis*, which is very similar to *Orthotylus cyanescens* Carvalho).

**SPECIMENS EXAMINED: USA: California:**  
**Monterey Co.:** Lockwood, 35.93667°N 121.08056°W, 24 Jul 1935, R. H. Beamer, 1 ♀ (AMNH\_PBI 00075320) (KU). **Riverside Co.:** 10 mi E of Hemet, San Bernardino National Forest, 33.73813°N 116.838°W, 581 m, 20 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Eriodictyon crassifolium* var. *crassifolium* Benth. (Hydrophyllaceae), det. A. Sanders UCR140621, 52 ♂ (AMNH\_PBI 00102870–AMNH\_PBI 00102890, AMNH\_PBI 00194957–AMNH\_PBI 00194966, AMNH\_PBI 00195000–AMNH\_PBI 00195006, AMNH\_PBI 00195015–AMNH\_PBI 00195025, AMNH\_PBI 00195063–AMNH\_PBI 00195065), 99 ♀ (AMNH\_PBI 00102891–AMNH\_PBI 00102910, AMNH\_PBI 00194967–AMNH\_PBI 00194999, AMNH\_PBI 00195007–AMNH\_PBI 00195014, AMNH\_PBI 00195026–AMNH\_PBI 00195056, AMNH\_PBI 00195066–AMNH\_PBI 00195072) (AMNH). Chino Canyon W of Palm Springs, 33.86444°N 116.57028°W, 11 Apr 1965, Doyen, 1 ♂ (AMNH\_PBI 00080114), 1 ♀ (AMNH\_PBI 00080116) (UCB). Palm Springs, 33.83028°N 116.54444°W, 24 May 1940, R. L. Usinger, 1 ♂ (AMNH\_PBI 00080115), 1 ♀ (AMNH\_PBI 00080117) (UCB). San Jacinto Mountains, 33.75028°N 116.66667°W, 21 Jul 1929, R. H. Beamer, 1 ♀ (AMNH\_PBI 00075319) (KU); 30 Jul 1938, R. I. Sailer, 1 ♀ (AMNH\_PBI 00075318) (KU). San Jacinto River Canyon, San Jacinto Mountains, 33.78389°N 116.95778°W, 30 May 1940, R. L. Usinger, *Eriodictyon* sp. (Hydrophyllaceae), 2 ♂ (AMNH\_PBI 00080110, AMNH\_PBI 00080111), 2 ♀ (AMNH\_PBI 00080112, AMNH\_PBI 00080113) (UCB). **San Bernardino Co.:** just E of Wrightwood on Rt 2, 34.35774°N 117.6105°W, 1700 m, 18 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Fremontodendron californicum* (Torr.) Coville (Sterculiaceae), det. A. Sanders UCR140607, 1 ♂ (AMNH\_PBI 00169937) (AMNH). **San Luis Obispo Co.:** E of Arroyo Grande, Husana Valley, Stony Creek Campground, 35.20933°N 120.25846°W, 09 May 1985, R. T. Schuh and B. M. Massie, *Eriodictyon tomentosum* Benth. (Hydrophyllaceae), 2 ♂ (AMNH\_PBI 00195202, AMNH\_PBI 00195203), 1 ♀ (AMNH\_PBI 00195204)

(AMNH). **Tulare Co.:** NE of Springville on Bear Creek Rd near Scicon, 36.21394°N 118.7716°W, 700 m, 23 May 2004, Schuh, Cassis, Schwartz, Weirauch, Wyniger, Forero, *Rhamnus californica* Eschsch. (Rhamnaceae), det. A. Sanders UCR140642, 4 ♂ (AMNH\_PBI 00194928–AMNH\_PBI 00194931), 13 ♀ (AMNH\_PBI 00194932–AMNH\_PBI 00194944) (AMNH).

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AMNH	American Museum of Natural History, New York, Randall T. Schuh
CNC	Canadian National Collection of Insects, Agriculture Canada, Ottawa, Michael D. Schwartz
IFML	Universidad Nacional de Tucumán, Colección entomológica de la Fundación e Instituto Miguel Lillo, Tucumán, Argentina, Eduardo Domínguez
KU	Kansas University, Zachary H. Falin
MACN	Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina, Arturo Roig-Alsina
MLP	Museo de La Plata, Argentina, Diego Carpintero
MNRJ	Museu Nacional, Universidade Federal do Rio de Janeiro, Brazil, Luiz A. A. Costa
MZH	Finnish Museum of Natural History, Museum of Zoology of Helsinki, Larry Huldén
UCB	University of California at Berkeley, Cheryl Barr
USNM	United States National Museum of Natural History, Washington D.C., Thomas J. Henry and Michele Touchet

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