

REVISION OF THE SOUTH AMERICAN GENUS *BRACHYSTERNUS*
GUÉRIN-MÉNEVILLE (COLEOPTERA: SCARABAEIDAE: RUTELINAE:
ANOPLGNATHINI: BRACHYSTERNINA)

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Abstract

The southern South American genus *Brachysternus* Guérin-Ménéville is revised and now includes seven species: *B. angustus* (Philippi and Philippi), *B. germaini* (Ohaus) **new combination**, *B. marginatus* Germain, *B. olivaceus* Philippi and Philippi, *B. patagoniensis* Jameson and Smith **new species**, *B. prasinus* Guérin-Ménéville, and *B. spectabilis* Erichson. The following species names are **new synonyms** of *B. prasinus*: *B. vicinus* Guérin-Ménéville, *B. sinuatifrons* Germain, *B. pubescens* Germain, *B. viridis* Germain, *B. dilatatus* Germain, *B. viridipes* Ohaus, and *B. hirtus* Ohaus. The following species names are **new synonyms** of *B. olivaceus*: *B. chloris* Philippi and Philippi, *B. riverae* Germain, *B. herbaceus* Germain, and *B. araucanicus* Ohaus. The following names were incorrect: “*B. viridis* Guérin-Ménéville” (*lapsus calami*), “*B. viridis* Laporte” (*lapsus calami*), “*B. viridis* Solier” (incorrect author), and “*B. fulvenscens* Germain” (misapplication). Lectotypes are designated for the following names: *B. araucanicus* Ohaus, *B. chloris* Philippi and Philippi, *B. dilatatus* Germain, *B. fulvipes* Guérin-Ménéville, *B. hirtus* Ohaus, *B. marginatus* Germain, *B. obscurus* Philippi and Philippi, *B. olivaceus* Philippi and Philippi, *B. philippii* Germain, *B. pubescens* Germain, *B. riverae* Germain, *B. spectabilis* Erichson, *B. vicinus* Guérin-Ménéville, *B. viridipes* Ohaus, and *B. viridis* Germain. Neotypes are designated for *B. germaini* (Ohaus) and *B. prasinus* Guérin-Ménéville. Keys to adults, diagnostic characters, descriptions, and distributions are presented.

Resumen

Se revisó el género *Brachysternus* Guérin-Ménéville. Este género, presente al sur de Sudamérica, ahora incluye siete especies: *B. angustus* (Philippi y Philippi), *B. germaini* (Ohaus) **nueva combinación**, *B. marginatus* Germain, *B. olivaceus* Philippi y Philippi, *B. patagoniensis* Jameson y Smith **nueva especie**, *B. prasinus* Guérin-Ménéville, y *B. spectabilis* Erichson. Las siguientes especies son **nuevos sinónimos** de *B. prasinus*: *B. vicinus* Guérin-Ménéville, *B. sinuatifrons* Germain, *B. pubescens* Germain, *B. viridis* Germain, *B. dilatatus* Germain, *B. araucanicus* Ohaus, *B. viridipes* Ohaus, y *B. hirtus* Ohaus. Los siguientes nombres son **nuevos sinónimos** de *B. olivaceus*: *B. chloris* Philippi y Philippi, *B. riverae* Germain, *B. herbaceus* Germain, y *B. araucanicus* Ohaus. Se encontró que los siguientes nombres son incorrectos: “*B. viridis* Guérin-Ménéville” (*lapsus calami*), “*B. viridis* Laporte” (*lapsus calami*), “*B. viridis* Solier” (autor incorrecto), y “*B. fulvenscens* Germain” (nombre aplicado incorrectamente). Se designaron lectotipos para los siguientes nombres: *B. araucanicus* Ohaus, *B. chloris* Philippi y Philippi, *B. dilatatus* Germain, *B. fulvipes* Guérin-Ménéville, *B. hirtus* Ohaus, *B. marginatus* Germain, *B. obscurus* Philippi y Philippi, *B. olivaceus* Philippi y Philippi, *B. philippii* Germain, *B. pubescens* Germain, *B. riverae* Germain, *B. spectabilis* Erichson, *B. vicinus* Guérin-Ménéville, *B. viridipes* Ohaus, y *B. viridis* Germain. Se designaron neotipos para *B. germaini* (Ohaus) y *B. prasinus* Guérin-Ménéville. En este estudio se presentan claves para la identificación de adultos, caracteres diagnóstico, descripciones y distribuciones.

Species in the genus *Brachysternus* Guérin-Ménéville are distinctive members of the scarab subfamily Rutelinae. These bright green, moderately sized (about 2 centimeters) scarabs are commonly observed feeding on *Nothofagus* (Nothofagaceae) trees or congregating at lights at night in mid-elevation forests in southern South America. In Chile, the common name for this insect is “pololos” (beetles), “pololos verdes” (green beetles), “San Juanes,” and “San Juanitos.” Although members of the genus are distinctive, no reliable source has been available for identification of the species. This research provides a revision of species in the genus and discusses the taxonomic history and distribution of the group.

Since the description of the first species in the genus *Brachysternus*, 24 species or subspecies have been included in a genus that, based on our work, includes only seven valid species. This over description of species was brought about due to several factors: 1) lack of communication between concurrent ruteline workers, 2) high intraspecific variation, 3) poor characterization of the species and of related genera that led to taxonomic confusion, 4) paucity of specimens for examination that led to a narrow characterization of species, 5) and a series of taxonomic mistakes that were compounded over 150 years.

The genus *Brachysternus* is characterized by the following: 1) labrum produced vertically with respect to the clypeus, 2) mentum at the apex with a narrow, median process (Fig. 3), 3) elytral margin with a membranous border (Fig. 9), 4) apex of the protibia lacking an apicomedial spur (Fig. 8), 5) male genitalia with well developed ventral and lateral sclerites (Figs. 28–34), 6) last abdominal sternite of the female moderately or deeply emarginate (Figs. 12–13), and 7) generally green or greenish dorsal coloration. The genus is a member of the monophyletic subtribe Brachysternina (tribe Anoplognathini) (see Smith 2002). Although we have demonstrated that the Brachysternina is a monophyletic group, we believe that phylogenetic analyses at the tribal level are needed to address relationships among the orthochilous rutelines: Spodochlamyini, Geniatini, Anoplognathini, and Adoretini. As a result of our continuing studies with the Rutelinae, we have discovered many shared characters between the Geniatini and Anoplognathini. Generally, the Geniatini possess expanded and dorsoventrally flattened tarsomeres (see Jameson [1990] for a key to tribes of Rutelinae) which separates them from the Anoplognathini. However, some taxa within these groups cannot be separated using this character. For example, *Geniatosoma* Costa Lima (Geniatini) lacks expanded and flattened tarsomeres, and *Mimadoretus* Arrow (Anoplognathini) possesses slightly expanded and flattened tarsomeres. Results of phylogenetic analyses of the orthochilous rutelines may substantially revise our understanding of ruteline evolution and biogeography.

This paper is the first in a series of three in this issue of *The Coleopterists Bulletin* that revises the subtribe Brachysternina. The second part is a synopsis of *Hylamorphia* by Ratcliffe and Ocampo (2002). The third part is a revision of *Aulacopalpus* and phylogeny, biogeography, key to genera, and catalog of the Brachysternina by Smith (2002).

Taxonomic History of the Genus *Brachysternus*

Guérin-Ménéville named *Brachysternus* for its short (*brachy*-) mesosternum (*-sternus*) which is not produced beyond the apex of the mesocoxae. The genus was established in 1831 by Guérin-Ménéville in the Atlas of the “*Voyage Autour du Monde. . . La Coquille*” (date verified by Sherborn and Woodward

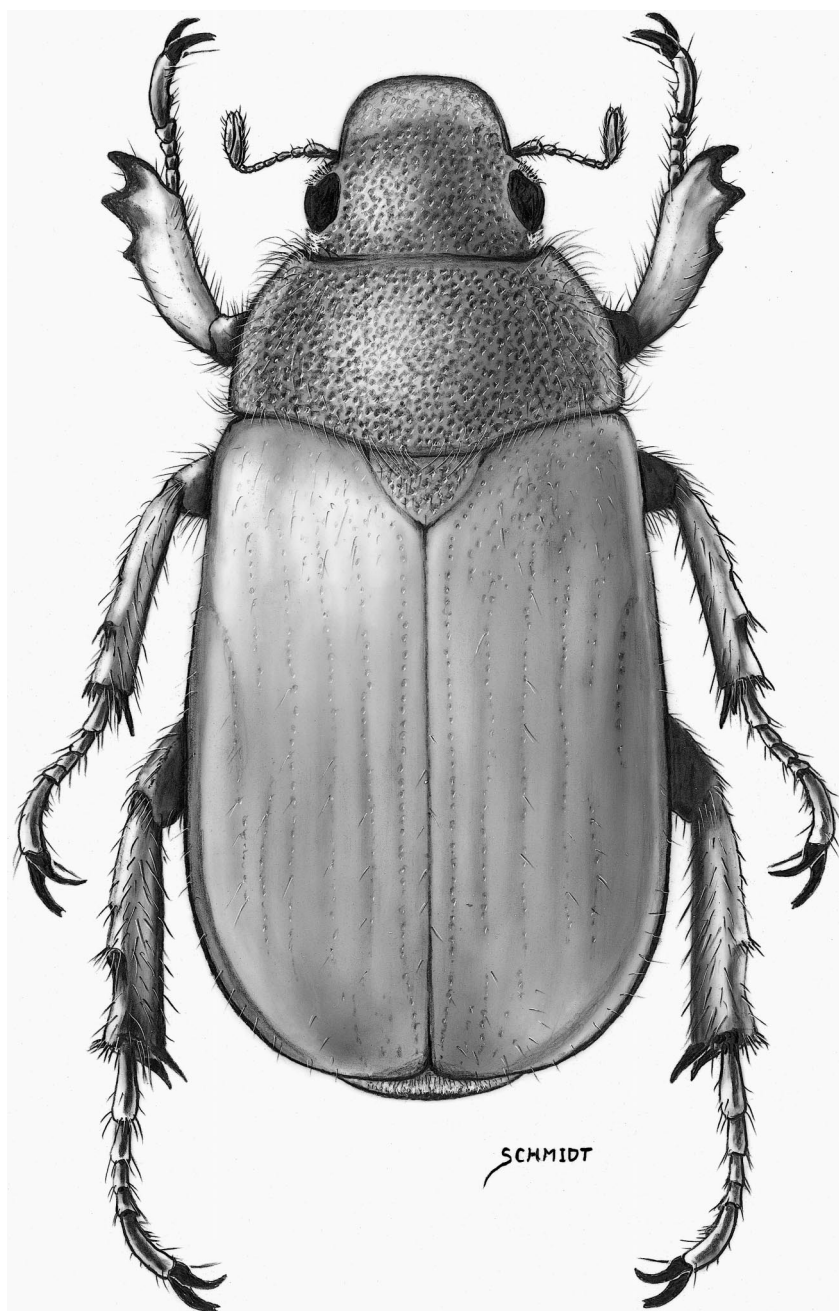


Fig. 1. Dorsal habitus of *Brachysternus prasinus* Guérin-Ménéville, female.

Table 1. The usage of the specific epithet “*viridis*” in the BrachySTEMINA.

Species name and attributed author	Nomenclatural status	Accepted name and previous usage
<i>Aulacopalpus viridis</i> Guérin-Méneville, 1838	valid name	=<i>A. viridis</i> Guérin-Méneville See Smith 2002 for a full account of this taxon.
<i>Aulacopalpus viridis</i> Burmeister, 1844	<i>lapsus calami</i> , unavailable name	=<i>Hylamorpha elegans</i> (Burmeister) Arrow (1899) mistakenly used this name when transferring the name <i>Aulacopalpus elegans</i> to <i>Hylamorpha</i> .
<i>Hylamorpha viridis</i> (Burmeister, 1844)	<i>lapsus calami</i> , unavailable name	=<i>Hylamorpha elegans</i> (Burmeister) Machatschke (1972) erroneously used the name as the type species for <i>Hylamorpha</i> .
<i>Brachysternus viridis</i> Guérin-Méneville, 1831	<i>lapsus calami</i> , unavailable name	=<i>B. prasinus</i> Guérin-Méneville First used mistakenly by Laporte (1840) who intended to redescribe <i>B. prasinus</i> .
<i>Brachysternus viridis</i> Laporte, 1840	<i>lapsus calami</i> , unavailable name	=<i>B. prasinus</i> Guérin-Méneville First used by Ohaus (1918) who referred to the name as a synonym of <i>B. prasinus</i> .
<i>Brachysternus viridis</i> Solier, 1851	available, invalid name, incorrect author	=<i>B. prasinus</i> Guérin-Méneville First used mistakenly by Germain (1905) who believed that Solier should be credited with the description of a new species (<i>B. viridis</i>) which Germain thought to be distinct from <i>B. prasinus</i> . Germain described “ <i>B. viridis sensu Solier</i> ” as distinct from <i>B. prasinus</i> and entered the name into nomenclature as an available name. Germain should be credited as the author of this name.
<i>Brachysternus viridis</i> Germain, 1905	available, invalid name	=<i>B. prasinus</i> Guérin-Méneville See <i>B. prasinus</i> “Remarks” section for a full account of this taxon.

[1906], Cowan [1970], and Britton [2000]). This publication consists of a series of plates illustrating species that were not formally described until 1838 (Guérin-Méneville 1838b). Because the 1831 publication contained the name *Brachysternus prasinus* in association with an illustration, this made available, by indication, the genus *Brachysternus* and the species *B. prasinus* Guérin-Méneville under Article 12.2.7 of the rules of nomenclature (International Commission on Zoological Nomenclature 1999). Guérin-Méneville (1831) placed only one species, *B. prasinus*, in the genus. The text of the “*Voyage Autour du Monde. . . La Coquille*” was dated 1830 but actually was published in 1838 (see Sherborn and Woodward [1906] and Cowan [1970]). In the “*Iconographie du Règne Animal*,” Guérin-Méneville (1844) discussed *B. prasinus*, and he noted that Dejean (1833, 1836) had used the name “*Epichloris prasina*” for the same taxon. Dejean did not describe the species and, because he attributed the species name “*prasina*” to a collection (that of d’Urville [see Horn and Kahle 1936]) rather than to Guérin-Méneville (or other published author), the generic name “*Epichloris*” Dejean is a *nomen nudum* (unavailable name). In two editions of the same catalog, Dejean (1833, 1836) used the generic name “*Brachysternus*” (attributing himself as the author) and listed one species from Cayenne, “*B. subsulcatus*” Dejean. However, the species “*B. subsulcatus*” Dejean was never described. Thus Dejean’s generic and specific names are both *nomina nuda*.

Thirty years after Guérin-Méneville’s description of the first species in the taxon, there were eight species in the genus *Brachysternus* and four available generic names in the subtribe Brachysternina (*Brachysternus*, *Bembegeneius* Solier, *Aulacopalpus* Guérin-Méneville, and *Tribostethes* Curtis). Solier (1851) and Philippi and Philippi (1864) were the earliest to attempt synopses of these taxa. Although both papers were primarily concerned with the fauna of Chile, these works provided a synopsis of the literature and demonstrated some of the taxonomic confusion within the group at the generic level.

In addition to generic concepts in the Brachysternina being poorly defined, the classification of the group has also been embroiled in confusion due to a series of mistakes that were repeated and compounded. Several historical workers have fancied the specific epithet “*viridis*” for various brachysternine species, and this began the confusion. The specific epithet is used (correctly or incorrectly) for species in the genera *Brachysternus*, *Aulacopalpus*, and *Hylamorpha*. Because the generic concepts were so poorly defined, and because the specific epithet was used simultaneously in all genera, the application of “*viridis*” was a source of much taxonomic confusion (see Table 1). In addition, “*viridis*” was used mistakenly (*lapsus calami*, invalid, unavailable name) in *Brachysternus* and *Hylamorpha*. In *Brachysternus*, the problems began when Laporte (1840) mistakenly used the specific epithet “*viridis*” when intending to refer to *B. prasinus* Guérin-Méneville. Arrow (1899) mistakenly referred to *Aulacopalpus* “*viridis*” Burmeister rather than *Aulacopalpus elegans* Burmeister (= *Hylamorpha elegans*) when transferring the taxon into the genus *Hylamorpha*, thus creating the unavailable name *Hylamorpha* “*viridis*.” Many of the mistakes were repeated to this day and in several forms. For additional discussion of the use of “*viridis*,” see the “Remarks” section in the species treatment of *B. prasinus*.

In 1905, separate synopses of the genus *Brachysternus* were published nearly concurrently by Philibert Germain (from Chile) and Friedrich Ohaus (from Germany). Germain’s work (dated November/December 1904 but not published until 1905 [see Blackwelder 1944]) was published before Ohaus’s work.

Therefore, Germain's work (early 1905) has nomenclatorial priority over Ohaus's work (November 1905). It appears to us that this complication arose primarily due to difficulty in communication (because of distant geographical locations that separated Germain and Ohaus). According to Ohaus (1909), he made two attempts to contact Philippi (presumably Friedrich Philippi rather than Rudolph Philippi since the latter died at the age of 96 in 1904), but his letters went unanswered. Ohaus had completed a taxonomic work on the Australian Anoplognathini (Ohaus 1904), and a natural extension of this work was research on the American Anoplognathini, including the Brachysternina. During a trip to Brazil in December 1904, Ohaus finally received a response from Philippi. Philippi stated that Ohaus's letters had been misplaced, and they had only recently reached him. He also informed Ohaus that the Chilean brachysternines had just been reviewed by Philibert Germain who had been working on the group "for a long time." In April 1905, Ohaus visited the museum in Santiago, Chile and was able to see Germain's work and examine his specimens. By this time, Ohaus's manuscript on the brachysternines had also been "published" (it was probably in press). Thus, Ohaus's and Germain's works were published nearly concurrently but without either having knowledge of the other's work. The two taxonomists were able to partially rectify this mishap through a lengthy correspondence. As a result, Germain sent his material to Germany for Ohaus to study. Ohaus (1909) then published a "supplement and emendation" of his revision of the Brachysternina in which he incorporated Germain's names and corrected several mistakes.

Ohaus (1909) stated that he hoped he had "succeeded in bringing clarity to the very confused systematics of the Brachysternidae." However, due to a paucity of specimens and little label data in the early 1900s, it was difficult for either Germain or Ohaus to properly revise the Brachysternina. As such, the species in the group have remained unidentifiable and taxonomically confused. Nothing significant has been published on the genus *Brachysternus* for nearly a century. We now have access to hundreds of specimens of *Brachysternus*, many with excellent locality data, and this has enabled us to elucidate and resolve some of the taxonomic problems in the group.

Specimens and Taxonomic Material

Specimens examined for this study were provided by 30 institutions and private collections. A total of 1336 specimens, including type specimens, formed the basis of this research. Acronyms for loaning institutions follow Samuelson *et al.* (2001).

ABTS	Andrew B. T. Smith Collection, Lincoln, NE
AMNH	American Museum of Natural History, New York, NY (Lee Herman)
BCRC	Brett C. Ratcliffe Collection, Lincoln, NE
BMNH	The Natural History Museum, London, England (Malcolm Kerley)
CASC	California Academy of Sciences, San Francisco, CA (Roberta Brett)
CMNC	Canadian Museum of Nature, Ottawa, ON, Canada (François Génier, Bob Anderson)
CMNH	Carnegie Museum of Natural History, Pittsburgh, PA (Robert Davidson)

CNCI	Canadian National Collection of Insects, Ottawa, ON, Canada (Yves Bousquet)
FMNH	Field Museum of Natural History, Chicago, IL (Al Newton, Philip Parrillo)
FSCA	Florida State Collection of Arthropods, Gainesville, FL (Mike Thomas, Brenda Beck)
GASC	Gerardo Arriagada S. Collection, Santiago, Chile
JMEC	José Mondaca E. Collection, Santiago, Chile
KSUC	Kansas State University, Manhattan, KS (Ralph Charlton)
LACM	Insect Collection, Los Angeles County Museum of Natural History, Los Angeles, CA (Brian Brown)
MABC	Marcos A. Beeche Collection, Santiago, Chile
MCZC	Museum of Comparative Zoology, Harvard University, Cambridge, MA (Philip Perkins)
MGFT	Georg Frey Collection, Naturhistorisches Museum Basel, Switzerland (Daniel Burckhardt)
MIZA	Museo del Instituto de Zoología Agrícola "Francisco Fernández Yépez," Universidad Central de Venezuela, Maracay, Venezuela (Luis Joly)
MLJC	Mary Liz Jameson Collection, Lincoln, NE
MNHN	Museum National d'Histoire Naturelle, Paris, France (Olivier Montreuil, Jean Menier)
MNNC	Museo Nacional de Historia Natural, Santiago, Chile (Mario Elgueta)
OSAC	Oregon State University, Corvallis, OR (Darlene Judd)
PVGH	Pedro Vidal Collection, Santiago, Chile
SEMC	Snow Entomological Museum, University of Kansas, Lawrence, KS (Steve Ashe)
UMRM	W. R. Enns Entomology Museum, University of Missouri, Columbia, MO (Robert Sites)
UNSM	University of Nebraska State Museum, Lincoln, NE
USNM	United States National Museum, Washington, D.C. (Dave Furth, Gloria House)
VMDM	V. Manuel Diéguez M. Collection, Santiago, Chile
ZMHB	Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany (Hella Wendt)
ZMUH	Zoologisches Institut und Zoologisches Museum der Universität Hamburg, Hamburg, Germany (Rudolf Abraham)

Definition of Taxonomic Characters and Character Examination

Internal and external morphological characters formed the basis of this work. Specimens were examined using a dissecting microscope (6.5 to 50×) and fiber-optic lights. For measurements, we used an ocular micrometer. Internal sclerotized structures were dissected by relaxing the specimen in hot water. Heavily sclerotized parts were soaked in a dilute solution (about 15%) of potassium hydroxide and neutralized in a dilute solution (about 15%) of acetic acid. Mouthparts, wings, and genitalia were studied and card-mounted or placed in a glycerin-filled vial beneath the specimen.

In the past, species of *Brachysternus* were characterized based on color, punctuation, distribution of setae, and types of setae. We found that any one of these characters alone is not reliable for species identification due to a great

amount of variation within species. Past workers relied heavily on color for species identification, but we found that color is not reliable. Color is often affected by preservation methods or due to sclerotization of the specimen. Ohaus (1909) attributed a bright yellow-green color to “younger” (teneral) specimens, and he believed that several color variants could be attributed to various collecting fluids: “in sugary alcohol (usually Schnapps) the green color will change into a light dirty brown. In mercuric chloride vapor the green will turn to cobalt blue, and in ammonia vapor it will transform into brick red.”

The evolutionary species concept (Wiley 1981) was applied in this work. Within species, there is a great deal of intraspecific variation, but constancy of combined characters indicates that individuals are part of the same species lineage. Species were recognized based on a constancy of states in morphological characters *and* combinations of states in morphological characters. We characterized species based on characters including form of the clypeus, legs, claws, elytra, pygidium, and mesometasternal peg; punctation and setal patterns of the head, pronotum, elytra, propygidium, pygidium, and venter; and form of the male parameres. Form of the ventral and lateral sclerites (ventral view) and form of the parameres (lateral and caudal views) are useful guideposts for diagnoses. However, we caution the user to be aware that variation is found even in the form of the male parameres, ventral sclerite, and lateral sclerites (*e.g.*, Figs. 31–33). Within some scarab groups, form of the parameres does not vary within a species, but this is not the case with species of *Brachysternus*.

The following standards were used for characters:

Body Length. Measured from the apex of the clypeus to the apex of the elytra.

Widest Body Width. Measured at base of the elytra.

Puncture Density. Defined as dense if punctures are nearly confluent to less than two puncture diameters apart, moderately dense if punctures are between two to six puncture diameters apart, and sparse if punctures are separated by more than six puncture diameters.

Puncture Size. Defined as small if 0.03 mm or smaller, moderate if 0.03–0.08 mm, moderately large if 0.08–0.17 mm, and large if 0.17 mm or larger.

Length of Setae. Defined as minute if less than 0.2 mm, short if between 0.2–0.5 mm, moderately long if between 0.5–1.0 mm, and long if between 1.0–2.0 mm.

Type of Setae. Defined as “hair-like” if slender and erect (Fig. 11c), “thickened” if slightly thick and erect or partially decumbent (Fig. 11b), and “scale-like” if broad, flat, and decumbent (Fig. 11a). Setae are subject to wear and may be abraded.

Interocular Width. The number of eye diameters (measured in dorsal view) that span the width of the frons.

Elytral Sutural Length. Measured from the base of the elytral suture to apex.

Female Terminal Sclerite. Defined as deeply emarginated at the middle apex (Fig. 12) or moderately emarginated (Fig. 13).

Elytral Apical Umbone. The elevated ridge located near the apex of the elytra that is either well developed or poorly developed.

Color. Described based on specimens that are viewed with magnification and illumination. Note the preceding comments regarding color and preservation methods.

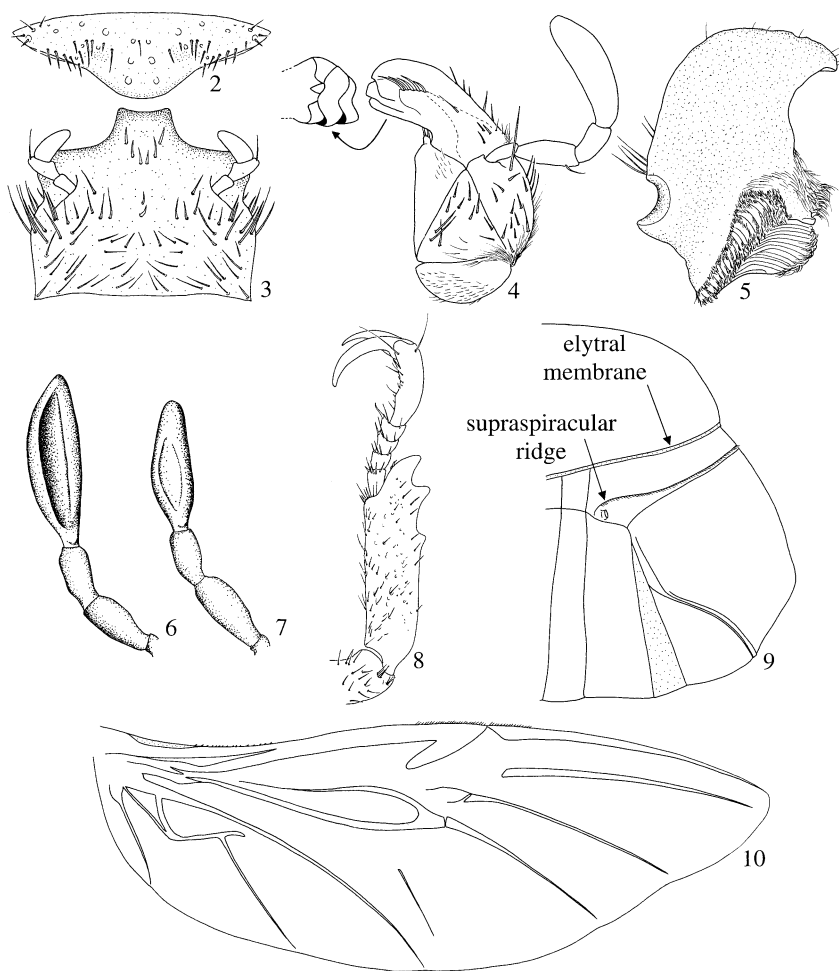
Designation of Lectotypes and Neotypes

The International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature 1999) requires that designations of lectotypes after 1999 must "contain an express statement of the taxonomic purpose of the designation" (74.7.3). Within the genus *Brachysternus*, we designate several lectotypes in order to preserve the stability of nomenclature by selecting one specimen as the sole name-bearing type of the taxon. The lectotype specimen serves to tie the published name to an actual specimen and as a reference standard for the taxon. We include all label data for lectotype specimens within descriptions. Lectotype specimens are herein designated for the following species names: *B. araucanicus* Ohaus, *B. chloris* Philippi and Philippi, *B. dilitatus* Germain, *B. fulvipes* Guérin-Meneville, *B. hirtus* Ohaus, *B. marginatus* Germain, *B. obscurus* Philippi and Philippi, *B. olivaceus* Philippi and Philippi, *B. philippii* Germain, *B. pubescens* Germain, *B. riverae* Germain, *B. spectabilis* Erichson, *B. vicinus* Guérin-Ménéville, *B. viridipes* Ohaus, and *B. viridis* Germain.

The International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature 1999) requires that a neotype "is validly designated when there is an exceptional need and only when that need is stated expressly" (75.3). The neotype specimen serves to tie the published name to an actual specimen and as a reference standard for the taxon. We designated neotypes for *B. germaini* (Ohaus) and *B. prasinus* Guérin-Ménéville in order to preserve the stability of nomenclature by selecting a name-bearing type specimen for each taxon because the original name-bearing type specimens were lost or destroyed. We feel that neotype specimens are necessary for these names due to the long history of taxonomic confusion of species and names in the genus *Brachysternus* and in the subtribe Brachysternina. Other qualifying conditions for designating valid neotypes in section 75.3 of the code (International Commission on Zoological Nomenclature 1999) are satisfied in the discussion and description of the species.

Natural History

Brachysternus species are inhabitants of *Nothofagus* forests that are sometimes mixed with *Araucaria* (Araucariaceae), *Saxegothaea* (Pinaceae), *Drimys* (Winteraceae), and/or *Chusquea* (Poaceae) species. Label data indicate that specimens were collected in remnant forest and selectively cut forest. Most species are abundant from November to February. Adults have been observed flying at dusk near *Nothofagus* trees. Specimens have also been collected at lights at night, under logs, in flight intercept traps, and using a method referred to as "car netting." Despite the abundance of several species of *Brachysternus* in collections, nothing is known of the biology and life cycle of any of the species. We hypothesize that larvae feed on decaying wood and vegetation, similar to other ruteline larvae.



Figs. 2–10. Generic characteristics of *Brachysternus*. Mouthparts of *B. angustus*: **2)** Frontal view of the labrum; **3)** ventral view of the mentum; **4)** ventral view of left maxilla and mesal view of maxillary teeth; **5)** dorsal view of left mandible; **6)** dorsal view of maxillary palpus of *B. germaini* (male) and **7)** *B. spectabilis* (male); **8)** prothoracic leg of *B. prasinus* (male) showing femur with apex weakly rounded and dilated, base of tibia with weak protibial notch, and form; **9)** lateral view of the apex of the abdomen in *B. prasinus* (male) showing supraspiracular ridge and elytral membrane; **10)** hind wing of *B. patagoniensis* showing distribution of wing pegs, setae, and venation.

Key to the Species of *Brachysternus*

Male *Brachysternus* species are characterized by having the apex of the terminal sternite quadrate; females are characterized by having the apex of the terminal sternite moderately to deeply emarginate (Figs. 12–13).

- 1 Larger protarsal claw appearing simple (claw of male with or without weak, apical nib in frontal view [Fig. 25, inset]; claw of female simple [Fig. 27]). Tarsomere 5 without ventromedial tooth (Fig. 25) *B. germaini* (Ohaus)
- 1' Larger protarsal claw split or toothed (claw of male split at apex in frontal view [Figs. 22–24]; claw of female toothed in dorsal view [Fig. 26]). Tarsomere 5 with ventromedial tooth (Fig. 22–24, 26) 2
- 2 Margin of elytron in ventral view with epipleuron expanded (Fig. 14) *B. marginatus* Germain
- 2' Margin of elytron in ventral view with epipleuron not expanded (Fig. 15) 3
- 3 Metatibia with inner and outer edges bowed, widest at middle (male; Fig. 19) or with inner edge bowed (female). Clypeus with weak basal constriction (Fig. 21). Elytral margin with dense, long, hair-like setae (Fig. 11c) *B. patagoniensis* Jameson and Smith, n. sp.
- 3' Metatibia with inner edge straight, not bowed, widest at apex (e.g., Figs. 16–18). Clypeus without basal constriction (e.g., Fig. 20). Elytral margin with short or moderately long, thickened or scale-like setae (Fig. 11a, b) 4
- 4 Pygidium at basolateral margins with thickened or scale-like setae (Fig. 11a–b). Apex of terminal sternite in female deeply emarginate (Fig. 12). Antennal club subequal in length to segments 1–7 (male and female) 5
- 4' Pygidium at basolateral margins with thickened and hair-like setae (Fig. 11b–c), lacking scale-like setae. Apex of terminal sternite in female moderately emarginate (Fig. 13). Antennal club slightly longer than segments 1–7 (male) *B. olivaceus* (Philippi and Philippi)
- 5 Sternites densely clothed with scale-like setae (sometimes only along lateral edges) (Fig. 11a). Elytron with apical umbone well developed *B. angustus* Philippi and Philippi
- 5' Sternites with moderately dense, thickened setae (Fig. 11b). Elytron with apical umbone poorly developed 6
- 6 Region posterior to eye with scale-like setae (Figs. 11a, 20). Clypeus of male and female tan or castaneous. Meso- and metafemora and meso- and metatibia testaceous with green sheen *B. prasinus* Guérin-Ménéville
- 6' Region posterior to eye with thickened setae (Fig. 11b). Clypeus of female castaneous; clypeus of male green. Meso- and metafemora and meso- and metatibia testaceous, lacking green sheen (sometimes with weak greenish reflections) *B. spectabilis* Erichson

Clave para las Especies de *Brachysternus*

Los machos de las especies de *Brachysternus* se caracterizan por tener el ápice del esternito terminal cuadrado; las hembras se caracterizan por tener el ápice del esternito terminal moderadamente o profundamente emarginado (Figs. 12–13).

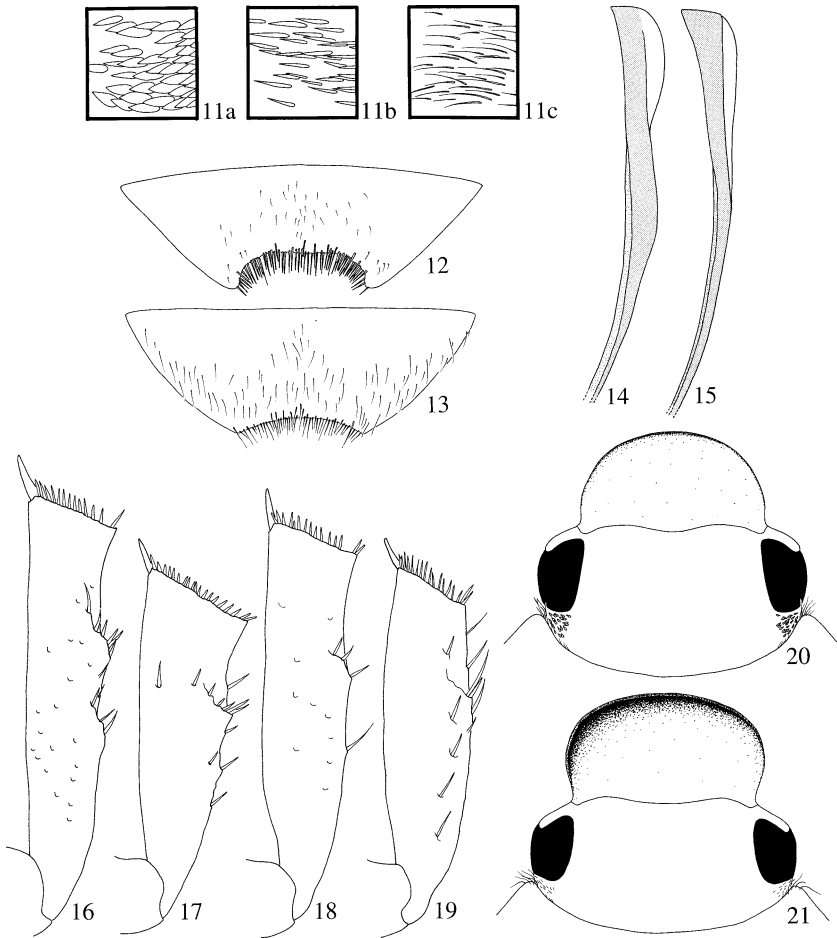
- 1 Uña mas grande del protarso simple (uña del macho con o sin dientecillo

- vestigial apical [en Fig. 25]; uña de la hembra simple [Fig. 27]). Tarsómero 5 sin diente medio interno (Fig. 25) *B. germaini* (Ohaus)
- 1' Uña mas grande del protarso dividida o dentada (uña del macho dividida en el ápice en vista frontal [Figs. 22–24]; uña de la hembra dentada en vista dorsal [Fig. 26]). Tarsómero 5 con diente medio interno (Figs. 22–24, 26) 2
- 2 Margen del élitro con epipleuro expandido en vista ventral (Fig. 14) *B. marginatus* Germain
- 2' Margen del élitro sin epipleuro expandido en vista ventral (Fig. 15) 3
- 3 Metatibia con márgenes interno y externos arqueados, más ancha en el medio (macho; Fig. 19) o con el margen interno arqueado (hembra). Clípeo con ligera constricción en la base (Fig. 21). Margen del élitro con muchas setas largas semejantes a pelos (Fig. 11c) *B. patagoniensis* Jameson and Smith, n. sp.
- 3' Metatibia con margen interno recto, no arqueado, más ancha en el ápice (ej., Figs. 16–18). Clípeo sin constricción en la base (ej., Fig. 20). Margen del élitro con setas cortas o moderadamente largas, gruesas o semejantes a escamas (Fig. 11a, b) 4
- 4 Pigidio con gruesas setas semejantes a escamas en el margen basolateral (Fig. 11a–b). Apice del esternito terminal de la hembra profundamente emarginado. (Fig. 12). Clava de la antena subigual en largo a los segmentos 1–7 (hembra y macho) 5
- 4' Pigidio con gruesas setas semejantes a pelos en el margen basolateral (Fig. 11b–c), sin setas semejantes a escamas. Apice del esternito terminal en la hembra moderadamente emarginado (Fig. 13). Clava de la antena ligeramente mas larga que los segmentos 1–7 (macho). *B. olivaceus* (Philippi and Philippi)
- 5 Esternitos densamente revestidos de setas semejantes a escamas (a veces sólo en los márgenes laterales) (Fig. 11a). Elitro con el umbón apical bien desarrollado *B. angustus* Philippi and Philippi
- 5' Esternitos con moderadamente densa cobertura de setas gruesas (Fig. 11b). Elitro con umbón apical pobremente desarrollado 6
- 6 Región posterior del ojo con setas semejantes a escamas (Figs. 11a, 20). Clípeo del macho y de la hembra marrón o castáneo. Meso- y metafémures y meso- y metatibias testáceos con reflejos verdes *B. prasinus* Guérin-Ménéville
- 6' Región posterior del ojo con setas gruesas (Fig. 11b). Clípeo de la hembra castáneo; clípeo del macho verde. Meso- y metafémures y meso- y metatibias testáceos sin verde (a veces con ligero reflejo verdoso) *B. spectabilis* Erichson

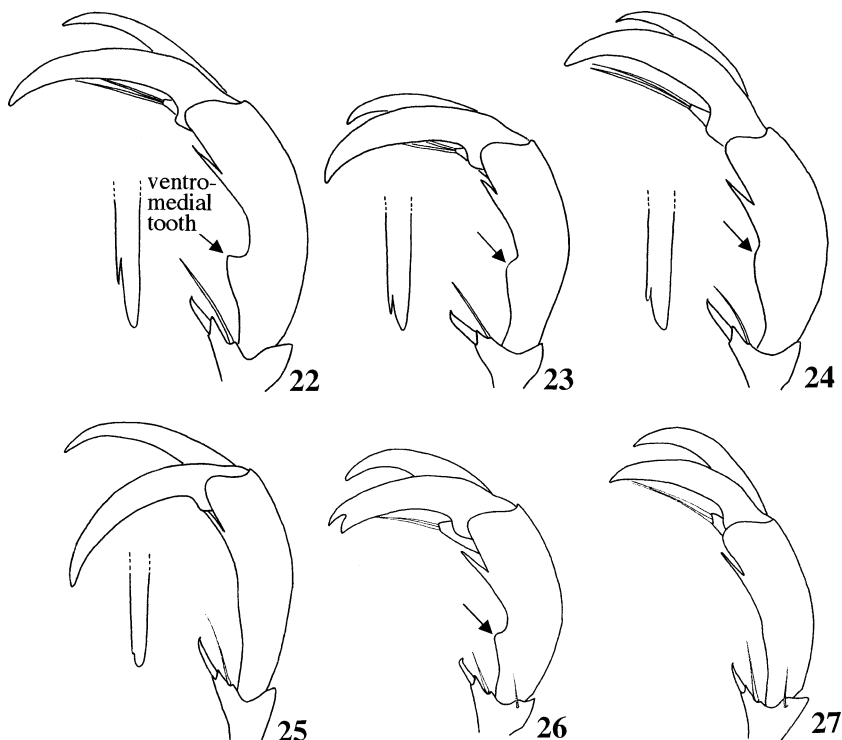
Genus *Brachysternus* Guérin-Ménéville, 1831
(Figs. 1–38; see also Fig. 1 in Smith 2002)

Brachysternus Guérin-Ménéville 1831:3. Type species *Brachysternus prasinus* Guérin-Ménéville, 1831 (by monotypy).

Description. Scarabaeidae, Rutelinae, Anoplognathini. *Form* (Fig. 1): Elongate oval, sides subparallel, pygidium exposed beyond apices of elytra, apex of elytra broadly rounded. Length from apex of clypeus to apex of elytra 16.0–25.0 mm; width at base of elytra 7.0–12.0 mm. Dorsal color variable hues of green (metallic or opaque), castaneous with metallic green shine, or bluish-green. *Head:* Disc of frons and clypeus in lateral view nearly flat or weakly convex (more convex in males). Clypeal apex semi-

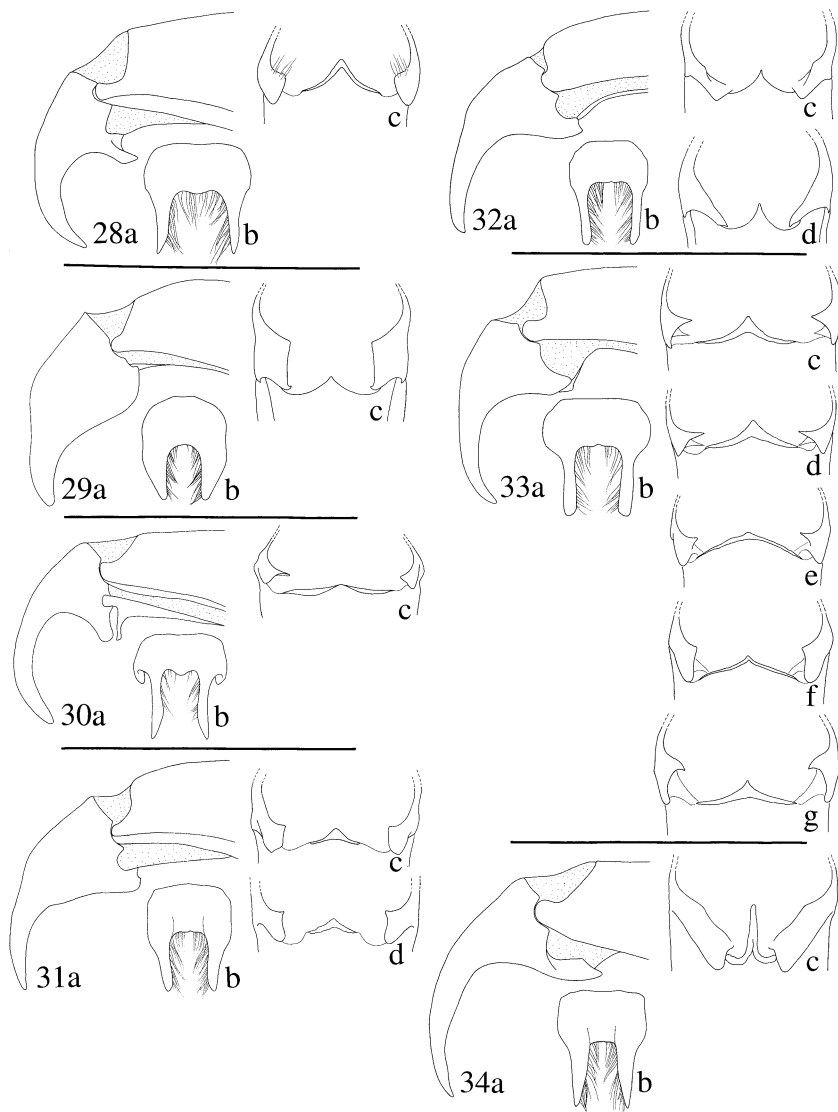


Figs. 11–21. Characteristics of *Brachysternus* species. Setal types in *Brachysternus* species: **11a**) scale-like setae (pygidium of *B. prasinus*); **11b**) thickened setae (pygidium of *B. olivaceus*); **11c**) hair-like setae (pygidium of *B. patagoniensis*). Apex of the terminal sternite in the female (ventral view): **12**) deeply emarginate (*B. angustus*); **13**) moderately emarginate (*B. olivaceus*). Elytral epipleuron (ventral view) showing: **14**) margin expanded from metacoxa to second sternite (*B. marginatus*); **15**) margin not expanded (*B. prasinus*). Metatibia (ventral view) of: **16**) *B. spectabilis* (male); **17**) *B. angustus* (female); **18**) *B. angustus* (male); **19**) *B. patagoniensis* (male). Head (dorsal view) showing: **20**) clypeus not constricted at the base and scale-like setae posterior to the eye (*B. prasinus*); **21**) clypeus weakly constricted at the base and hair-like setae posterior to the eye (*B. patagoniensis*).



Figs. 22–27. Form of the fourth and fifth protarsomeres (dorsomedial view) with inset of the apex of male larger claw (frontal view): **22)** *B. olivaceus* (male); **23)** *B. angustus* (male); **24)** *B. patagoniensis* (male); **25)** *B. germaini* (male); **26)** *B. spectabilis* (female); **27)** *B. germaini* (female).

circular to rectangular with broadly rounded corners, weakly constricted at base or not; margins and apex weakly or broadly reflexed (more reflexed in males). Frons and clypeus variably punctate, some punctures setose; setae short to long, slender or thick, white to orange, variable in density. Frontoclypeal suture complete, weakly bisinuate. Eye canthus narrow, poorly developed, not cariniform. Interocular width 2.0–6.0 transverse eye diameters. Region posterior to eye with or without thickened or scale-like setae. Mandibles (Fig. 5) with external margin rounded, with 1 inner tooth; molar region broad. Labrum (Fig. 2) vertically produced with respect to clypeus, with well-defined medial tooth, apex broadly rounded. Maxilla (Fig. 4) with 6 poorly defined contiguous teeth in an arch, mesal side forming an inner concavity; palpus 4-segmented, terminal segment (in dorsal view) flattened, weakly or deeply sulcate, cylindrical or bean-shaped, 1.5 times longer than segments 2–3 or subequal to segments 2–3. Mentum (Fig. 3) with well-defined medial tooth, apex quadrate; palpus 3-segmented. Antenna 10-segmented with 3-segmented club; club subequal to slightly longer than segments 1–7 combined (male) or subequal to segments 2–7 combined (female). *Pronotum*: Form widest at middle, weakly protuberant at mid-base, basolateral angle quadrate or feebly produced. Surface with variably impressed, median, longitudinal groove and variably punctate, some punctures setose; setae short to long, slender or thick, white to orange, variable in density. Marginal bead complete laterally, incomplete basally (to slightly beyond posteriolateral angle or



Figs. 28–34. Form of the male genitalia in *Brachysternus* species (lateral view of parameres and apex of phallobase, caudal view of parameres, and ventral view of ventral and lateral sclerites). **28a–c)** *Brachysternus angustus*; **29a–c)** *B. germaini*; **30a–c)** *B. marginatus*; **31a–d)** *B. olivaceus*; **32a–d)** *B. patagoniensis*; **33a–g)** *B. prasinus*; **34a–c)** *B. spectabilis*.

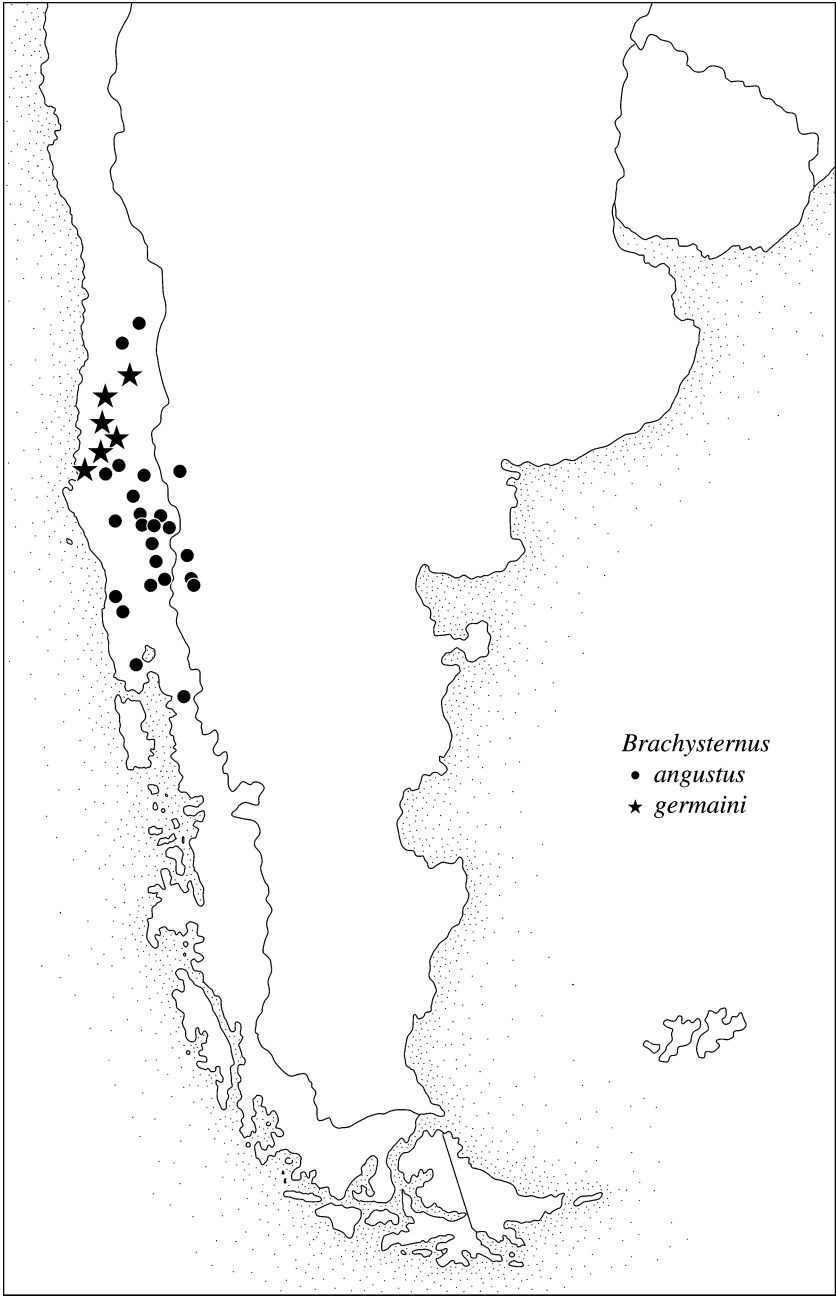


Fig. 35. Map showing the distribution of *B. angustus* and *B. germaini* in southern South America.

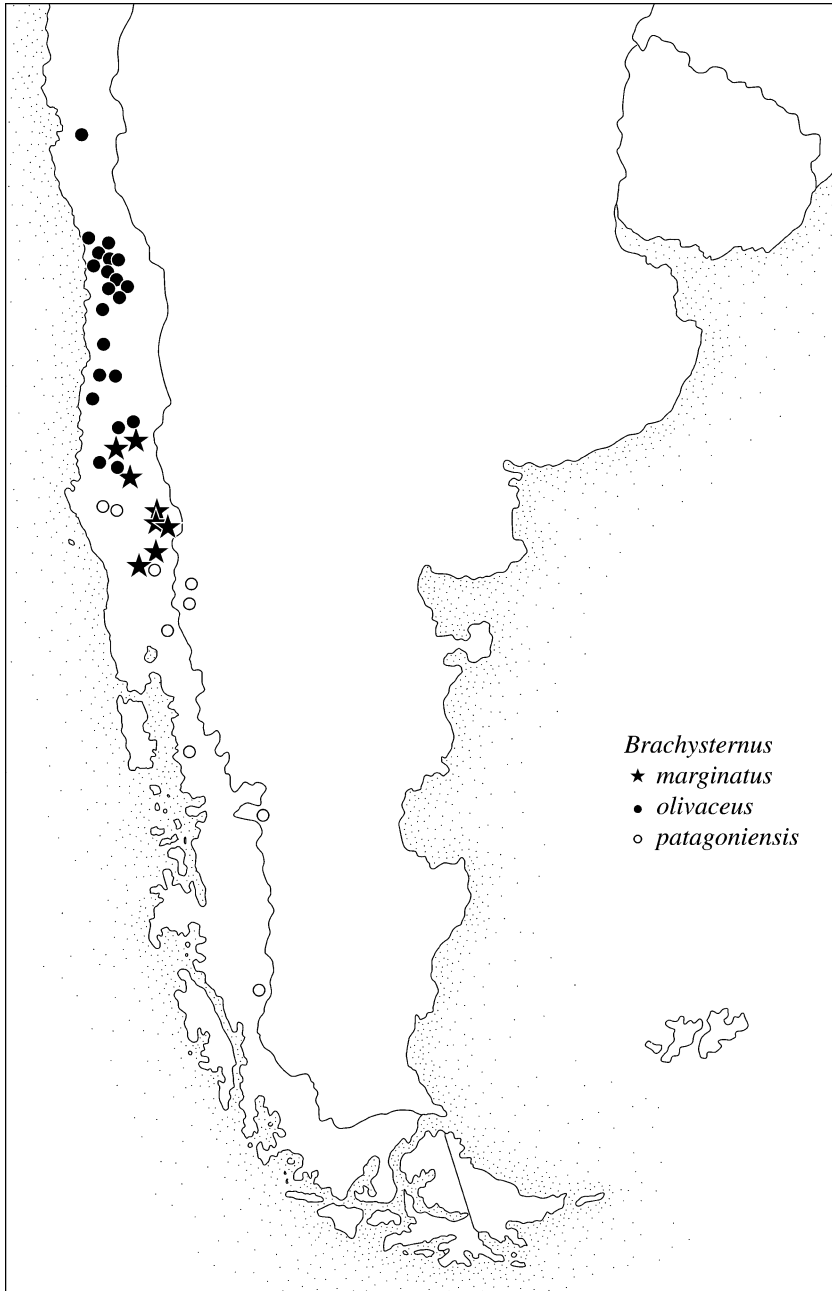


Fig. 36. Map showing the distribution of *B. marginatus*, *B. olivaceus*, and *B. patagoniensis* in southern South America.

to middle of pronotum), lacking anteriorly. *Scutellum*: Shape parabolic, wider than long; base declivous at elytral base. Variably punctate, some punctures setose; setae short to long, slender or thick, white to orange, variable in density. *Mesepimeron*: Apex entirely hidden by base of elytra in dorsal view. *Elytron*: Surface with 4–6 weakly impressed, punctate striae; intervals variably punctate, some punctures setose; setae short to long, slender or thick, white to orange, variable in density. Epipleuron rounded or flat, expanded or not from metacoxa to sternite 2, region from base to sternite 2 with or without bead; region from metacoxa to apex setose or not. Apex of elytron weakly rounded. Sutural angle square or weakly rounded. Elytral sutural length 9.0–11.0 times length of scutellum. *Propygidium*: Hidden or weakly exposed; posterior margin with a fringe of setae; setae short to long, slender or thick, white to orangish. Supraspiracular ridge well-defined or indicated by a line (Fig. 9). *Pygidium*: Variably sculptured and setose, disc of male convex, disc of female weakly convex or concave; setae short to long, slender or thick, white to orangish, variably dense; margins beaded; apex rounded or quadrate. *Venter*: Castaneous or testaceous in color, variably clothed with setae; setae short to long, slender or thick, white to orangish, variably dense. Prosternal keel broadly triangular; apex projecting anteriorly at about 45° with respect to ventral plane; apex produced to about level of prothorax, blunt. Mesometasternum with apex weakly produced (quadrate or rounded) or not produced. Abdominal sternites 1–4 subequal in width in male and female. Last sternite of male with subapex weakly sinuate, with fringe of setae, apex quadrate. Last sternite of female moderately or deeply emarginated at middle (Figs. 12–13). *Legs*: Profemur with apex weakly rounded and dilated (Fig. 8). Protibia (Fig. 8) with 3 teeth in apical half, basal tooth weakly removed from apical teeth, base with weak protibial notch, apical spur lacking. Larger claw of male slightly thickened, subequal in length to tarsomere 5, twice as thick as smaller claw, apex split or with a weak nib at subapex or apex in frontal view. Larger claws of female not thickened (both claws subequal in width), with or without ventral tooth. Unguitractor plate (all legs) laterally flattened, exposed beyond tarsomere 5, apex with 2 long setae. Tarsomere 5 of male with (Figs. 22–24) or without (Fig. 25) ventromedial tooth or swelling. Pro- and mesotarsomere 4 with 2 apical spines, spines recurved at apex (Figs. 22–27). Mesotibia with sides subparallel, apical 1/5 weakly divergent, external edge with 1–2 carinae; apex with 2 inner spurs, 10–14 spinulae, spinulae short to moderately long. Metacoxa with externo-lateral apex membranous, square or weakly acute. Metatrochanter with apex weakly produced beyond posterior border of femur. Metatibia (Figs. 16–19) with inner edge straight or weakly bowed inwardly, outer edge straight or weakly bowed outwardly, with 1–2 carinae, apical 1/5 divergent (more so in females; e.g., Fig. 17) or not; apex with 2 inner spurs, 14–26 spinulae, spinulae short to moderately long. *Hind wing* (Fig. 10): Precosta with poorly developed hooks present on ScA; setae present either side of RA₃₊₄. Vein AA₁₊₂ about 1/4 length of AA₃₊₄. AP₃₊₄ with bulbous, enlarged base. *Male genitalia*: Parameres and ventral plates symmetrical (Figs. 28–34). *Female gonocoxites*: Simple, symmetrical.

Diagnosis. In the Brachysternina, *Brachysternus* is separated from *Hylamorpha* by the following characters: 1) unguitractor plate with 2 setae (multisetose in *Hylamorpha*), 2) protarsomere 4 with 2 recurved spines (not recurved in *Hylamorpha*), 3) propygidium with supraspiracular ridge (lacking in *Hylamorpha*), 4) last sternite of the female weakly or deeply emarginated at the middle (rounded in *Hylamorpha*). *Brachysternus* is separated from *Aulacopalpus* based on the following characters: 1) last sternite of the female weakly or deeply emarginated at the middle (rounded in *Aulacopalpus*), 2) male parameres with well developed ventral and lateral sclerites (poorly developed in *Aulacopalpus*).

Distribution (Figs. 35–38). Southwestern South America.

Natural History. Species of *Brachysternus* are known to occur from sea level to 2,000 m elevation within southwestern South America. Their distribution corresponds to the distribution of *Nothofagus* species on which they

feed. Adults are attracted to lights at night. Larvae are not known but probably feed on decaying wood or vegetation.

Comments. Some species in the genus *Brachysternus* were previously placed in the brachysternine genera *Aulacopalpus*, *Sulcicalpus* Harold (= *Aulacopalpus*), and *Tribostethes* Curtis (= *Aulacopalpus*). The following species were originally described in the genus *Brachysternus* but were subsequently transferred to other genera: *Brachysternus castaneus* Laporte (now *Aulacopalpus castaneus*) and *Brachysternus lamprimoides* White (now *Epichrysus lamprimoides* [subtribe Anoplognathina]).

Brachysternus angustus (Philippi and Philippi, 1864)

(Figures 2–5, 12, 17–18, 23, 28a–c, 35; see also Fig. 1 in Smith 2002)

Aulacopalpus angustus Philippi and Philippi 1864:322. Holotype male at MNHC with label data: a) “361” (handwritten), b) “HOLOTIPO ♂” (orange label, typeface), c) “Aulacopalpus? angustus Ph.” (handwritten), d) “angustus P.G. monogr. g. aulacopalpus Phil. 1494” (handwritten), e) “Chile M.N.H.N. Tipo No 2909” (typeface), f) “AULACOPALPUS ANGUSTUS PHILIPPI & PHILIPPI ♂ HOLOTYPE” (our red holotype label), g) *Brachysternus* ANGUSTUS (PHILIPPI AND PHILIPPI) ♂ DET:JAMESON & SMITH 2000.” Male genitalia card-mounted. Philippi and Philippi (1864) stated that there was only one specimen in the type series, therefore the holotype is fixed by monotypy.

Description. *Length:* 15.8–20.3 mm. *Width:* 7.2–9.7 mm at base of elytra. *Color:* Dorsally light to dark shiny apple green (occasionally bluish-green or tan), elytral margins metallic brassy-green, apical umbone metallic green; apex of clypeus and pronotal margin tan or green; femora, tibiae, and sternites testaceous with metallic green sheen (occasionally entirely testaceous); pygidium metallic dark green (occasionally entirely testaceous); propygidium and tergites castaneous. *Head:* Clypeal apex rectangular with broadly rounded corners, not constricted at base; margins and apex weakly reflexed (male) or flat (female). Frons densely punctate; punctures moderately large (0.07–0.12 mm), some setose; setae hair-like laterally and at base (sparse, short to moderately long, tawny) and scale-like posterior to eye (dense, short, white). Clypeus confluent punctate to rugopunctate, punctures moderate. Interocular width 3.5–6.0 transverse eye diameters. Terminal segment of maxillary palpus (dorsally) with moderately impressed groove from base to near apical third, segment subequal in length to segments 2–3. Antennal club subequal in length to segments 1–7 (male) or segments 2–7 (female). *Pronotum:* Surface with weakly impressed, median, longitudinal groove; disc confluent punctate, margins confluent punctate or rugopunctate; punctures moderate in size, some setose; setae hair-like, short to moderately long, tawny, moderately or sparsely dense. Basal bead complete to just beyond posteriolateral angle. *Elytron:* Surface with 5 weakly impressed, poorly defined, punctate, longitudinal striae between suture and humerus; punctures moderate and small, sparse (disc), moderately dense (base), or dense (margin at apex), some setose; setae hair-like (short to moderately long, sparse, tawny) or thickened (moderately long, sparse, white). Intervals with similar sculpturing. Humeral and apical umbone well-developed. Epipleuron flat, not expanded, marginal bead present; region from metacoxa to apex setose; setae thickened, short and moderately long, dense, white. Sutural angle square. *Propygidium:* Posterior margin with fringe of setae; setae thickened, short, white. Supraspiracular ridge well-defined. *Pygidium:* Male: disc and middle apex with hair-like setae (moderately long and long, moderately dense, tawny) and punctures (small, sparse); margins with scale-like setae (dense, white). Female: disc weakly bituberculate, punctate at margins and at middle apex; punctures moderate in size, setose; setae on disc hair-like, tawny, moderately long and long, sparse (at margins) or moderately dense (at middle apex), margins with scale-like setae (dense, white). *Venter:* Setose; male clothed with dense, white, scale-like setae; female with sparse (disc) and dense (lateral margins),

white, scale-like setae. Prosternal keel broadly triangular; apex projecting anteriorly at about 45° with respect to ventral plane; apex produced to about level of protrochanter, blunt. Mesometasternum with apex rounded, not produced. Apex of terminal sternite in female deeply emarginated at middle (Fig. 12). *Legs*: Larger pro- and mesotarsal claw of male weakly bifurcate at apex. Pro- and mesotarsomere 5 of male with well developed ventromedial tooth, apex rounded or quadrate (not acute) (Fig. 23). Metatibia (Figs. 17–18) with inner and outer edges straight, with 2 weak carinae; 1 at middle (poorly developed), 1 in apical third (moderately developed), carinae more developed in females; apical 1/5 weakly divergent (more so in females). *Male genitalia*: Figs. 28a–c.

Diagnosis. *Brachysternus angustus* is separated from other species of *Brachysternus* by the well-developed humeral and apical umbones on the elytron, the form of the male genitalia (ventral and lateral sclerites and form of the parameres in lateral view), and the form of the pygidium in the female (surface of disc weakly bituberculate). The species is most similar to *B. spectabilis*, but differs by the green coloration on the meso- and metafemora (castaneous or castaneous with weak green reflections in *B. spectabilis*); the dense, scale-like setae on the sternites (moderately dense, thickened setae in *B. spectabilis*); and the scale-like setae posterior to the eye (setae thickened in *B. spectabilis*).

Brachysternus angustus bears an overall similarity to *Hylamorphia elegans* (Burmeister) based on the well-developed humeral and apical umbones, distribution of scale-like setae on the venter and pygidium, and overall coloration. These taxa differ by several features including: larger claw split (simple in *Hylamorphia*), female with apex of the last sternite emarginate (Fig. 12) (simple in *Hylamorphia*), form of the male genitalia (Fig. 28), and bisetose unguitractor plate (trisetose in *Hylamorphia*) (see Ratcliffe and Ocampo 2002 for a detailed description of *Hylamorphia*).

Distribution (Fig. 35). Recorded from 100–1,800 m elevation from O'Higgins to Llanquihue, Chile and east to Neuquén, Argentina.

Locality Data. 85 specimens examined from AMNH, BCRC, CASC, CMNC, CMNH, FMNH, GASC, LACM, MGFT, MNNC, PVGH, SEMC, USNM, VMDM.

ARGENTINA (6). NEUQUÉN (6): Lago Lácar, Parque Nacional Lanín, Tromén.

CHILE (78). BÍO-BÍO (1): Cerro Pemehue. CAUTÍN (7): Volcán Villarrica. CURICÓ (1): Las Trancas. LLANQUIHUE (5): Hornohuínco (11 km SW Lago Chapo), Los Muermos (12 km S). MALLECO (38): Lonquimay, Malalcahuello, Manzanar, Manzanar (9.2 km E), Parque Nacional Nahuelbuta, Río Chanchuco, Villa Portales (15 km W). ÑUBLE (10): Las Trancas (72 km SE Chillán), Los Lleuques, Nevados de Chillán, Shangrila (SW side Volcán Chillán). O'HIGGINS (1): Las Cabras. OSORNO (2): Parque Nacional Puyehue. VALDIVIA (13): Lago Pirehueico, Las Lajas (W La Unión), Pirihueico, Valdivia.

NO DATA (1).

Temporal Data. January (9), February (10), March (1), November (17), December (41).

Natural History. *Brachysternus angustus* has been collected in *Nothofagus* forests (including *Nothofagus* swamp and a mixed forest with *Nothofagus pumilio* Krasser, *Araucaria araucana* [C. Koch], and *Chusquea* species). Specimens were collected at ultraviolet lights at night, at flight intercept traps, and under logs.

Remarks. Philippi and Philippi (1864) described *B. angustus* based on one male specimen. They were dubious about the generic placement of the taxon

and referred to the species as "*Aulacopalpus? angustus*." Based on the characters that seemed to be indicative of the prevailing generic concepts of *Brachysternus* and *Aulacopalpus* (claws, mesosternum, femora), Philippi and Philippi placed the taxon in the genus *Aulacopalpus*. However, they queried the reader, "... wouldn't it be most sensible to combine *Brachysternus* and *Aulacopalpus* again?" This comment reflected the confused state of the brachysternine generic concepts at that time.

Brachysternus germaini (Ohaus, 1909) NEW COMBINATION
(Figs. 6, 25, 27, 29a–c, 35; see also Fig. 1 in Smith 2002)

Tribostethes germaini Ohaus 1909:9, 14. Neotype male at the MNNC, labeled a) "CHILE TALCA La Vega (E Carrizal) 3-Noviembre-1991 leg. M. Elgueta", b) "TRIBOSTETHES GERMAINI OHAUS ♂ NEOTYPE A. B. T. SMITH 2000" (red type label), c) "*Brachysternus* GERMAINI (OHAUS) ♂ DET: Jameson & Smith 2000" (white determination label). **Neotype here designated.** It is necessary to designate a neotype for *B. germaini* because the original holotype has been lost. Ohaus (1909) remarked that the "type is in the collection of the museum in Santiago." We have searched numerous collections for the holotype (see "Specimens and Taxonomic Material"). According to Mario Elgueta of the Museo Nacional de Historia Natural, Santiago, Chile (which houses Germain's collection and types) and Hella Wendt of the Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany (which houses Ohaus's types) the type of *B. germaini* is not in either collection. The original holotype was a male labeled "Chile, Curico, IX. 97, Ph. Germain S." We selected a male neotype from the neighboring province of Talca. The neotype was collected less than 100 km away from the original holotype and closely matches the original description by Ohaus (1909). Mario Elgueta, who collected the neotype, stated that the coordinates for La Vega in Talca, Chile are 35°17'S and 72°09'W.

Description. *Length:* 19.5–20.3 mm. *Width:* 8.3–10.3 mm at base of elytra. *Color:* Dorsally shiny apple green to olive green; elytral margins metallic brassy green or green; apex of clypeus castaneous (females) or green (males); pronotal margin testaceous suffused with green or green; legs, sternites, pygidium, and propygidium coppery-brown to castaneous. *Head:* Clypeal apex rectangular with broadly rounded corners, not constricted at base; margins and apex weakly to moderately reflexed. Frons moderately densely punctate (occasionally confluent at apex); punctures moderate to moderately large; setae short to moderately long, hair-like, tawny to reddish; region posterior to eye with or without sparse, thickened, short, white setae. Clypeus densely punctate (disc) and confluent punctate (base and apex); punctures moderate to moderately large. Interocular width 4.6–5.4 (male) or 4.8–7.2 (female) transverse eye diameters. Maxilla with terminal segment of maxillary palpus (dorsally) deeply impressed from base to apex (Fig. 6), segment 1.4 (male) or 1.3 (female) times longer than segments 2 and 3. Antennal club subequal in length to segments 1–7 (male) or segments 2–7 (female). *Pronotum:* Surface with weakly impressed, median, longitudinal groove; disc moderately densely to densely punctate (occasionally confluent), margins sparsely to moderately densely punctate; punctures moderate to large, few setose at posteriolateral angle and anteriolateral angle; setae hair-like and thickened, moderately long, tawny. Basal bead complete to just beyond posteriolateral angle. *Elytron:* Surface with 1–5 poorly defined, punctate, longitudinal striae between suture and humerus; punctures moderate and small (mixed), sparse (disc), lacking setae. Intervals with similar sculpturing. Humeral umbone poorly developed, apical umbone poorly developed. Epipleuron flat, not expanded, marginal bead present; region from metacoxa to apex setose; setae thickened, short and moderately long

(mixed), dense, whitish. Sutural angle square. *Propygidium*: Posterior margin with fringe of setae; setae thickened, short, white. Supraspiracular ridge poorly defined. *Pygidium*: Male: disc and middle apex with hair-like setae (moderately long and long [mixed], moderately dense, white) and punctures (small, moderately dense); margins and base with moderately dense, white, thickened setae. Female: disc lacking concavity, punctate; punctures crescent-shaped (moderately dense) and transversely wrinkled, setose; setae on hair-like and thickened, white, moderately long and long (mixed). *Venter*: Sternum densely (male) or moderately densely (female) clothed with long, tawny, setae; sternites with setae moderately dense, hair-like, white setae (less dense in female). Prosternal keel broadly triangular; apex projecting anteriorly at about 45° with respect to ventral plane; apex produced to about middle of protrochanter, blunt. Mesometasternum with apex rounded or weakly quadrate, not produced. Apex of terminal sternite in female moderately emarginated at middle (e.g., Fig. 13). *Legs*: Larger protarsal claw of male with or without weak nib at apex (Fig. 25). Claws of female simple, subequal in width (Fig. 27). Tarsomere 5 without ventromedial tooth (Figs. 25, 27). Metatibia with inner and outer edges straight, with carinae: 1 at middle, 1 in apical third, carinae more developed in females; apical 1/5 weakly divergent (more so in females). *Male genitalia*: Fig. 29a–c.

Diagnosis. This species is separated from all other species in the genus *Brachysternus* by the following combination of characters that are unique for the genus: all tarsal claws appearing simple in male (Fig. 25) and female (Fig. 27) (male with weak, apical nib in some specimens); protarsomere 5 without ventromedial tooth (Figs. 25, 27); pygidium of the female simple (lacking discal concavity); terminal segment of the maxillary palp (Fig. 6) with deeply impressed sulcus from base to apex; and 1.3–1.4 times as long as segments 2 and 3 combined (male and female) (Fig. 6).

Distribution (Fig. 35). Andes from Curicó to Concepción, Chile.

Locality Data. 9 specimens examined from BMNH, CMNC, CNCI, FMNH, MNHC.

CHILE (9). CONCEPCIÓN (3): Concepción, Penco. CURICÓ (2): El Coigo, no data. LINARES (1): Estero Leiva, Cord Parral. ÑUBLE (1): Cachapoal. TALCA (2): Canelillos (E. Carrizal), La Vega (E. Carrizal).

Temporal Data. February (1), October (1), November (4), December (3).

Remarks. *Brachysternus germaini* has an unusual combination of primitive and derived character states compared to other species of *Brachysternus*. Some character state reversals include: all tarsal claws appearing simple in both sexes (shared with *Hylamorphia*) (Figs. 25, 27), sulcate terminal maxillary palp that is longer than the two preceding segments (shared with some species of *Aulacopalpus*) (Fig. 6), pygidium in the female that lacks a discal concavity (shared with some species of *Aulacopalpus*), supraspiracular ridge not well-developed (shared with species of *Aulacopalpus*), and fifth protarsomere that lacks a ventromedial tooth (shared with species of *Aulacopalpus*) (Figs. 25, 27). In addition, *B. germaini* shares many derived character states with other species of *Brachysternus* including: form of the maxillary teeth (e.g., Fig. 4), male parameres with well developed lateral and ventral sclerites (Fig. 29a–c), and apex of the terminal sternite moderately emarginate in the female (e.g., Fig. 13). Transfer of this species from *Aulacopalpus* to *Brachysternus* is justified based on these derived character states. Smith's (2002) phylogenetic analysis of the subtribe Brachysternina also corroborates transfer of this species to *Brachysternus*. Although *Brachysternus germaini* has been collected in several Chilean provinces, it is rare in collections.

Brachysternus marginatus Germain, 1905
(Figs. 14, 30a–c, 36; see also Fig. 1 in Smith 2002)

Brachysternus marginatus Germain 1905:485–487. Lectotype female at MNNC with label data: a) “HOLOTIPO ♀” (erroneous holotype label, orange label, typeface), b) “Brach. mar-ginatus P.G. ♀” (handwritten), c) “marginatus P.G. monogr. 1499” (handwritten), d) “Chile M.N.H.N. Tipo No. 2906” (typeface), e) “BRACHYSTERNUS MARGINATUS GERMAIN ♀ DET:JAMESON & SMITH 2000 LECTOTYPE” (red lectotype label), f) *Brachysternus* MARGINATUS GERMAIN ♀ DET: JAMESON & SMITH 2000.” **Lectotype here designated.** Paralectotype female with label data: a) “Paratipo ♀” (erroneous paratype label, orange label, typeface), b) “Chile M.N.H.N. Tipo No. 2907” (typeface), c) “BRACHYSTERNUS MARGINATUS GERMAIN ♀ DET:JAMESON & SMITH 2000 PARALECTOTYPE” (yellow paralectotype label), f) *Brachysternus* MARGINATUS GERMAIN ♀ DET:JAMESON & SMITH 2000.” Germain (1905) had two specimens in the original type series. Both specimens are badly damaged and lacking all tarso-meres.

Description. *Length:* 16.5–18.4 mm. *Width:* 7.8–8.8 mm at base of elytra. *Color:* Dorsally shiny apple green, elytral margins metallic brassy-green; clypeal apex of female tan with metallic green shine (entirely metallic green in male); pronotal margins tan with metallic green shine; femora, tibiae, and sternites shiny testaceous; pygidium shiny testaceous with metallic green shine; propygidium and tergites shiny brown. *Head:* Clypeal apex rectangular with broadly rounded corners, not constricted at base; margins moderately reflexed, apex broadly reflexed (male) or weakly reflexed only at tip (female). Frons moderately densely punctate (disc and base) to densely punctate (apex and sides); punctures moderate in size, some setose; setae hair-like laterally (sparse, moderately long, tawny), thickened posterior to eye (sparse, moderately long, white). Clypeus of male densely punctate (base) to rugopunctate (mid-disc to apex), rugopunctate in female; punctures moderately large. Interocular width 4.3–5.2 transverse eye diameters. Terminal segment of maxillary palpus (dorsally) weakly impressed from base to about middle, segment subequal in length to segments 2–3. Antennal club subequal in length to segments 1–7 (male) or subequal to segments 2–7 (female). *Pronotum:* Surface with moderately impressed, median, longitudinal groove, disc with small punctures (moderately dense), margins and lateral apex with a field of moderately-sized punctures (moderately dense), with few setae; setae hair-like and thickened, moderately long and long, tawny, sparse. Basal bead complete to near middle. *Elytron:* Surface with 5 weakly impressed, poorly defined, punctate, longitudinal striae between suture and humerus; punctures small (moderately dense), some at margins and apex moderate in size, some setose; setae hair-like or thickened, moderately long and long (mixed), sparse, white. Intervals with similar sculpturing. Humeral and apical umbone poorly developed. Epipleuron expanded from metacoxa to sternite 2 (Fig. 14), marginal bead lacking; region from metacoxa to apex with 0–10 setae; setae thickened, short, white. Sutural angle square. *Propygidium:* Posterior margin with fringe of setae; setae thickened, short, white. Supraspiracular ridge well-developed. *Pygidium:* Male: disc, margins, and apex with hair-like and thickened setae (moderately long and long (mixed), moderately dense to dense, tawny and white) and punctures (small, moderately dense to dense). Female: disc weakly impressed (not bituberculate), punctate at apex (moderately dense) and at margins (moderately dense to dense); punctures small and moderate, setose; setae hair-like and thickened, tawny, moderately long and long (mixed), moderately dense to dense. *Venter:* Sternum setose; densely clothed with white, long, hair-like setae; sternites densely clothed with thickened and hair-like, white, moderately long setae (less dense in female). Prosternal keel broadly triangular; apex projecting anteriorly at about 45° with respect to ventral plane; apex produced to mid-protrochanter, apex blunt. Apex of terminal sternite in female deeply

emarginated at middle (e.g., Fig. 12). *Legs*: Larger claws of male thickened and weakly bifurcate at subapex. Larger claws of female with a ventral tooth. Tarsomere 5 with well developed ventromedial tooth, apex acute. Metatibia with inner edge weakly bowed inwardly, outer edge straight, with 2 weak carinae; 1 at basal third (poorly developed), 1 at apical third (moderately developed), carinae more developed in females; apical 1/5 weakly divergent (more so in females). *Male genitalia*: Figure 30a–c.

Diagnosis. *Brachysternus marginatus* is easily separated from other species of *Brachysternus* by the expanded elytral epipleuron (Fig. 14) (not expanded in other species of *Brachysternus*); the pronotal disc with small, sparse punctures (in other species of *Brachysternus* the punctures of the pronotal disc are moderately large or large and moderately dense or dense); broadly reflexed clypeal apex in the male (shared with *B. patagoniensis*); the form of the male genitalia (Fig. 30a–c); and the metatibia with inner edge weakly bowed inwardly, outer edge straight (in *B. patagoniensis*, the metatibia is bowed inwardly on the inner edge and the outer edge is bowed outwardly; in other species of *Brachysternus*, the metatibia is not bowed).

Distribution (Fig. 36). Recorded from about 1,100 m elevation from Linares to Cautín, Chile.

Locality Data. 22 specimens examined from BCRC, CMNC, FMNH, MGFT, MNNC, SEMC, VMDM.

CHILE (20). CAUTÍN (1): Pucará, Villarrica. LINARES (3): Parral, San Pablo. MALLECO (15): Lonquimay, Manzanar, Manzanar (9.2 km E). ÑUBLE (1): Recinto.

NO DATA (2).

Temporal Data. January (1), October (1), November (4), December (14).

Brachysternus olivaceus Philippi and Philippi, 1864

(Figs. 11b, 13, 22, 31a–d, 36; see also Fig. 1 in Smith 2002)

Brachysternus olivaceus Philippi and Philippi 1864:318. Lectotype female at MNNC with label data: a) “ALOTIPO ♀” (erroneous allotype label, orange label, typeface), b) “SINTIPO” (typeface), c) “1864 olivaceus (Phil.) Stett. Zeit. 1506” (handwritten), d) “Chile M.N.H.N. Tipo No. 2919” (typeface), e) “BRACHYSTERNUS OLIVACEUS PHILIPPI AND PHILIPPI ♀ DET: JAMESON & SMITH 2000 LECTOTYPE” (red lectotype label), f) *Brachysternus OLIVACEUS PHILIPPI AND PHILIPPI ♀ DET: JAMESON & SMITH 2000.* **Lectotype here designated.** Philippi and Philippi (1864) did not state how many specimens were used in their original description of *B. olivaceus*, but Germain (1905) stated that six specimens comprised the original series. Germain was able to locate only two males and one female from Philippi and Philippi’s collection for his work. We were able to locate only one female; thus, five specimens from the original type series were not located.

Brachysternus chloris Philippi and Philippi 1864:319. Lectotype male at MNNC with label data: a) “HOLOTYPE ♂” (erroneous holotype label orange label, typeface), b) “Tribosteth. chloris, P.V. Germ., p. 435” (handwritten), c) “chloris. (Phil.), P. G. monogr. (ined.) 1503” (handwritten), d) “CHILE M.N.H.N. Tipo No. 2908” (typeface), e) “BRACHYSTERNUS CHLORIS PHILIPPI AND PHILIPPI ♂ DET: JAMESON & SMITH 2000 LECTOTYPE” (red lectotype label), f) *Brachysternus OLIVACEUS PHILIPPI AND PHILIPPI ♂ DET: JAMESON & SMITH 2000.* Male genitalia card-mounted. **Lectotype here**

designated. Philippi and Philippi (1864) examined four males and two females in the original type series. The location of the remaining three male paralectotype and two female paralectotypes is unknown. **NEW SYNONYMY.**

Brachysternus riverae Germain 1905:497. We examined three specimens from the original type series; the lectotype and one paralectotype are conspecific with *B. olivaceus* and one paralectotype is conspecific with *B. prasinus*. Lectotype male at MNNC with label data: a) "Br. Riverae ♂ P.G." (handwritten), b) "HOLOTIPO ♂" (erroneous holotype label, orange label, typeface), c) "Riverae P.G. monogr. 1507" (handwritten), d) "Riverae P.G. monogr. Brachys. 1 parte 1904 1514" (handwritten), e) "Chile M.N.H.N. Tipo No. 2901" (typeface), f) "BRACHYSTERNUS RIVERAE GERMAIN ♂ DET: JAMESON & SMITH 2000 LECTOTYPE" (red lectotype label), g) "*Brachysternus OLIVACEUS PHILIPPI AND PHILIPPI* ♂ DET:JAMESON & SMITH 2000." Male genitalia card mounted. **Lectotype here designated.** One paralectotype male at MNNC with label data: a) "Chonadagüa N-74" (handwritten), b) "PARATIPO" (erroneous paratype label, orange label, typeface), c) "BRACHYSTERNUS RIVERAE GERMAIN ♂ DET:JAMESON & SMITH 2000 PARALECTOTYPE" (yellow paralectotype label), d) "Chile M.N.H.N. Tipo No. 2903" (typeface), e) "*Brachysternus OLIVACEUS PHILIPPI AND PHILIPPI* ♂ DET:JAMESON & SMITH 2000." One paralectotype female at MNNC with label data: a) "Cuidad Chillan-XI-98" (handwritten), b) "ALOTIPO ♀" (erroneous allotype label, orange label, typeface), c) "Rivera" (handwritten), d) "Br. Riverae ♀ P.G." (handwritten), e) "Chile M.N.H.N. Tipo No. 2902" (typeface), f) "BRACHYSTERNUS RIVERAE GERMAIN ♀ DET: JAMESON & SMITH 2000 PARALECTOTYPE" (yellow paralectotype label), g) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♀ DET:JAMESON & SMITH 2000." Germain (1905) described the species based on two male and two female specimens in the original type series. The location of the remaining female paralectotype is unknown. **NEW SYNONYMY.**

Brachysternus herbaceus Germain 1905:499. Holotype at MNNC with label data: a) "HOLOTIPO" (orange label, typeface), b) "BRACHYSTERNUS HERBACEUS GERMAIN DET. R. CAMOUSSEIGHT" (handwritten), c) "herbaceus P. G. monogr. 1510" (handwritten), d) "Colección P. Germain" (typeface), e) "Chile M.N.H.N. Tipo No. 2866" (typeface), f) "BRACHYSTERNUS HERBACEUS GERMAIN ♂ HOLOTYPE" (our red holotype label), g) "*Brachysternus OLIVACEUS PHILIPPI AND PHILIPPI* ♂ DET:JAMESON & SMITH 2000." Germain (1905) stated that there was only one specimen in the type series therefore the holotype is fixed by monotypy. Only the maxillae and mentum (cardmounted on one card with "1510 a" handwritten on the card) and the male genitalia (cardmounted with "1510 a" handwritten on the card) and were found for this specimen. **NEW SYNONYMY.**

Brachysternus araucanicus Ohaus 1905:156. Lectotype male at ZMHB with label data: a) "Chili" (typeface), b) "subsp. araucanicus Ohs" (handwritten), c) "BRACHYSTERNUS PRASINUS ARAUCANICUS OHAUS ♂ DET: JAMESON & SMITH 2000 LECTOTYPE" (red lectotype label), d) "Zool. Mus. Berlin" (typeface), d) "*Brachysternus OLIVACEUS PHILIPPI & PHILIPPI* ♂ DET:JAMESON & SMITH 2000." **Lectotype here designated.** The location of the other paralectotype is unknown.

totypes is unknown. Ohaus (1905) had more than one specimen of each sex in the original type series. **NEW SYNONYMY.**

Description. *Length:* 17.0–21.4 mm. *Width:* 7.7–10.5 mm at base of elytra. *Color:* Dorsally dark shiny apple green to olivaceous shiny green, elytral margins metallic brassy-green; clypeus tan with or without metallic green on disc; femora, tibiae, sternites, and pygidium shiny testaceous; propygidium and tergites shiny brown. *Head:* Clypeal apex rectangular with broadly rounded corners, not constricted at base; margins and apex weakly reflexed (male) or weakly reflexed only at tip (female). Frons densely punctate; punctures moderately large (base and sides) and moderate (disc) interspersed with minute punctures, some setose; setae hair-like laterally (sparse, moderately long, tawny), thickened posterior to eye (sparse, moderately long, white). Clypeus densely punctate (base) to rugopunctate (mid-disc to apex) in male, rugopunctate in female; punctures moderately large. Interocular width 2.8–3.3 transverse eye diameters (male) or 4.5–5.5 (female). Terminal segment of maxillary palpus in dorsal view weakly impressed or flattened from base to middle, segment subequal in length to segments 2–3. Antennal club slightly longer than segments 1–7 (male) or subequal to segments 1–7 (female). *Pronotum:* Surface with or without weakly impressed, median, longitudinal groove; disc moderately punctate, moderately densely punctate laterally; punctures moderately large, some setose; setae hair-like and thickened, moderately long and long, tawny, sparse. Basal bead complete to just beyond posteriolateral angle. *Elytron:* Surface with 5–6 weakly impressed, poorly defined, punctate, longitudinal striae between suture and humerus; punctures moderate and small (mixed), sparse (disc) and moderately dense (margins and apex), some setose; setae hair-like or thickened (moderately long to long, sparse, white). Intervals with similar sculpturing. Humeral and apical umbone poorly developed. Epipleuron flat, not expanded, marginal bead present; region from metacoxa to apex setose; setae thickened, short to moderately long, dense, white. Sutural angle square. *Propygidium:* Posterior margin with a fringe of setae; setae thickened, short, white. Supraspiracular ridge indicated by weakly elevated line. *Pygidium:* Male: disc and middle apex with hair-like setae (moderately long to long, moderately to sparsely dense, tawny to white) and punctures (small, moderately dense to dense, some vertically confluent); margins with thickened setae (moderately dense, white). Female: disc weakly impressed (not bituberculate), punctate at apex (moderately dense) and at margins (moderately dense to dense); punctures small, setose; setae hair-like, tawny, moderately long and long, sparse (at margins and apex) and thickened, tawny or white, moderately long, moderately dense (at base and margins). *Venter:* Sternum setose; moderately densely clothed with tawny, long, hair-like setae; sternites moderately densely clothed with thickened, tawny, moderately long setae (less dense in female). Prosternal keel triangular; apex projecting anteriorly at about 45° with respect to ventral plane; apex produced to protrochanter, blunt or acute. Mesometasternum with apex rounded, not produced. Apex of terminal sternite in female moderately emarginated at middle (Fig. 13). *Legs:* Larger claws of male thickened and weakly bifurcate at subapex. Larger claws of female with ventral tooth. Tarsomere 5 with well developed ventromedial tooth, apex acute (Fig. 22). Metatibia with inner and outer edges straight, with 2 weak carinae; 1 at basal third (poorly developed), 1 at apical third (moderately developed), carinae more developed in females; apical 1/5 weakly divergent (more so in females). *Male genitalia:* Figure 31a–d.

Diagnosis. *Brachysternus olivaceus* is distinct from other species of *Brachysternus* based on the following combination of characters: antennal club slightly longer than segments 1–7 (male) or subequal to segments 1–7 (female), pygidium lacking scale-like setae, large eyes (interocular width 2.8–3.3 transverse eye diameters in males or 4.5–5.5 in females), and apex of the terminal sternite in the female moderately emarginate (Fig. 13).

The “*B. riverae*” morphotype of *B. olivaceus* could be confused with *B. spectabilis* or *B. prasinus*. In specimens of this morphotype, the antennal club is subequal to segments 1–7 (males and females), the interocular width is 3.5–4.3 (male) to 5.2–5.6 (female), and the setae on the pygidium are more dense.

However, the ventral sclerite of the male genitalia, the terminal sclerite of the female, the supraspiracular ridge, and the form of the clypeal apex are characters that are all consistent with *B. olivaceus*. Specimens of this morphotype can be separated from *B. spectabilis* and *B. prasinus* based on the form of the supraspiracular ridge (poorly developed in *B. olivaceus*; well developed in *B. spectabilis* and *B. prasinus*), the form of the ventral sclerite in the male genitalia in *B. olivaceus* contrasted with those of *B. spectabilis* (Fig. 31 and Fig. 34), and the form of the terminal sclerite in the female (weakly emarginate in *B. olivaceus*; deeply emarginate in *B. prasinus* and *B. spectabilis*), and the more reflexed clypeal apex (apex weakly reflexed at tip in *B. prasinus* and *B. spectabilis*).

Distribution (Fig. 36). Recorded from 500–2,300 m in elevation from Coquimbo to Ñuble, Chile.

Locality Data. 126 specimens examined from CASC, CMNC, CMNH, FMNH, GASC, JMEC, KSUC, MNNC, PVGH, USNM, VMDM, ZMHB.

CHILE (121). ACONCAGUA (1): Fundo Talanquén. COQUIMBO (1): Valle Elqui Alcohuz. CURICÓ (59): Las Tablas, Los Niches. MAULE (1): Río Teno (40 km E Curicó). O'HIGGINS (3): Las Nieves, Reserva Nacional Río Cipreses. SANTIAGO (36): Alto de Cantillana, Buin, Cerro La Campana, Cerro Roble Alto, El Monte, El Roble, Lo Aguirre, Maipú, Paine, Río Peuco (45 km S Santiago), Talagante. TALCA (8): Molina, Penciahue. VALPARAÍSO (6): Limache, Valparaíso. NO DATA (6).

NO DATA (5).

Temporal Data. January (2), September (3), October (79), November (27), December (6).

Remarks. Philippi and Philippi (1864) described *B. olivaceus* and *B. chloris* consecutively in their publication, but they did not discuss the differences between the two species. When Philippi and Philippi named this species, they were uncertain whether the species should be assigned to *Brachysternus*, *Aulacopalpus*, or *Tribostethes* (= *Aulacopalpus*). They used the form of the claws (which are split) to place the species in the genus *Brachysternus*. Based on study of the type specimens of *B. olivaceus* and *B. chloris*, we determined that these two taxa are conspecific.

Germain (1905) described two species that are conspecific with *B. olivaceus*: *B. herbaceus* and *B. riverae*. *Brachysternus herbaceus* was described based on one male specimen. Only the male genitalia, maxillae, and mentum were found for this specimen. Based on our study of these parts, we determined that *B. herbaceus* is conspecific with *B. olivaceus*. *Brachysternus riverae* was named based on four specimens. Germain (1905) differentiated it from other species based on color of the clypeus, color of the tibia and femora, and length of the sternites. We have found that these characters are variable within the species. In fact, two specimens from the original type series of *B. riverae* (the lectotype and one paralectotype) are conspecific with *B. olivaceus*, and one paralectotype is conspecific with *B. prasinus*. Only with a large number of specimens was it possible to understand the breadth of intraspecific variation in *B. olivaceus* and to determine that the "*B. riverae*" morphotype is a member of this taxon. Specimens of this morphotype share similarities with both *B. prasinus* and *B. spectabilis* (see diagnosis). Based on several character states (see "Diagnosis"), we determined that *B. riverae* is conspecific with *B. olivaceus*.

The invalid name "*Brachysternus fulvescens* Germain" is listed as a synonym of *B. chloris* Philippi and Philippi in Machatschke (1972). Much confusion has surrounded this name. The confusion began when Germain (1905:

473) transferred *Bembegeneius fulvescens* Solier to the genus *Brachysternus*. He redescribed what he believed was Solier's concept of "fulvescens," but he had not studied Solier's specimen of *B. fulvescens*. Ohaus (1909) believed that Germain's "fulvescens" was simply a specimen of *B. chloris* that had been discolored by preservation in alcohol, and was not Solier's "fulvescens." Ohaus (1909) referred to Germain's concept as "Br. fulvescens Sol. sensu Ph. Germain." Gutiérrez (1950) incorrectly listed "*Brachysternus fulvescens* Germain" as a synonym of *B. chloris*, and this error was repeated by Machatschke (1972). *Bembegeneius fulvescens* Solier is now considered a junior synonym of *Aulacopalpus castaneus* (Laporte) (see Smith 2002).

Brachysternus patagoniensis Jameson and Smith, n. sp.

(Figs. 10, 11c, 19, 21, 24, 32a–d, 36; see also Fig. 1 in Smith 2002)

Type Series. Holotype labeled: a) "CHILE: 45 km W Angol Nahuelbuta Nat. Pk. 9.XII.84–16.II.85 S&J Peck, 1400 m, car.tp. Nothofagus-Arucaria For." (typeface), b) "BRACHYSTERNUS PATAGONIENSIS JAMESON & SMITH 2001 ♂ HOLOTYPE" (red holotype label). Allotype labeled: a) "CHILE OSORNO Antillanca Diciembre 1995 Leg. A. Ugarte.P" (typeface), "COLECCIÓN JOSE MONDACA.E" (typeface), c) "BRACHYSTERNUS PATAGONIENSIS JAMESON & SMITH 2001 ♀ ALLOTYPE" (red allotype label). All 39 paratypes (34 males and 5 females) with our yellow paratype label "BRACHYSTERNUS PATAGONIENSIS JAMESON & SMITH 2001 [♂/♀] PARATYPE." Six male paratypes with label data identical to the holotype. One female paratype with label data identical to the allotype. Six male paratypes labeled a) "CHILE: Cautin Prov. Volcan Villarrica 1,250 m. ste653 15–29 Dec.1982 *N.dombeyi* *N. pumilio*, Chusquea A. Newton, M. Thayer" (typeface), b) "flight intercept window/trough trap" (typeface). One male paratype labeled: a) "ARGENTINA NEUQUEN S. M. de los Andes C° Chapolco Shajovskog-leg. Coll. Martinez 21.XI.64" (handwritten), b) "403" (typeface), c) "H. & A. HOWDEN COLLECTION ex. A. Martinez coll." (typeface). Two male paratypes with same data labels as previous paratype but with the second label (b) "405" and "406" respectively. One male paratype labeled: a) "ARGENTINA NEUQUEN S. M. de los Andes C° Chapolco Coll. Martinez NOV.964" (handwritten), b) "398" (typeface), c) "H. & A. HOWDEN COLLECTION ex. A. Martinez coll." (typeface). One male paratype with same label data as previous paratype but with second label (b) "407." One male paratype labeled: a) "ARGENTINA CHUBUT Lago Fontana Soriano-leg. Coll. Martinez Oct.-946" (handwritten), b) "400" (typeface), c) "H. & A. HOWDEN COLLECTION ex. A. Martinez coll." (typeface). One male paratype with same label data as previous paratype but with second label (b) "404." Three male and one female paratypes labeled: a) "CHILE Dec.-97 Osorno prov. Antillanca Leg.: A. Ugarte P." (typeface), b) "COLECCIÓN JOSE MONDACA.E" (typeface). Three male paratypes labeled: a) "CHILE Cautín Pr. Volcán Villarrica, 1250 m site 653 15–29.xii.1982 Noth. domb.-pumilio forest w/ Chusquea A. Newton & M. Thayer" (typeface), b) "window trap" (typeface). Two male paratypes labeled: a) "CHILE X REGION Antillanca Diciembre 1995 leg. Gabriel Carrasco" (typeface). Two male paratypes labeled: a) "CHILE Cautín Pr.: P.N. Villarrica, Volcán Villarrica, road to ski center, 1390 m, 39°23.27'S, 71°57.82'W, 27.xii.1996–3.ii.1997," (typeface), b) "stunted Nothofagus pumilio forest FMHD #96–241, flight intercept trap, A. Newton & M. Thayer 981 FIELD MUS. NAT. HIST." (typeface). One male

paratype labeled: a) "Cerros Nahuelbuta ANGOL-CHILE 5 Dic 1948 vallejitos 1,240 mt" (typeface and handwritten), b) "E. P. Reed Collection" (typeface), c) "Collection of the CALIFORNIA ACADEMY OF SCIENCES, San Francisco, Calif." (typeface). One female paratype with same label data as previous paratype but collected on "4 Dic 1948." One male paratype labeled: a) "Cerros de Nahuelbuta, Angol, Chile 28 Dicmbre 1941 D. S. Bullock." (typeface and handwritten), b) "E. P. Reed Collection" (typeface), c) "Collection of the CALIFORNIA ACADEMY OF SCIENCES, San Francisco, Calif." (typeface). One male paratype labeled: a) "CHILE:Malleco Pr.:P.N. Nahuelbuta, Los Portones entrance area, 1150 m, 37°49.10'S, 72°57.70'W, 20.xii.1996" (typeface), b) "Nothofagus spp. w/few Araucaria araucana; on road at night, A.Newton, M.Thayer, E.Arias FIELD MUS. NAT. HIST." (typeface). One male paratype labeled: a) "S. CHILE: San Pedro, Chiloé.42°S. 18.xi.1958. 1,500 ft. G. Kuschel." (handwritten), b) "H. & A. HOWDEN COLLECTION ex. A. Martinez coll." (typeface). One male paratype labeled: a) "ANGOL-CHILE 10 Nov 1948 H Nahuel" (typeface and handwritten), b) "E. P. Reed Collection" (typeface), c) "Collection of the CALIFORNIA ACADEMY OF SCIENCES, San Francisco, Calif." (typeface). One female paratype labeled: a) "CHILE Aisén Villa OHiggins 11 Enero 1984 Coll Vidal & Villalón" (typeface). One female paratype labeled: a) "C° Malo Parque Lanin Rpo. Argentina 22/11/59 A. Mesa" (handwritten), b) "H. & A. HOWDEN COLLECTION ex. A. Martinez coll." (typeface). Holotype and 10 paratypes deposited at CMNC. Allotype and four paratypes deposited at MNHC. Ten paratypes deposited at FMNH. Three paratypes each deposited at CASC and UNSM. Two paratypes each deposited at ABTS and VMDM. One paratype each deposited at BCRB, JMEC, MLJC, PVGH, and ZMHB.

Holotype (male). *Length:* 19.2 mm. *Width:* 8.9 mm at base of elytra. *Color:* Dorsally dark shiny apple green to olivaceous shiny green with bluish reflections, elytral margins metallic brassy-green; clypeus castaneous with metallic green; femora, tibiae, sternites, and pygidium shiny testaceous to castaneous, femora with weak green reflections; propygidium castaneous and tergites shiny black. *Head* (Fig. 21): Clypeal apex subovoid, constricted weakly at base; margins and apex broadly reflexed. Frons moderately densely punctate (disc) to densely punctate with some contiguous (base and sides); punctures moderately large (disc) to large (base and sides), some setose; setae hair-like, (moderately dense to dense, moderately long to long, testaceous), thickened posterior to eye (sparse, moderately long, white). Clypeus densely punctate (base) to rugopunctate (mid-disc to apex); punctures moderately large, some setose laterally; setae moderately long, hair-like, sparse to moderately dense. Interocular width 5.0 transverse eye diameters. Terminal segment of maxillary palpus (dorsally) weakly impressed from base to apical one-fourth, segment subequal in length to segments 2–3. Antennal club slightly shorter than segments 1–7. *Pronotum:* Surface with moderately impressed, median, longitudinal groove; disc with small and moderate punctures; punctures moderately dense; margins, apex, and base with moderately large to large punctures; some punctures with hair-like, moderately long and long (mixed), testaceous to tawny, moderately dense to dense setae. Basal bead complete to near middle. *Elytron:* Surface with 5–6 weakly impressed, poorly defined, punctate, longitudinal striae between suture and humerus; punctures moderate to small, sparse (disc) and moderately dense (margins and apex), some setose; setae hair-like, long, sparse, testaceous. Intervals with similar sculpturing. Humeral and apical umbone poorly developed. Epipleuron flat, not expanded, with marginal bead poorly developed (from base to metacoxa or sternite 1) or lacking; region from metacoxa to apex setose; setae hair-like, moderately long and long (mixed), dense, testaceous. Sutural angle square. *Propygidium:* Posterior margin with fringe of setae; setae thickened, short or moderately long, testaceous or white. Supraspiracular ridge well developed. *Pygidium:* Surface with hair-like and thickened setae (mixed, moderately long and long, moderately

dense to dense, testaceous) and punctures (small, moderately dense to dense, some vertically confluent). *Venter*: Sternum setose; densely clothed with testaceous, long, hair-like setae; sternites moderately densely clothed with thickened, tawny, moderately long setae. Prosternal keel broadly triangular; apex projecting anteriorly at about 60° with respect to ventral plane; apex produced to base of protrochanter, apex blunt. Mesometasternum with apex rounded, not produced. *Legs*: Larger claws thickened and weakly bifurcate at apex. Tarsomere 5 ventromedially swollen, without tooth (Fig. 24). Metatibia (Fig. 19) with inner edge slightly bowed inwardly, outer edge slightly bowed outwardly; outer edge with 1 weak carina in the apical third. *Male genitalia*: Figure 32a–d.

Variation. The allotype and paratype specimens vary from the holotype in the following respects. *Length*: 17.4–20.6 mm. *Width*: 7.9–8.9 mm (at base of elytra). *Color*: Dorsally dark shiny apple green to olivaceous shiny green (some other specimens tan) with or without bluish reflections; clypeus castaneous with or without metallic green. *Head*: Clypeal margins and apex weakly reflexed only at tip (females). Clypeus rugopunctate; punctures moderately large, some setose laterally (females). Interocular width 5.0–6.1 transverse eye diameters. Antennal club subequal in length to segments 2–7 (females) or slightly longer than segments 1–7 (1 male). *Pronotum*: Surface with weakly or moderately impressed, median, longitudinal groove. *Elytron*: Lateral margin with setae moderately dense, moderately long (1 male). *Pygidium*: Disc in female weakly impressed (not bituberculate), moderately densely punctate; punctures small, some confluent vertically, some setose; setae hair-like or thickened (scale-like in some specimens), tawny or white, moderately long and long, moderately dense and dense. Apex at middle rounded (female). Surface with setae white or testaceous (male). *Venter*: Sternum moderately densely or densely clothed with tawny or testaceous, long, hair-like setae; sternites with tawny or white setae (less dense in females). Apex of terminal sternite in females moderately emarginated at middle (e.g., Fig. 13). *Legs*: Metatibia of female with inner edge slightly bowed inwardly, outer edge weakly divergent in apical 1/5, with 1 weak carina in apical third. Female claws with ventral tooth on larger claw.

Etymology. The specific epithet is taken from the latinized adjective meaning “Patagonian,” referring to the region in which this species is found. The suffix “-ensis” denotes place or locality.

Diagnosis. *Brachysternus patagoniensis* is separated from other species of *Brachysternus* by the form of the metatibia (Fig. 19) (inner and outer edges in the male bowed, inner edge in the female bowed), the clypeus that is weakly constricted at the base (Fig. 21); the presence of dense, long, testaceous setae on the lateral margin of the elytron and margins of the pronotum and head (Fig. 11c); the black or castaneous propygidium and sternites; and the form of the ventral and lateral sclerites of the male genitalia (Fig. 32a–d).

One male specimen from San Pedro, Chile, differs from the all other specimens in the type series due to its antennal club that is slightly longer than segments 1 to 7 (subequal to segments 1 to 7 in other specimens) and the setae on the elytral margin that are moderately dense and moderately long (setae dense and long in other specimens). The remainder of characters are consistent with other specimens of *B. patagoniensis* (bowed form of the metatibia, constricted base of the clypeus, black sternites and propygidium, and form of the ventral and lateral sclerites of the male genitalia).

Distribution Fig. 36). Recorded from 450–1,400 m elevation from Malleco to Aisén, Chile and nearby areas of western Argentina.

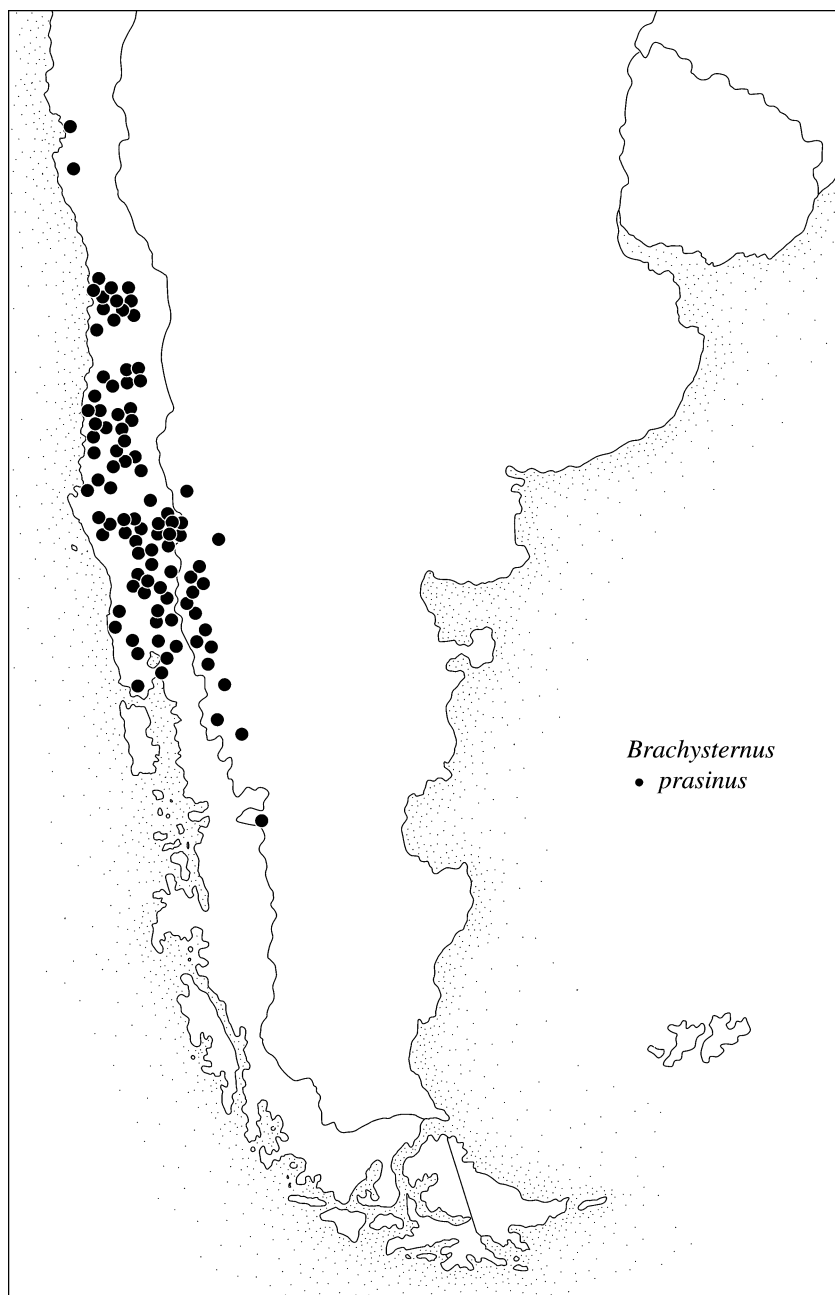


Fig. 37. Map showing the distribution of *B. prasinus* in southern South America.

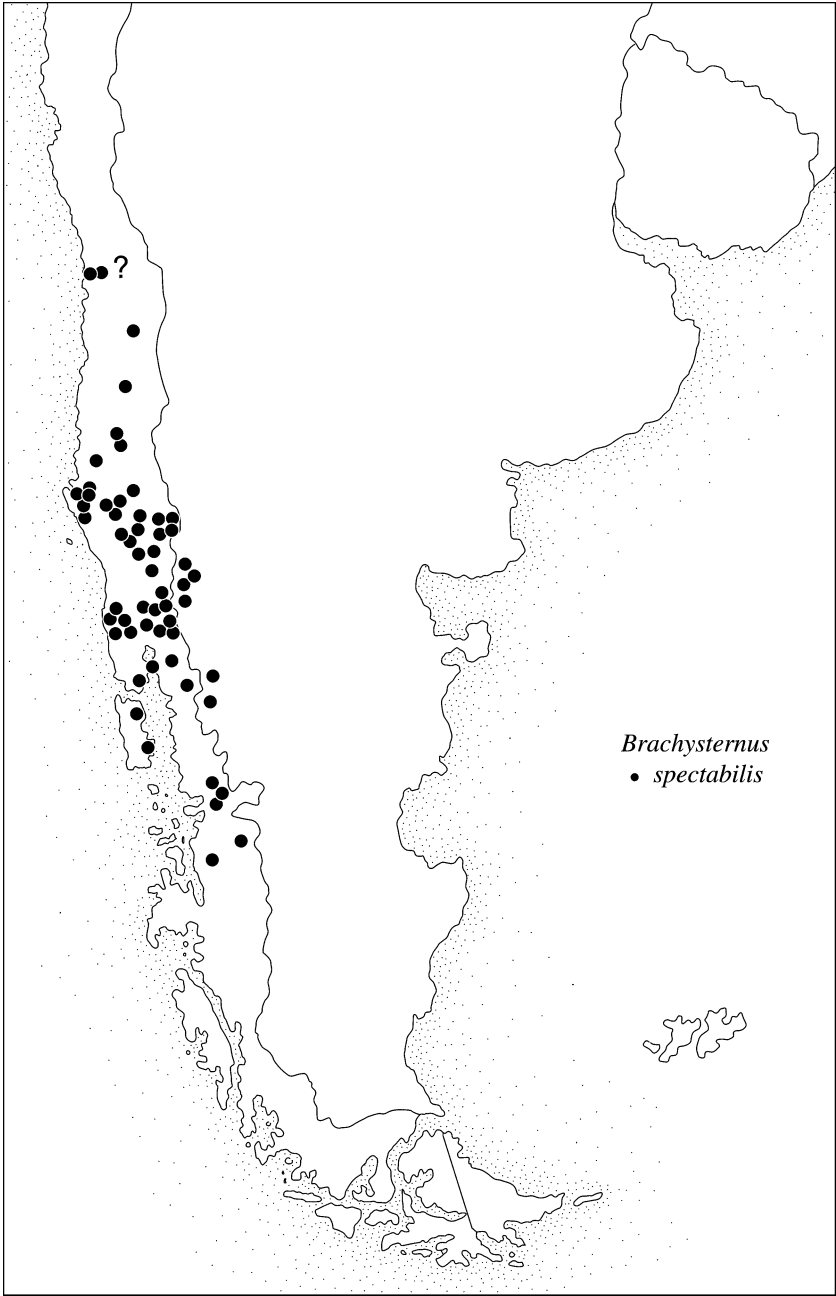


Fig. 38. Map showing the distribution of *B. spectabilis* in southern South America.

Locality Data. 41 specimens examined from CASC, CMNC, FMNH, JMEC, MNNC, PVGH.

ARGENTINA (8). CHUBUT (2): Lago Fontana. NEUQUÉN (6): Parque Nacional Lanín, San Martín de los Andes.

CHILE (33). AISEN (1): Villa O'Higgins. CAUTÍN (11): Volcán Villarrica. CHILOÉ (1): San Pedro. MALLECO (12): Angol, Cerros de Nahuelbuta, Parque Nacional Nahuelbuta (45 km W Angol). OSORNO (8): Antillanca.

Temporal Data. October (2), November (7), December (22), January (9).

Natural History. *Brachysternus patagoniensis* has been recorded from forests composed of *Nothofagus* and *Arucaria* species; *Nothofagus dombeiyi* (Blume), *Saxegothea* sp., and *Drimys*; and stunted *Nothofagus pumilio* Krasser. Label data indicate that some specimens were captured using flight intercept traps and as incidental captures in pitfall traps.

Brachysternus prasinus Guérin-Ménéville, 1831

(Figs. 8, 9, 11a, 15, 20, 33a–g, 37; see also Fig. 1 in Smith 2002)

Brachysternus prasinus Guérin-Ménéville 1831:3. Neotype male at ZMHB labeled: a) "CHILE Valdivia" (typeface), b) "prasinus Guérin" (handwritten), c) "Brachysternus prasinus Guérin m.d. Type vergl. Paris 5.VII.1911." (handwritten [by Ohaus] and typeface, blue label), d) "BRACHYSTERNUS PRASINUS GUÉRIN-MÉNEVILLE DET:JAMESON & SMITH 2001 NEOTYPE" (handwritten and typeface). **Neotype here designated.** It is necessary to designate a neotype for *B. prasinus* because the original type has been lost. Guérin-Ménéville (1838a) did not specify where the type series was deposited, but all of Guérin-Ménéville's types are now housed at MNHN. We searched for the types at the MNHN and numerous institutions (see "Specimens and Taxonomic Materials") without success, and we conclude that the type specimen has been lost. The original type was from Concepción, Chile. We selected a male neotype from Valdivia, Chile that matches the original illustration and description by Guérin-Ménéville (1831, 1838b). We selected the neotype specimen because it was compared with the original type specimen at MNHN by Friedrich Ohaus (note "m.d. Type vergl. Paris 5.VII.1911" on Ohaus's label). Based on the original description and Ohaus's label, we are confident that the neotype is virtually identical to the original type. Two specimens at MNHN were erroneously labeled "type" and "prasinus" (from Fairmaire's collection), but neither had Guérin-Ménéville's distinct handwritten determination labels or "Ex. Musaeo Guér.-Ménev" labels (seen on other Guérin-Ménéville types). Therefore, we consider these specimens to have erroneous type labels. Two specimens of *Hylamorphia elegans* at MNHN were labeled "prasinus" and were from the Guérin-Ménéville collection, but these specimens do not match the original illustration (Guérin-Ménéville 1831) or the original description (Guérin-Ménéville 1838b) of *B. prasinus*. Therefore, we consider these specimens to have erroneous type labels.

Brachysternus fulvipes Guérin-Ménéville 1838a:61. Lectotype male at MNHN labeled: a) "Type" (typeface), b) "Brachysternus fulvipes. Guer. Perou. Icon. R. a." (handwritten, erroneous locality data), c) "Ex. Musaeo GUÉR.-MÉNEV." (typeface with border), d) "BRACHYSTERNUS FULVIPES GUÉRIN-MÉNEVILLE DET:JAMESON & SMITH 2001 LECTOTYPE" (red lectotype label), e) "*Brachysternus PRASINUS* GUÉ-

RIN-MÉNEVILLE ♂ Det: Jameson & Smith 2001.” **Lectotype here designated.** Blanchard (1851), Philippi (1861), Harold (1869), Ohaus (1905, 1918), Blackwelder (1944), and Machatschke (1965, 1972) all list this name as a “variety” or “form” of *B. prasinus*. Based on the examination of the type specimen, we agree with these authors and therefore place the name in synonymy. Guérin-Méneville (1838a) erroneously stated that the type series was from Peru. Name first placed in synonymy with *B. prasinus* by Harold (1869).

Brachysternus vicinus Guérin-Méneville 1840:300. Lectotype male at MNHN labeled: a) “type” (typeface), b) “*Brachysternus vicinus* Guer. Rev. Zool. 1839 (type) Port Famine” (handwritten, erroneous locality data), c) “Ex. Musaeo GUÉR-MÉNEV.” (typeface), d) “BRACHYSTERNUS VICINUS GUÉRIN-MÉNEVILLE ♂ LECTOTYPE DET:JAMESON & SMITH 2000” (red lectotype label), e) “*Brachysternus PRASINUS* GUÉRIN-MÉNEVILLE ♂ Det: Jameson & Smith 2000.” **Lectotype here designated.** Blanchard (1851), Philippi (1861), and Ohaus (1905) all suggested that this name was a possible synonym or variety of *B. prasinus*. Harold (1869) first placed *B. vicinus* in synonymy with *B. prasinus*. Ohaus (1918) and Machatschke (1972) took it out of synonymy and listed it as a valid species. Based on examination of the lectotype, we place the name in synonymy. Guérin-Méneville stated that the description was based on two male specimens. The location of the paralectotype is unknown. **PLACED IN SYNONYMY.**

Brachysternus sinuatifrons Germain 1905:475. Holotype female at MNNC labeled: a) “Holótipo” (orange, typeface), b) “Br. sinuatifrons P.G. ♀ Andes del Cachapoal.” (handwritten), c) “sinuatifrons P.G. monogrf. 1508” (handwritten), d) “Det. F. Ohaus 1909 Br. dilatatus Ph. G. ♀ insuffisance colorié et mal devel.”, e) “Chile M.N.H.N. Tipo No. 2905” (typeface), f) “BRACHYSTERNUS SINUATIFRONS GERMAIN ♀ HOLOTYPE” (red holotype label), g) *Brachysternus PRASINUS* GUÉRIN-MÉNEVILLE ♀ DET:JAMESON & SMITH 2000.” Germain (1905) stated that there was only one specimen in the type series therefore the holotype is fixed by monotypy. **NEW SYNONYMY.**

Brachysternus viridis Germain 1905:487. Lectotype male at MNHN labeled: a) “115 40” (green, round label with handwriting underneath), b) “B. viridis. Guérin. Chili. M. Gay.” (green label, handwritten), c) “BRACHYSTERNUS VIRIDIS GERMAIN DET:JAMESON & SMITH 2001 LECTOTYPE” (red lectotype label), d) “*Brachysternus PRASINUS* GUÉRIN-MÉNEVILLE Det: Jameson & Smith 2001.” **Lectotype here designated.** Although the name *B. viridis* was made available by Germain (1905), the type series includes the specimens described by Solier (1851:87) under “*B. viridis* Guérin-Méneville” (see article 72.4.2, International Commission of Zoological Nomenclature [1999]). **NEW SYNONYMY.**

Brachysternus pubescens Germain 1905:495. Lectotype male at MNNC with label data: a) “HOLOTIPO” (erroneous holotype label, orange label, typeface), b) “Conception A. [illegible word]” (handwritten), c) “pubescens P.G. monog. 1502” (handwritten), d) “Chile M.N.H.N. Tipo No. 2904” (typeface), e) “BRACHYSTERNUS PUBESCENS GERMAIN ♂ DET: JAMESON & SMITH 2000 LECTOTYPE” (red lectotype label), g) “*Brachysternus PRASINUS* GUÉRIN-MÉNEVILLE ♂ DET: JAMESON & SMITH 2000.” Male genitalia card mounted. **Lectotype**

here designated. The location of the two remaining paralectotypes is unknown. Germain (1905) also discussed a female specimen in his description of *B. pubescens* that he thought might be the same species. We found this female specimen at MNNC, but it is not part of the type series. **NEW SYNONYMY.**

Brachysternus dilatatus Germain 1905:502. Lectotype male at MNNC with label data: a) "Brachysternus dilatatus Ph. p. 1425" (handwritten), b) "SINTIPO" (typeface), c) "Br. dilatatus ♂ Ph. ined." (handwritten), d) "dilatatus Phil. (ined.) P.G. monogr. 1501" (handwritten), e) "Chile M.N.H.N. Tipo No. 2862" (typeface), f) "BRACHYSTERNUS DILATATUS GERMAIN ♂ DET: JAMESON & SMITH 2000 LECTOTYPE" (red lectotype label), g) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♂ DET: JAMESON & SMITH 2000." Male genitalia card mounted. **Lectotype here designated.** One male paralectotype at MNNC with label data: a) "SINTIPO" (typeface), b) "m" (typeface), c) "Chile M.N.H.N. Tipo No. 2868" (typeface), d) "BRACHYSTERNUS DILATATUS GERMAIN ♂ DET: JAMESON & SMITH 2000 PARALECTOTYPE" (yellow paralectotype label), e) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♂ DET: JAMESON & SMITH 2000." One male paralectotype at MNNC with label data: a) "1501 a ♂" (handwritten), b) "Campanita XII.88" (handwritten), c) "SINTIPO" (typeface), d) "Colección P. Germain" (typeface), e) "BRACHYSTERNUS DILATATUS GERMAIN DET. CAMOUSSEIGHT" (handwritten), f) "Chile M.N.H.N. Tipo No. 2869" (typeface), g) "BRACHYSTERNUS DILATATUS GERMAIN ♂ DET: JAMESON & SMITH 2000 PARALECTOTYPE" (yellow paralectotype label), e) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♂ DET: JAMESON & SMITH 2000." Germain (1905) had six males and one female in his original type series. The location of three male and one female paralectotypes is unknown. **NEW SYNONYMY.**

Brachysternus viridipes Ohaus 1905:157. Lectotype female at ZMHB with label data: a) "Chile Victoria" (typeface), b) "BRACHYSTERNUS PRASINUS VIRIDIPIES OHAUS ♀ DET: JAMESON & SMITH 2000 LECTOTYPE" (red lectotype label), c) "Zool. Mus. Berlin" (typeface), d) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♀ DET: JAMESON & SMITH 2000." **Lectotype here designated.** One paralectotype female at ZMHB with label data: a) "Chili" (typeface), b) "subsp. viridipes Ohs" (handwritten), c) "BRACHYSTERNUS PRASINUS VIRIDIPIES OHAUS ♀ DET: JAMESON & SMITH 2000 PARALECTOTYPE" (yellow lectotype label), d) "Zool. Mus. Berlin" (typeface), e) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♀ DET: JAMESON & SMITH 2000." The location of the other paralectotypes is unknown. Ohaus (1905) had more than one male specimen in the original type series. **NEW SYNONYMY.**

Brachysternus hirtus Ohaus 1905:158. Lectotype male at ZMHB with label data: a) "Osorno S. Chile" (typeface), b) "Typus!" (red label, typeface), c) "Br. hirtus Ohaus" (red label, handwritten), d) "*Brachysternus pubescens* Ph. g. m.d.Type vergl. Stglitz. 5.III.09." (handwritten and typeface), e) "Zool. Mus. Berlin" (typeface), f) "BRACHYSTERNUS HIRTUS OHAUS ♂ DET: JAMESON & SMITH 2000 LECTOTYPE" (red lectotype label), g) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♂ DET: JAMESON & SMITH 2000." **Lectotype here designated.** Lec-

toallotype female at ZMHB with label data: a) "CHILE" (typeface), b) "♀" (typeface), c) "Typus!" (red label, typeface), d) "hirtus Ohaus" (red label, handwritten), e) "Brachysternus pubescens Ph. Germ." (handwritten), f) "Zool. Mus. Berlin" (typeface), g) "BRACHYSTERNUS HIRTUS OHAUS ♀ DET: JAMESON & SMITH 2000 LECTOALLOTYPE" (red lectoallotype label), h) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♀ DET: JAMESON & SMITH 2000." One female paralectotype at ZMHB with label data: a) "CHILE" (typeface), b) "♀" (typeface), c) "Cotypus!" (red label, typeface), d) "Brachysternus pubescens Ph. Germ." (handwritten), e) "Zool. Mus. Berlin" (typeface), f) "BRACHYSTERNUS HIRTUS OHAUS ♀ DET: JAMESON & SMITH 2000 PARELECTOTYPE" (yellow paralectotype label), g) "*Brachysternus PRASINUS GUÉRIN-MÉNEVILLE* ♀ DET: JAMESON & SMITH 2000." The existence and location of other paralectotypes are unknown. **NEW SYNONYMY.**

Description. *Length:* 16.3–23.2 mm. *Width:* 7.6–11.5 mm at base of elytra. *Color:* Dorsally shiny apple green or lime green (occasionally with tan, turquoise, light blue, or purplish), elytral margins metallic brassy-green; clypeal apex tan or castaneous with metallic green shine; pronotal margins tan with metallic green shine; tibiae, profemur, and sternites shiny testaceous; meso- and metafemora testaceous with metallic green, meso- and metatibia testaceous, with or without metallic green; pygidium testaceous with metallic green, metallic green, or olivaceous green; propygidium and tergites castaneous. *Head* (Fig. 20): Clypeal apex semicircular to rectangular with broadly rounded corners, not constricted at base; margins and apex weakly reflexed at tip. Frons densely punctate, nearly contiguous; punctures moderately large (a few large punctures at sides of base), some setose; lateral setae hair-like or thickened (sparse to moderately dense, moderately long, tawny), setae posterior to eye scale-like or thickened (dense or moderately dense, short, white or tawny). Clypeus contiguously punctate or rugopunctate; punctures mixed, moderately large and large. Interocular width 3.7–4.2 transverse eye diameters (male) or 4.9–6.1 (female). Terminal segment of maxillary palpus (dorsally) weakly impressed to moderately depressed from base to middle or apical third, segment subequal in length to segments 2–3. Antennal club subequal in length to segments 1–7 (male) or subequal in length to segments 2–7 (female). *Pronotum:* Punctate and with weakly impressed median, longitudinal groove; punctures in groove moderately dense to dense, punctures laterad of groove sparse to moderately dense, punctures mesad of margin dense to contiguous, punctures at margin moderately dense; punctures mixed, moderately large and large, setose; large punctures with setae mixed, hair-like and thickened, moderately long and long, tawny; moderate punctures with setae hair-like, minute to short, tawny (setae sometimes abraded), setae at base and apex occasionally scale-like. Basal bead complete to just beyond posteriolateral angle. *Elytron:* Surface with 5–6 punctate, longitudinal striae between suture and humerus; punctures moderate (some moderately large at apex), moderately dense (margins and apex) and sparse (disc), some setose; setae thickened (moderately long and long [mixed], sparse or moderately dense, tawny), occasionally scale-like at apex and near suture, occasionally with fine and minute setae (in newly emerged specimens). Intervals with similar sculpturing. Humeral and apical umbone poorly developed. Epipleuron (Fig. 15) flat, not expanded, marginal bead present; region from metacoxa to apex setose; setae scale-like or thickened, short and moderately long, dense, white. Suture angle square. *Propygidium:* Posterior margin with fringe of setae; setae scale-like or thickened, short, white. Supraspiracular ridge well developed (Fig. 9). *Pygidium:* Male: disc and middle apex with hair-like setae (mixed, moderately long and long, moderately dense, tawny) and punctures (small, sparse or moderately dense); lateral margin and base with scale-like setae (dense, white). Female: disc weakly depressed longitudinally, punctate at margins and at middle apex; punctures mixed, small and moderate, setose; setae on disc thickened, white, moderately long and long (mixed), sparse or moderately; setae at base and lateral margin scale-like, dense,

white. *Venter*: Sternum moderately densely or densely clothed with hair-like setae and/or scale-like setae; sternites moderately densely clothed with thickened and/or scale-like, white, moderately long setae (less dense in female). Prosternal keel broadly triangular; apex projecting anteriorly at about 45° with respect to ventral plane; apex produced to protrochanter, apex blunt. Mesometasternum with apex quadrate, weakly produced beyond middle or apex of mesocoxa. Apex of terminal sternite in female deeply emarginated at middle (e.g., Fig. 12). *Legs*: Larger claws of male thickened, weakly bifurcate at apex. Larger claws of female with ventral tooth. Tarsomere 5 with poorly developed ventromedial tooth, apex rounded (Fig. 8). Metatibia with inner and outer edges straight, with 2 carinae; 1 in basal third (poorly developed), 1 at apical third (moderately developed in males, well developed in females); apical 1/6 weakly divergent (more so in females). *Male genitalia*: Figure 33a–g.

Diagnosis. *Brachysternus prasinus* is the most common of all *Brachysternus* species and is also the most variable in terms of color, setae, and punctuation. This species is distinguished from other species of *Brachysternus* based on the following combination of characters: clypeus tan or castaneous (rarely green) and reflexed only at the tip; mesometasternal projection quadrate and produced to the middle or apex of the mesocoxa; elytral epipleuron not expanded (Fig. 15); protarsomere 5 (male) with ventromedial tooth blunt at apex (Fig. 8); elytron without well developed humeral and apical umbones; supraspiracular ridge well developed (Fig. 9).

Due to the wide range of variability, we contrast each species of *Brachysternus* with *B. prasinus* for ease of diagnosis. *Brachysternus spectabilis* is separated from *B. prasinus* based on the following: form of the ventral sclerites of the male genitalia (Fig. 34 versus Fig. 33), clypeus green and reflexed more broadly, mesometasternal projection produced to only the base of the mesocoxae, region posterior to eye with thickened setae (Fig. 20) rather than scale-like setae, meso- and metafemora and meso- and metatibia testaceous (sometimes with weak greenish reflections) rather than testaceous with green. *Brachysternus marginatus* is separated from *B. prasinus* based on the following: margin of elytron with epipleuron expanded and lacking marginal bead (Fig. 14 versus Fig. 15), pronotal disc with small and sparse punctures, inner margin of metatibia bowed inwardly, form of the ventral sclerites of the male genitalia (Fig. 30). *Brachysternus olivaceus* is separated from *B. prasinus* based on the following: pygidium at base and margins with hair-like setae rather than thickened or scale-like setae (Fig. 11b versus Fig. 11c), supraspiracular ridge poorly developed rather than well developed, antennal club slightly longer than segments 1–7 (male) or subequal to segments 1–7 (female), interocular width 2.8–3.3 transverse eye diameters in males or 4.5–5.5 in females. *Brachysternus patagoniensis* is separated from *B. prasinus* based on the following: metatibia with inner edge bowed inwardly (Fig. 19) rather than straight, form of the ventral sclerites of the male genitalia (Fig. 32), clypeus that is weakly constricted at the base (Fig. 21), and elytral margin with dense, long, hair-like setae. *Brachysternus angustus* is separated from *B. prasinus* based on the following: elytron with apical umbone well developed, clypeus green, and the form of the male genitalia (Fig. 28 versus Fig. 33).

Because of the great amount of variation in *B. prasinus*, many names have been proposed for various morphotypes. We have studied two morphotypes of *B. prasinus* that warrant discussion. Specimens of one variant, from the provinces of Maule (Carrizalillo and Constitución) and Talca (Alto de Vilches) in Chile, are more densely setose dorsally (setae usually orange), darker metallic green dorsally, and darker ventrally (nearly castaneous). We believe that this

morphotype is within the range of variation observed in other populations of *B. prasinus*. Additionally, localities where specimens of this morphotype were collected also yielded the "typical" *B. prasinus* morphotype.

Another variant is the "*B. riverae*" morphotype of *B. olivaceus*. This variant is more sparsely punctate on the head and elytra than typical *B. olivaceus*. The type series of *B. riverae* was, in fact, a mixed series including the lectotype and a paralectotype that are conspecific with *B. olivaceus* and a paralectotype that is conspecific with *B. prasinus*. Specimens of the "*B. riverae*" morphotype are distributed over a wide range of localities that coincide with *B. prasinus*. We believe that variation observed in the "*B. riverae*" morphotype is within the range of variation of *B. prasinus*. Specimens of *B. prasinus* are separated from specimens of the "*B. riverae*" morphotype and specimens of *B. olivaceus* by the well developed supraspiracular ridge (present in *B. prasinus* [Fig. 9], poorly developed in *B. olivaceus* and the "*B. riverae*" morphotype).

Distribution (Fig. 37). Recorded from sea level to 2,000 m elevation from Coquimbo to Llanquihue, Chile and from Neuquén to Chubut in western Argentina.

Locality Data. 852 specimens examined from AMNH, BCRC, CASC, CMNC, CMNH, CNCI, FMNH, FSCA, GASC, KSUC, LACM, MABC, MCZC, MGFT, MIZA, MLJC, MNHN, MNNC, OSAC, PVGH, SEMC, UMRM, USNM, VMDM, ZMHB, ZMUH.

ARGENTINA (47). CHUBUT (10): El Turbio, Esquel, Lago Fontana, Parque Nacional Los Alerces, No Data. NEUQUÉN (26): Arroyo Quechuquina, Copahue, La Angostura, Lago Espejo, Lago Hermoso, Parque Nacional Lanín, Pucará, Río Litran, San Martín de los Andes. RÍO NEGRO (10): Bariloche, El Bolson, Isla Victoria, Llao Llao, Río Villegas. NO DATA (1).

CHILE (788). ARAUCO (39): Arauco, Caramávida, Caramávida (20 km W), Contulmo, Peillén Pillé. BÍO-BÍO (19): Cobquecura, El Abanico. CAUTÍN (44): Cherquenco, Curacautín, El Secreto Bog, Fundo El Coigue, Fundo La Selva, Galvarino, Huife, Loncoche (12.3 km N), Pucón, Pucón (14 km SE), Río Cautín, Temuco, Temuco (20 km E), Villarrica, Villarrica (30 km NE). COLCHAGUA (3): Tanumé. CONCEPCIÓN (41): Collico Norte, Concepción, Fundo Pinares, Nonguén, Penco. COQUIMBO (3): El Pangué, La Serena. CURICÓ (27): Cordillera Curicó, Cubillo, El Coigo, Las Tablas, Las Trancas, Los Queñes (6 km E), Palos Negros. LINARES (26): El Emboque, Estero Leiva, Linares, Parral. LLANQUIHUE (14): Cayetue, Maullín, Puerto Varas. MALLECO (96): Angol, Collipolli (23 km E), Cordillera Las Raíces, Cordillera Nahuelbuta, Curacautín, Lago Galletué, Laguna de Icalma, Laguna San Pedro, Liucura, Lonquimay, Manzanar, Manzanar (20 km E), Parque Nacional Nahuelbuta, Pino Hachado, Selva Oscura, Termas de Tolhuaca, Victoria, Villa Portales, Villa Portales (20 km E). MAULE (75): Carrizalillo, Cauquenes, Cayurranquil, Constitución, Curanipe, Curanipe (15 km E), El Pantanillo, Fundo El Rosal, Paso García, Río Teno, Tregualemo. ÑUBLE (74): Alto Tregualemu, Bulnes, Chillán, Cobquecura, El Abanico, Las Trancas, Los Lleuques, Piedras Comadres, Puente Marchant, Recinto, Recinto (13 km E), San Carlos (50 km E). O'HIGGINS (3): Las Cabras, Las Nieves. OSORNO (25): Anticura, Chanchan, Entre Lagos, Maicolpué, Osorno, Parque Nacional Puyehue. SANTIAGO (69): Alto de Cantillana, Bucalemu, Cantillana, Cuesta La Dormida, El Roble, Fundo Pinares, La Dormida, Melipilla, Santiago, Villa Alhué. TALCA (117): Alto de Vilches, Pencahue, Rari. VALDIVIA (39): Corral, Lago Pirehueico, Licanray, Liquiñe, Llancahue, Panguipulli, Pucura, Puerto Fuy (Lago

Pirihueico), Río Licán, Valdivia. VALPARAÍSO (8): Campanita, Casablanca, Limache, Valparaíso. NO DATA (66).

NO DATA (17).

Temporal Data. January (162), February (51), March (21), June (1), August (2), September (7), October (95), November (108), December (271).

Natural History. *Brachysternus prasinus* has been recorded in various *Notofagus* forests (often referred to as Valdivian rainforest). Adults have been captured at night using ultraviolet light.

Remarks. This variable species has gone by many species names since its description over 170 years ago. In fact, Guérin-Méneville created two synonyms for his *B. prasinus* (a species that he described): *B. fulvipes* and *B. vicinus*. These species were reduced to varieties by Blanchard (1851) and by Harold (1869), respectively. We studied the lectotypes of *B. fulvipes* and *B. vicinus* and determined that they are both conspecific with *B. prasinus*.

Within the literature that deals with *Brachysternus*, much confusion has surrounded the name "*B. viridis*" (see section on "Taxonomic History of the Genus *Brachysternus*"). The confusion was created early in the history of the genus, and it has been perpetuated to this day. In his "Histoire Naturelle des Insectes Coléoptères," Laporte (1840) discussed the genus *Brachysternus* and placed two species in the genus: *B. "viridis"* Guérin-Méneville (*lapsus calami*) and a new species, *Brachysternus castaneus* (now *Aulacopalpus castaneus*). Laporte correctly cited Guérin-Méneville's publication, pagination, and plate number for *B. prasinus*, but he incorrectly referred to the species as *B. "viridis"* Guérin-Méneville. Because Laporte correctly cited Guérin-Méneville's publication and made no reference to *B. prasinus*, we believe that Laporte simply made a mistake in using the name *B. "viridis"* Guérin-Méneville. The name does not appear to be used as a replacement name and does not appear to be used as a new species name. Instead, Laporte seems to have grossly misspelled the species name. This mistake resulted in much taxonomic confusion within *Brachysternus*. Subsequent authors (Burmeister 1844; Blanchard 1851; Solier 1851; Lacordaire 1856) followed Laporte's mistake and cited the name as "*B. viridis* Guérin-Méneville." In each of these instances, the authors cited Guérin-Méneville's publication, pagination, and plate number for *B. prasinus*, but they used the incorrect name "*B. viridis*." Because these authors correctly cited Guérin-Méneville's publication, pagination, and plate number for *B. prasinus*, we believe that references to "*B. viridis* Guérin-Méneville" were intended to be redescriptions (or merely catalog listings) of *B. prasinus* Guérin-Méneville; they were not intended to be descriptions of a new species. In addition, Lacordaire (1856) erroneously stated that "*B. viridis* Guérin-Méneville" was the type of the genus *Brachysternus*, even though Guérin-Méneville (1844) specifically stated that *B. prasinus* was the type of the genus.

Philippi (1861) was the first to report that "*B. viridis*" was an erroneous name for *B. prasinus* Guérin-Méneville, and he clarified this in his publication. Philippi and Philippi (1864) restated this fact in their paper on new Chilean chafers. One would have thought that this would have terminated the use of "*B. viridis*" within the nomenclature. However, in his work on the genus *Brachysternus*, Germain (1905) entered the name into nomenclature as an available name by clearly indicating that "*B. viridis sensu* Solier" (1851) was an entity separate from *B. prasinus* and by providing thorough descriptions of both species. Germain (1905) was aware that "*B. viridis* Guérin-Méneville" had been misapplied to *B. prasinus* Guérin-Méneville, but he believed that Solier's concept of "*B. viridis*" differed from *B. prasinus*:

"This species [*B. viridis*], which is the one most frequently encountered in Chile, and which, in 1851 was described by Solier in the work of Gay, has been considered erroneously by many entomologists as a synonym of *Br. prasinus* that . . . Guérin described in the "Voyage de la Coquille." These two species: *viridis* (Sol.) and *prasinus* (Guér.), are distinct without a doubt; and I am going to explain the confusion" (Germain 1905: 487, translated from Spanish).

Germain discussed the differences between *B. prasinus* and "*B. viridis sensu Solier*" and gave a lengthy description for "*B. viridis Solier*." Solier (1851) intended to redescribe *B. prasinus*, and Germain (1905) intended to describe *B. viridis* as a new species that was distinct from all other known species in the genus. Thus, Germain's description constitutes a valid description of the species (see Article 12.2.1, International Code of Zoological Nomenclature [1999]). Because the name "*B. viridis* Guérin-Ménéville" was a *lapsus calami* (thus not an available name), Germain was the first to enter the name into nomenclature as an available name. Solier is incorrectly attributed as the author of "*B. viridis*" by Germain (1905); Ohaus (1909, 1918); Blackwelder (1944); Gutierrez (1947, 1949); and Machatschke (1965, 1972). We credit Germain as the correct author, thus the species should be cited: *B. viridis* Germain (not "*B. viridis* Guérin-Ménéville" or "*B. viridis Solier*"). We consider this name a synonym of *B. prasinus*.

Ohaus (1918) attributed Laporte as the author for "*B. viridis*," but it is clear to us that Laporte (1840) was not describing a new species. Laporte was clearly trying to redescribe *B. prasinus* Guérin-Ménéville (correctly citing Guérin-Ménéville's publication, pagination, and plate number for *B. prasinus*). Instead, he mistakenly used the incorrect specific epithet "*viridis*." Thus, *B. viridis* Laporte is a *lapsus calami* (incorrect subsequent spelling).

Besides *B. viridis*, Germain (1905) created three other species names for *B. prasinus*: *B. dilatatus*, *B. pubescens*, and *B. sinuatifrons*. Germain named *B. dilatatus* based on six males and one female. The specific epithet "*dilatatus*" was a manuscript name used by Philippi (the lectotype bears a label that says "p. 1425", probably with reference to Philippi's manuscript). This species was described based on color of the clypeus (red and green) and color of the femur. We have found that color is variable for the species. Based on examination of the lectotype, we determined that this taxon is conspecific with *B. prasinus*. Germain (1905) described *B. pubescens* based on three males. He stated that *B. pubescens* was most similar to *B. "viridis*." Based on examination of the type specimens, we determined that *B. pubescens* is conspecific with *B. prasinus*. *Brachysternus sinuatifrons* Germain (1905) was named based on one female specimen that he differentiated from other *Brachysternus* based on elytral coloration and punctuation (characters that we have found are variable for the species). Based on examination of the type specimen, we determined that *B. sinuatifrons* is simply a poorly developed specimen with unusual coloration. A label (in French) on the specimen corroborates this view "*insuffisance colorié et mal devel.*" Thus, we believe that *B. sinuatifrons* is conspecific with *B. prasinus*.

Brachysternus spectabilis Erichson, 1847

(Figs. 7, 16, 26, 34a–c, 38; see also Fig. 1 in Smith 2002)

Brachysternus spectabilis Erichson 1847:100. Lectotype female at ZMHB with label data: a) "11479" (typeface), b) "♀" (typeface), c) "Type" (orange

label, typeface), d) "spectabilis Er.* Perú Phil" (erroneous locality, blue label, handwritten), e) "BRACHYSTERNUS SPECTABILIS ERICHSON ♀ DET: JAMESON & SMITH 2000 LECTOTYPE" (red lectotype label), f) "Zool. Mus. Berlin" (typeface). **Lectotype here designated.** The location and existence of paralectotypes are unknown. Two female specimens from the ZMHB have an identical orange "type" label but are also labeled "Chile." Erichson (1847) did not mention specimens labeled "Chile" and the "Catalog General Musei Zoologi Berlinen Coleoptera 1 (Nr. 1-12870)" at ZMHB states that only one specimen was received from Philippi from "Peru." Therefore, we consider the specimens labeled "Chile" to have erroneous type labels. Although Erichson described this species as from Peru, the type specimen(s) were mislabeled and were actually collected in Chile or Argentina (based on known distributional data, see "Remarks" section).

Brachysternus major Philippi and Philippi 1864:317. Holotype female at MNHC with label data: a) "HOLOTIPO" (orange label, typeface), b) "SINTIPO" (typeface), c) "Br. major Phil. 876" (handwritten), d) "Collección Philippi" (typeface), e) "♀" (typeface), f) "BRACHYSTERNUS PHILIPPII GERMAIN DET. F. CAMOUSSEIGHT" (handwritten), g) "Det. F. Ohaus 1909 Br. spectabilis ♀ Erichson" (typeface and handwritten), h) "Chile M.N.H.N. Tipo No. 2899" (typeface), i) "BRACHYSTERNUS MAJOR PHILIPPI AND PHILIPPI ♀ HOLOTYPE" (our red holotype label), j) "*Brachysternus SPECTABILIS ERICHSON ♀ DET: JAMESON & SMITH 2000.*" Specimen with abdomen missing. Philippi and Philippi (1864) had only one specimen in the original type series (they refer to it as "the available specimen" in the singular). Therefore the holotype is fixed by monotypy. Name placed in synonymy with *B. spectabilis* by Ohaus (1909).

Brachysternus obscurus Philippi and Philippi 1864:317. Lectotype male at MNHC with label data: a) "HOLOTIPO ♂" (erroneous holotype label, orange label, typeface), b) "Brachysternus obscurus Ph. F." (handwritten), c) "Brachysternus obscurus Phil ♂ = Brachysternus spectabilis Er." (handwritten), d) "Chile M.N.H.N. Tipo No. 2900" (typeface), e) "BRACHYSTERNUS OBSCURUS PHILIPPI AND PHILIPPI ♂ DET: JAMESON & SMITH 2000 LECTOTYPE" (red lectotype label), f) "*Brachysternus SPECTABILIS ERICHSON ♂ DET: JAMESON & SMITH 2000.*" Male genitalia card mounted. **Lectotype here designated.** It is unclear how many specimens were in the original type series (Philippi and Philippi 1864). The location and existence of paralectotypes are unknown. Name placed in synonymy with *B. spectabilis* by Ohaus (1909).

Brachysternus philippii Germain 1905:481. Lectotype male at MNHC with label data: a) "Hallado en copulacion el W. Chiloe" (handwritten), b) "SINTIPO" (typeface), c) "Collección P. Germain" (typeface), d) "BRACHYSTERNUS PHILIPPII GERMAIN DET. R. CAMOUSSEIGHT" (handwritten), e) "Det. F. Ohaus 1909, Brachysternus spectabilis Er. ♂" (typeface and handwritten), f) "Brachysternus spectabilis Er. ♂ R. Gutiérrez-Det 51" (typeface and handwritten), g) "Chile M.N.H.N. Tipo No. 2870" (typeface), h) "BRACHYSTERNUS PHILIPPII GERMAIN ♂ DET: JAMESON & SMITH 2000 LECTOTYPE" (red lectotype label), i) "*Brachysternus SPECTABILIS ERICHSON ♂ DET: JAMESON & SMITH 2000.*" **Lectotype here designated.** Lecto-

allotype female at MNNC with label data: a) "Chiloe" (handwritten), b) "♀" (typeface), c) "Colección P. Germain" (typeface), d) "SINTIPO" (typeface), e) "BRACHYSTERNUS PHILIPPII GERMAIN DET. R. CAMOUSSEIGHT" (handwritten), f) "Chile M.N.H.N. Tipo No. 2890" (typeface), g) "BRACHYSTERNUS PHILIPPII GERMAIN ♀ DET: JAMESON & SMITH 2000 LECTOALLOTYPE" (red lectoallotype label), f) "*Brachysternus SPECTABILIS* ERICHSON ♀ DET: JAMESON & SMITH 2000." Thirteen male and fourteen female paralectotypes with similar labels to lectotype and lectoallotype. All paralectotypes have the following labels: "Colección P. Germain," "SINTIPO," "BRACHYSTERNUS PHILIPPII GERMAIN DET. R. CAMOUSSEIGHT," "BRACHYSTERNUS PHILIPPII GERMAIN DET: JAMESON & SMITH 2000 PARALECTOTYPE," and "*Brachysternus SPECTABILIS* ERICHSON DET: JAMESON & SMITH 2000." All paralectotypes also have a "Chile M.N.H.N. Tipo No." label with the numbers 2871–2889, 2891–2898. Germain (1905) had 30 specimens in the original type series. The location of one paralectotype is unknown. Name placed in synonymy with *B. spectabilis* by Ohaus (1909).

Description. *Length:* 18.7–23.8 mm. *Width:* 8.6–11.1 mm at base of elytra. *Color:* Dorsally light to dark shiny green (occasionally castaneous or olivaceous), elytral margins metallic brassy-green or green; clypeus tan or castaneous (female) or green (male), pronotal margin occasionally tan; femora, tibiae, and sternites testaceous or castaneous; pygidium metallic dark green or olivaceous green; propygidium and tergites brown or testaceous. *Head:* Clypeal apex rectangular with broadly rounded corners, not constricted at base; margins and apex weakly reflexed. Frons densely punctate; punctures moderately large and large (mixed), some setose; setae hair-like or thickened laterally and at base (sparse, short to moderately long, reddish) and thickened posterior to eye (moderately dense, short, tawny or white). Clypeus confluent punctate to rugopunctate; punctures moderate. Interocular width 3.2–3.8 (male) or 4.0–4.7 (female) transverse eye diameters. Terminal segment of maxillary palpus (dorsally) weakly impressed or flattened from base to about middle, segment subequal in length to segments 2–3. Antennal club subequal in length to segments 1–7 (male) or segments 2–7 (female). *Pronotum:* Surface with weakly impressed, median, longitudinal groove; disc and margins densely to confluent punctate, rugopunctate in some places; punctures moderate to large, some setose; setae thickened (long, reddish) and hair-like (short to moderately long, tawny, sometimes abraded) moderately dense. Basal bead complete to just beyond posteriolateral angle. *Elytron:* Surface with 1–5 poorly defined, punctate, longitudinal striae between suture and humerus; punctures moderate and small (mixed), sparse (disc) and moderately dense (margin at apex), some setose; setae thickened and long (sparse, tawny or reddish) or short (sparse or moderately dense, tawny or white, may be abraded). Intervals with similar sculpturing. Humeral umbone poorly developed, apical umbone occasionally well-developed. Epipleuron flat, not expanded, marginal bead present; region from metacoxa to apex setose; setae thickened, short and moderately long (mixed), dense, white or reddish. Suture angle square. *Propygidium:* Posterior margin with fringe of setae; setae thickened, short, white. Supraspiracular ridge well-defined. *Pygidium:* Male: disc and middle apex with hair-like setae (mixed, moderately long and long, moderately dense, white) and punctures (small, moderately dense); margins and base with dense, white, scale-like setae. Female: disc with broad, glabrous concavity as wide or wider than emargination in terminal sternite, punctate at margins and at middle apex; punctures small, some setose; setae on disc hair-like and thickened, white, moderately long and long (mixed); margins and base with dense, white, scale-like setae. *Venter:* Sternum densely clothed with long, tawny, setae; sternites with setae moderately dense, thickened, white setae (less dense in female). Prosternal keel broadly triangular; apex projecting anteriorly at about 45° with respect to ventral plane; apex produced to about middle of prothorax, blunt. Mesometasternum with apex rounded or weakly quadrate, not pro-

duced. Apex of terminal sternite in female deeply emarginated at middle (e.g., Fig. 12). *Legs*: Larger claws of male thickened, weakly bifurcate at subapex. Larger claws of female with ventral tooth (Fig. 26). Tarsomere 5 with well developed ventromedial tooth, apex quadrate and acute. Metatibia (Fig. 16) with inner and outer edges straight, with carinae; 1 at middle, 1 in apical third, carinae more developed in females; apical 1/5 weakly divergent (more so in females). *Male genitalia*: Figure 34a–c.

Diagnosis. *Brachysternus spectabilis* is most similar to *B. angustus* based on the coloration, sculpturing, and presence in some specimens of a well developed apical elytral umbone. However, it differs from *B. angustus* based on the meso- and metafemora and tibia (some specimens have weak greenish reflections rather than testaceous with green as in *B. angustus*), the moderately dense and thickened setae on the sternites (rather than the dense, scale-like setae as in *B. angustus*), the thickened setae posterior to eye (rather than scale-like setae as in *B. angustus*), the overall size that is generally larger in *B. spectabilis* (18.7–23.8 mm in *B. spectabilis*, 15.8–20.3 mm in *B. angustus*), and the form of the ventral and lateral sclerites of the male genitalia (Fig. 28 versus Fig. 34).

Brachysternus spectabilis is also similar to *B. prasinus*, but is separated by: the testaceous meso- and metafemora and tibia (some specimens have weak greenish reflections; the meso- and metafemora are testaceous with green in *B. prasinus*); setae posterior to eye thickened (scale-like in *B. prasinus* [Figs. 11a, 20]); form of the male genitalia; dorsal surface of the head and pronotum that lack short, fine, erect setae (present in *B. prasinus*).

Some specimens of *B. spectabilis* could be confused with the “*B. riverae*” morphotype of *B. olivaceus* (see “remarks” in the description of *B. olivaceus*). Specimens of *B. spectabilis* are separated from this morphotype based on the form of the supraspiracular ridge (poorly developed in *B. olivaceus*; well developed in *B. spectabilis* [e.g., Fig. 9]), the form of the ventral sclerite of the male genitalia (Fig. 31 versus Fig. 34), and the form of the female terminal sclerite (moderately emarginate in *B. olivaceus* [e.g., Fig. 13] or deeply emarginate in *B. spectabilis* [Fig. 12]).

Distribution (Fig. 38). Recorded from 70–1,900 m elevation from O’Higgins to Aisén, Chile and from Neuquén to Chubut in western Argentina.

Locality Data. 201 specimens examined from AMNH, BCRC, CASC, CMNC, CNCI, FMNH, GASC, LACM, MABC, MCZC, MGFT, MNNC, PVGH, SEMC, UMRM, UNSM, USNM, VMDM, ZMHB.

ARGENTINA (8). CHUBUT (2): El Turbio, Lago Puelo. NEUQUÉN (5): La Angostura, Lago Huechulafquén, Parque Nacional Lanín, San Martín de los Andes. RÍO NEGRO (1): El Bolsón.

CHILE (159). AISEN (5): Coyhaigue, Lago Risopatrón, Parque Nacional Río Simpson, Puerto Aisén, Río Palos. ARAUCO (6): Arauco, Contulmo, Peillén Pillé, Pichinahuel. BÍO-BÍO (1): No Data. CAUTÍN (29): Cherquenco, Cunco, Fundo La Selva (48 km NW Nueva Imperial), Lago Caburga, Lago Pirehueico, Pucón, Temuco, Villarrica, No Data. CHILOÉ (4): Puntra, Terao, No Data. CONCEPCIÓN (1): Fundo Pinares. CURICÓ (1): Las Trancas. LLANQUIHUE (5): Hornohuínco, Lago Chapo, Maullín, Puerto Montt. MALLISCO (14): Angol (17 km W), Cordillera de Las Raíces, Curacautín, Laguna San Pedro, Lonquimay, Malleco, Manzanar, Palo Botado, Purén, Victoria (15 km W). ÑUBLE (11): Chillán, Las Trancas. O’HIGGINS (1): Las Nieves. OSORNO (18): Antillanca, Osorno, Parque Nacional Puyehue, Puauchó (14.5 km W), Pucatrihue, Rupanco. SANTIAGO (4): El Roble. VALDIVIA (27): Chauquén, Corral, El Azaval, Lanco, La Unión (34 km WNW), Las Lajas (W

La Unión), Llancahué, Pirihueico, Puerto Fuy (Lago Pirihueico), Río Gol-gol, Río Licán, Valdivia. VALPARAÍSO (8): Quilpué, Valparaíso. NO DATA (24).

NO DATA (34).

Temporal Data. January (30), February (18), March (6), October (10), November (16), December (56).

Natural History. *Brachysternus spectabilis* has been recorded from Valdivian rainforest, mixed evergreen forest, mixed *Nothofagus* forest, mixed remnant forest, and selectively cut forest. Germain (1905:482) reported this species flying at night and found on the leaves of *Nothofagus* (then considered *Fagus*). Adults have been captured using ultraviolet lights at night, flight intercept traps, and by "car netting."

Remarks. Several names have been proposed for this species, perhaps partially due to a lack of communication. Philippi and Philippi (1864) and Germain (1905) were Chilean workers and were apparently unaware of Erichson's work (1847). Neither Philippi and Philippi nor Germain discussed *B. spectabilis* Erichson. In "The Fauna of Peru," Erichson (1847) described *B. spectabilis* based on specimens that were probably mislabeled as "Peru." Solier (1851) and Blanchard (1851) commented that "Entomologists frequently confuse insect collections originating from the two regions (Peru and Chile) even though they are so different." This was apparently a common mistake at the time, perhaps due to the recent changes in the political borders and regional name changes of the area. Philippi and Philippi (1864) created two names for *B. spectabilis* (*B. major* and *B. obscurus*), and Germain (1905) created the name *B. philippii*.

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Literature Cited

Arrow, G. J. 1899. On the classification of the coleopterous family Rutelidae. The Annals and Magazine of Natural History (series 4) 7:363–370.

- Blackwelder, R. E. 1944.** Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America. Part 2. United States National Museum Bulletin 185:189–341.
- Blanchard, C. É. 1851.** Ordre des Coleoptera [pp. 129–240]. In: Muséum d'Histoire Naturelle de Paris. Catalogue de la Collection Entomologique. Classe des Insectes, vol. 1, part 2 (H. Milne-Edwards, C. É. Blanchard, and H. Lucas, editors). Gide and Baudry, Paris.
- Britton, E. B. 2000.** A review of *Heteronyx* Guérin-Ménéville (Coleoptera: Scarabaeidae: Melolonthinae). Invertebrate Taxonomy 14:465–589.
- Burmeister, H. 1844.** Handbuch der Entomologie, vol. 4, part 1. T. C. F. Enslin, Berlin. 586 pp.
- Cowan, C. F. 1970.** The insects of the *Coquille* voyage. Journal of the Society for the Bibliography of Natural History 5:358–360.
- Dejean, P. F. M. A. 1833.** Catalogue des Coléoptères de la Collection de M. le Comte Dejean, Fascicules 1–2. Méquignon-Marvis Père et Fils, Paris. 176 pp.
- Dejean, P. F. M. A. 1836.** Catalogue des Coléoptères de la Collection de M. le Comte Dejean. Troisième Édition, Revue, Corrigée et Augmentée, Fascicules 1–4. Méquignon-Marvis Père et Fils, Paris. 468 pp.
- Erichson, W. F. 1847.** Conspectus Insectorum Coleopterorum quae in Republica Peruana observata sunt. Archiv für Naturgeschichte 13:67–185.
- Germain, P. 1905.** Apuntes entomológicos. Anales de la Universidad, Republica de Chile 115:449–506. [“1904”]
- Guérin-Ménéville, F. E. 1831.** Insectes. In: Voyage Autour du Monde, Exécuté par Ordre du Roi, sur la Corvette de la Majesté, la Coquille, Pendant les Années 1822, 1823, 1824 et 1825, sous le Ministère et Conformément aux Instructions de S. E. M. Le Marquis de Clermont-Tonnerre, Ministre de la Marine; et Publié sous les Auspices de son Excellence Mgr le Cte de Chabrol, Ministre de la Marine et des Colonies, Atlas (Histoire naturelle, Zoologie) (M. L. I. Duperrey Editor). Arthus Bertrand, Paris, 21 plates.
- Guérin-Ménéville, F. E. 1838a.** Insectes du voyage de la *Favorite*. Magasin de Zoologie 8(9):1–80.
- Guérin-Ménéville, F. E. 1838b.** Insectes [pp. 57–302]. In: Voyage Autour du Monde, Exécuté par Ordre du Roi, sur la Corvette de la Majesté, la Coquille, Pendant les Années 1822, 1823, 1824 et 1825, sous le Ministère et Conformément aux Instructions de S. E. M. Le Marquis de Clermont-Tonnerre, Ministre de la Marine; et Publié sous les Auspices de son Excellence Mgr le Cte de Chabrol, Ministre de la Marine et des Colonies, vol. 2, Part 2 (Zoologie, M. Lesson editor). Division 1 (M. L. I. Duperrey, editor). Arthus Bertrand, Paris. 319 pp. [“1830”]
- Guérin-Ménéville, F. E. 1840.** Description de quelques Coléoptères des côtes du détroit de Magellan. Revue Zoologique 1840:295–305.
- Guérin-Ménéville, F. E. 1844.** Iconographie du Règne Animal de G. Cuvier, ou Représentation d’après Nature de L’une des Espèces les plus Remarquables et souvent non encore Figurees, de Chaque Genre d’Animaux, vol. 3. J. B. Baillière, Paris. 576 pp.
- Gutiérrez, R. 1947.** Escarabajos comunes a Chile y la Argentina. Revista de la Sociedad Entomológica Argentina 13:309–314.
- Gutiérrez, R. 1949.** Notas sobre Scarabaeidae Neotropicos. Anales de la Sociedad Científica Argentina 148:9–35.
- Gutiérrez, R. 1950.** Notas sobre Scarabaeidae Chilenos (Coleoptera Lamellicornia). Arthropoda 1(2/4):267–278.
- Harold, E. 1869.** Scarabaeidae [p. 979–1346]. In: Catalogus Coleopterorum Hucusque Descriptorum Synonymicus et Systematicus, vol. 4 (M. Gemminger and E. Harold, editors). E. H. Gummi, Monachii.
- Horn, W., and I. Kahle. 1936.** Über entomologische Sammlungen, Entomologen und Entomo-Museologie (Ein Beitrag zur Geschichte der Entomologie). Entomologische Beihefte 3(2):161–296.
- International Commission on Zoological Nomenclature. 1999.** International Code of

- Zoological Nomenclature, Fourth Edition. International Commission on Zoological Nomenclature, The Natural History Museum, London. 306 pp.
- Jameson, M. L. 1990.** Revision, phylogeny, and biogeography of the genera *Parabyrsopolis* Ohaus and *Viridimicus* (new genus) (Coleoptera: Scarabaeidae: Rutelinae). *Coleopterists Bulletin* 44:377–422.
- Lacordaire, J. T. 1856.** Histoire Naturelle des Insectes. Genera des Coléoptères, vol. 3. Librairie Encyclopédique de Roret, Paris. 594 pp.
- Laporte, F. L. (Comte de Castelnau). 1840.** Histoire Naturelle des Insectes Coléoptères (Volume 2 of Histoire Naturelle des Animaux Articulés). P. Duménil, Paris. 564 pp.
- Machatschke, J. W. 1965.** Coleoptera Lamellicornia. fam. Scarabaeidae, subfam. Rutelinae, section Rutelinae Orthochilidae. *Genera Insectorum* 1990:1–145.
- Machatschke, J. W. 1972.** Scarabaeoidea: Melolonthidae, Rutelinae. *Coleopterorum Catalogus Supplementa* 66(1):1–361.
- Ohaus, F. 1904.** Revision der Anoplognathiden (Coleoptera lamellicornia). *Stettiner Entomologische Zeitung* 65:57–175.
- Ohaus, F. 1905.** Revision der amerikanischen Anoplognathiden (Coleoptera lamellicornia). *Stettiner Entomologische Zeitung* 66:120–167.
- Ohaus, F. 1909.** Nachträge und Berichtigungen zu meiner Revision der Brachysterniden (Coleopt. lamellicornia). *Stettiner Entomologische Zeitung* 71:3–26. [1910].
- Ohaus, F. 1918.** Scarabaeidae: Euchirinae, Phaenomerinae, Rutelinae. *Coleopterum Catalogus* 20:1–241. [“1915”]
- Philippi, F. 1861.** Observaciones sobre los lamellicornios de Chile, descritos en la obra del Señor Gay, con descripción de algunas especies nuevas. *Anales de la Universidad, Republica de Chile* 18:735–742.
- Philippi, R. A., and F. Philippi 1864.** Beschreibung einiger neuen Chilenischen Käfer. *Stettiner Entomologische Zeitung* 25:313–406.
- Ratcliffe, B. C., and F. Ocampo 2002.** A review of the genus *Hylamorphia* Arrow (Coleoptera: Scarabaeidae: Rutelinae: Anoplognathini: Brachysternina). *Coleopterists Bulletin* 56:367–378.
- Samuelson, A., N. Evenhuis, and G. Nishida 2001.** The Insect and Spider Collections of the World Web Site. URL: <http://www.bishopmuseum.org/bishop/ento/codens-r-us.bhtml>.
- Sherborn, C. D., and B. B. Woodward. 1906.** Notes on the dates of publication of the natural history portions of some French voyages.—‘Voyage autour du Monde. . . sur . . . la *Coquille* pendant . . . 1822–25. . . Par L. J. Duperry,’—a correction. *The Annals and Magazine of Natural History* 17(7):335–336.
- Smith, A. B. T. 2002.** Revision of the southern South American endemic genus *Aulacopalpus* Guérin-Méneville with phylogenetic and biogeographic analyses of the subtribe Brachysternina (Coleoptera: Scarabaeidae: Rutelinae: Anoplognathini). *Coleopterists Bulletin* 56:379–437.
- Solier, A. J. J. 1851.** Orden III. Coleopteros [pp. 5–285]. In: *Historia Física y Política de Chile. Zoología*, vol. 5 (C. Gay, editor). C. Gay, Paris. 564 pp.
- Wiley, E. O. 1981.** Phylogenetics. The theory and practice of phylogenetic systematics. John Wiley and Sons, New York. 439 pp.

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