

## **A New Click Beetle Genus from Southern Chile: Llanquihue (Coleoptera, Elateridae, Elaterinae, Pomachiliini)**

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# A new click beetle genus from Southern Chile: *Llanquihue* (Coleoptera, Elateridae, Elaterinae, Pomachiliini)

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## Abstract

*Llanquihue*, a new genus of Elateridae from Southern Chile, is here described and illustrated with 2 species: *Llanquihue vittipennis* (Candèze) new comb., and *L. carlota* sp. nov. The genus *Llanquihue* belongs to the subfamily Elaterinae and to the tribe Pomachiliini.

## Résumé

Se describe e ilustra *Llanquihue*, género nuevo de Elateridae con dos especies: *Llanquihue vittipennis* (Candèze) new comb., and *L. carlota* sp. nov. El género *Llanquihue* pertenece a la subfamilia Elaterinae y a la tribu Pomachiliini. Se describe e ilustra *Llanquihue*, género nuevo de Elateridae con dos especies: *Llanquihue vittipennis* (Candèze) new comb., and *L. carlota* sp. nov. El género *Llanquihue* pertenece a la subfamilia Elaterinae y a la tribu Pomachiliini.

**Keywords:** *Deromecus*, Pomachiliini

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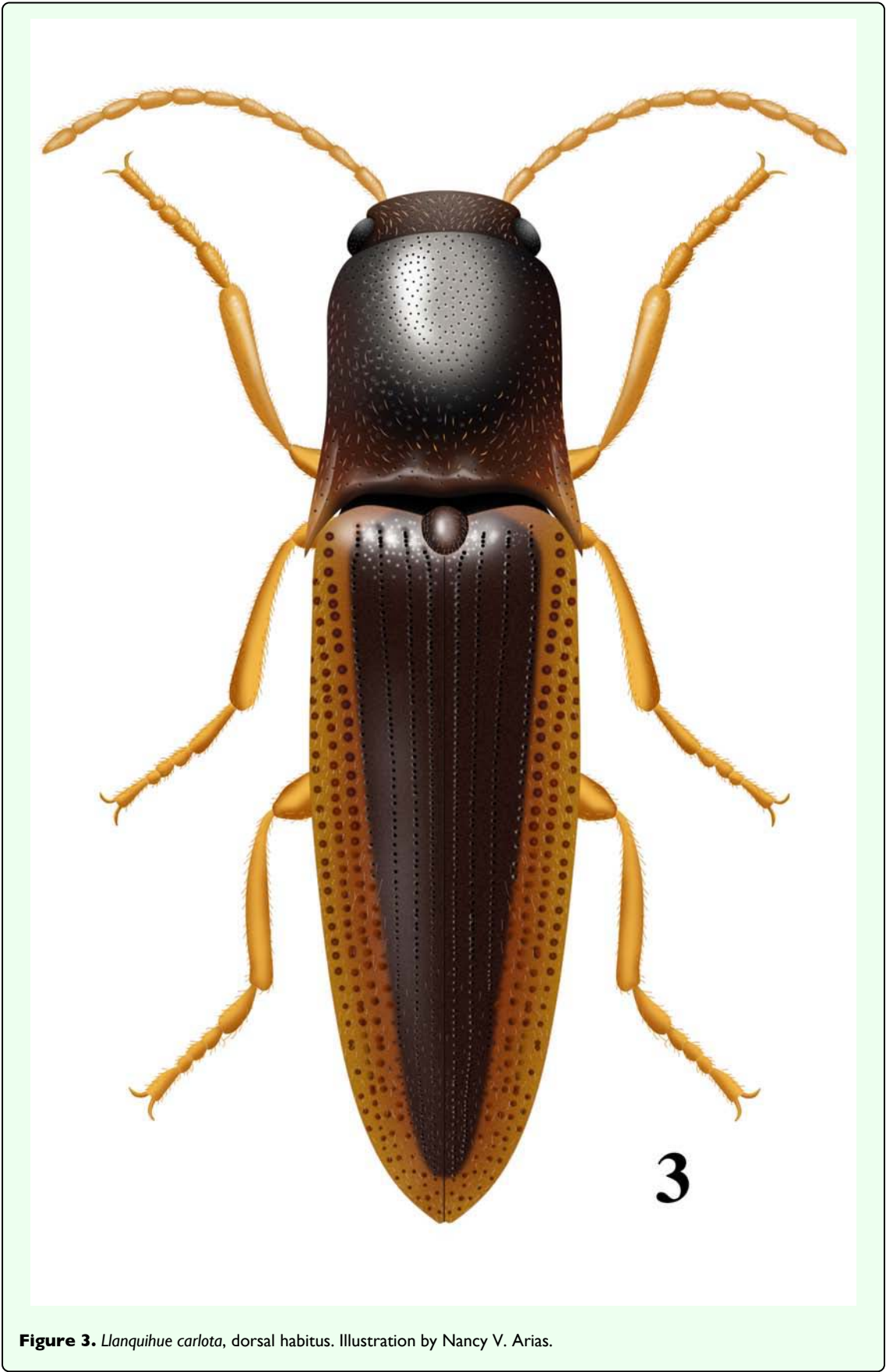
**Figure 1.** (a) Type of *Deromecus vittipennis* (Candèze). (b). Type labels of *D. vittipennis*.  
**Figure 2.** Type of *Llanquihue carlota* Arias

Introduction

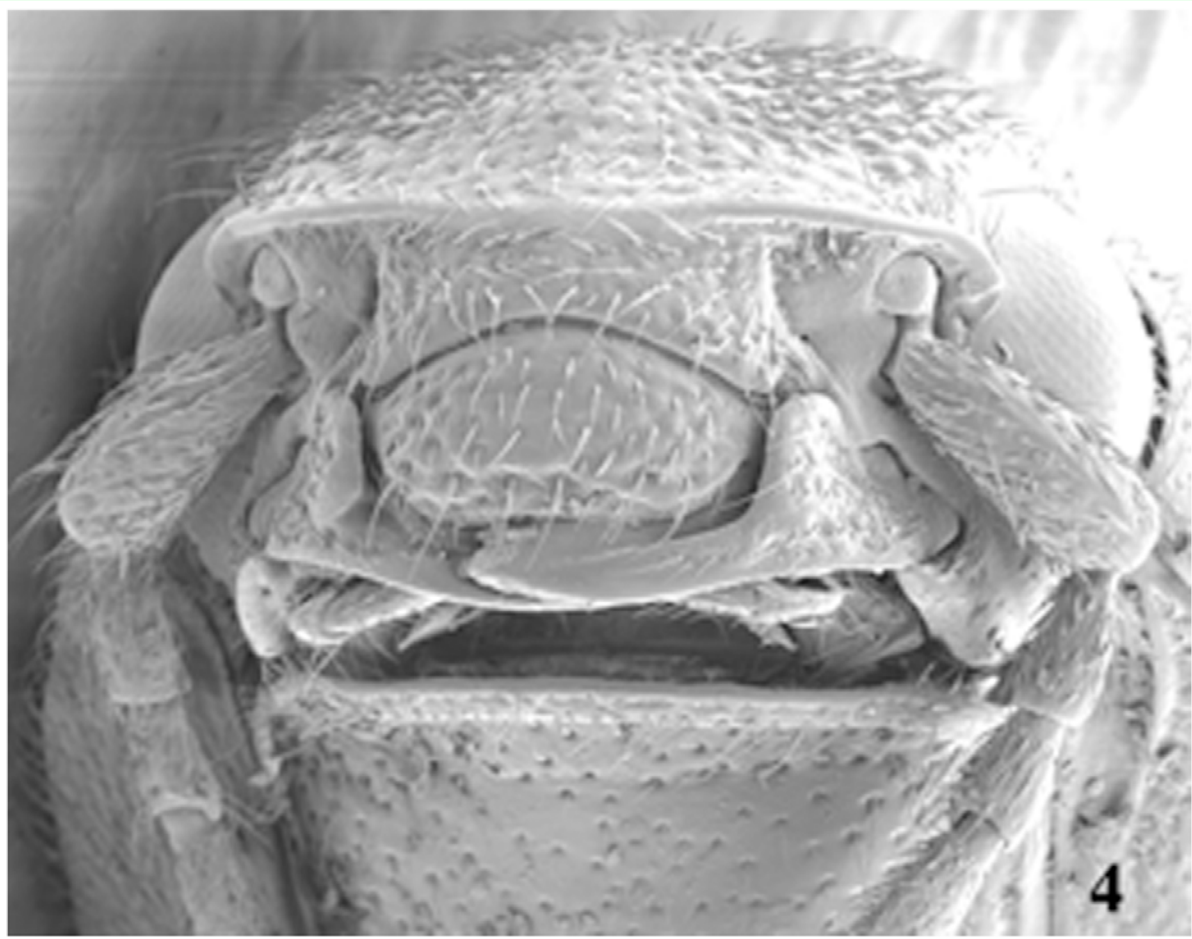
The fauna of Pomachiliini in Chile is formed by the following genera: *Deromecus* (Solier 1851), *Gabryella* (Arias 2001a), *Lynnyella* (Arias 2001b), *Alyma* Arias (2004), *Mecothorax* (Solier 1851), *Pomachilius* (Eschscholtz 1829), *Podonema* (Solier 1851), *Medonia* (Fleutiaux 1907), *Pseudoderomecus* (Fleutiaux 1907), and *Sofia* (Arias 2005). In 1851 Edgard Solier, a French naturalist was the first to study Chilean Elateridae. Solier (1851) created the genus *Deromecus* with 8 species. Later, in 1900, Candèze, a Belgian naturalist, described *Deromecus vittipennis*. However, this species does not share the generic characters of the genus *Deromecus*. A new genus *Llanquihue* is proposed to include the species *vittipennis* (Candèze) new comb., and *carlota* sp. nov.

Materials and Methods

Measurements were made with a calibrated ocular micrometer. The total body length was measured (mm) from the frontal margin to the apex of the elytra, and elytral width was the maximum width of the elytra, when both sides were in focus. Indices are indicated as follows. 1) The eye index an index of eye prominence was obtained by subtracting the interocular head (frons) width from the maximum width of the head across the eyes and dividing the result by the maximum head width. 2) Pronotal elytral index was obtained by dividing the length of the pronotum by the length of the elytra, the pronotal elytral index is used here because it gives a general idea of how big the pronotum is compared with the elytra. 3) The pronotal index was obtained by dividing the length of the pronotum by its width (Calder 1996). 4)



**Figure 3.** *Llanquihue carlota*, dorsal habitus. Illustration by Nancy V. Arias.



**Figure 4.** Scanning electron micrograph of frontal head of *Llanquihue carlota*.

Antennomere proportion was measured as the length of antennomeres 2 through 11 as 1/100th of the total antennal length. This is not measured for antennomere 1 because it is curved and hard to measure. 5) Total body length was measured from dorsal view including the head. 6) Tarsomere proportion gives the lengths of the tarsomeres as 1/100th of the total tarsal length.

Specimens from which the genitalia were to be removed were first relaxed overnight in warm water with a few drops of soap added. For examination of male genitalia, the last abdominal segment was removed and placed in water with a few drops of soap in a Petri dish and left over night. Then, genitalia were removed and glued to a point card on its lateral side with balsam, and placed on the pin under the specimen. Becker (1958) was followed for female genitalia examination.

Drawings were made using a camera lucida on a dissecting scope Leica MZ7. All dates in the records given were converted to a standard format of day.month.year, with the month given in Roman numerals. Places and names in the recorded labels are the original spellings.

Museums and institutions that contributed to this work are indicated in the acknowledgements and in the text by the acronyms in brackets (Arnett et al 1997), excluding [ETA] author's collection. Type specimen repositories are also indicated in descriptions. Type material will be deposit at the Museo Nacional de Historia Natural, Santiago Chile [MNNC].

Taxonomy **Llanquihue Gen. Nov.** (Figures 1a, 2, 3)

Type species *Deromecus vittipennis* Candèze 1900:91.

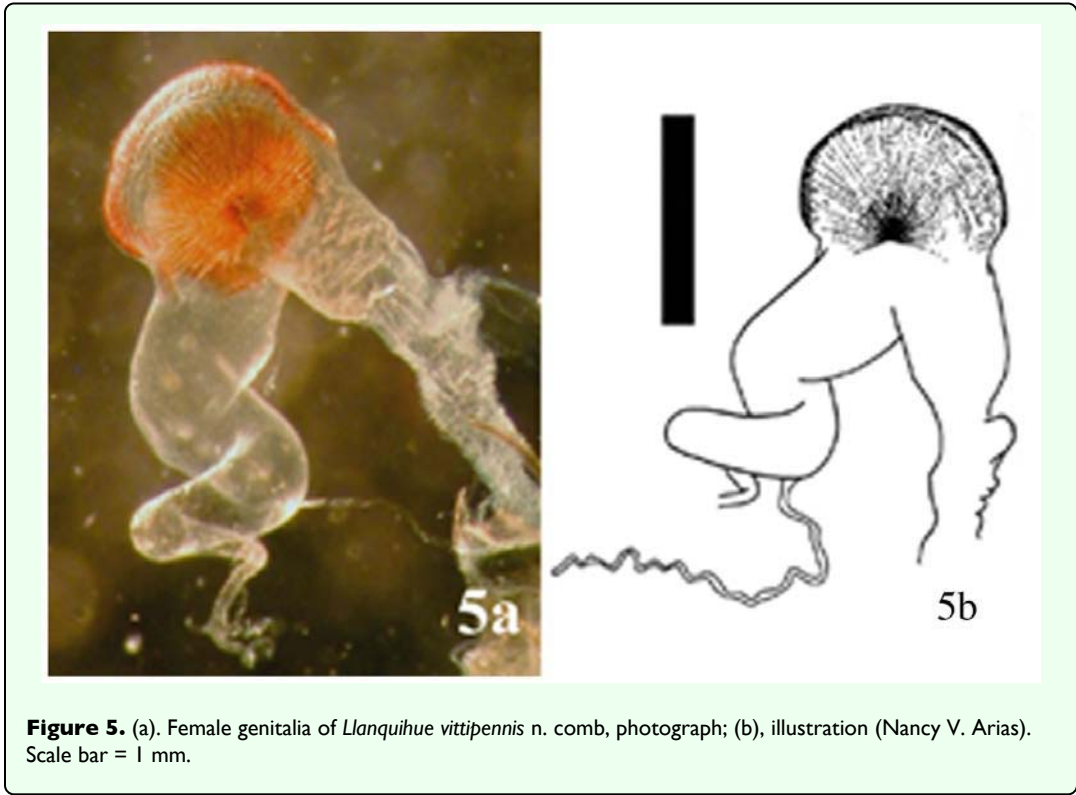
**Description**

Body stout (Figures 1a, 2, and 3); general body color brown, dark brown, or reddish brown, blackish, a long darker stripe on the elytral suture, extended side ways covering almost all elytral surface, broader anteriorly and narrower towards elytral apex.

**Head**

Declivous, punctate; vestiture long, pale or gold, semi-erect, or semi-decumbent, sparse or dense; frontoclypeal region sloping to base of clypeus, not intercepting





**Figure 5.** (a). Female genitalia of *Llanquihue vittipennis* n. comb, photograph; (b), illustration (Nancy V. Arias). Scale bar = 1 mm.

clypeus; clypeus, narrow at center; frontal carina complete across front of frons, slightly protruded (Figure 4); eyes small, [eye index: 0.25]; labrum exposed, tall, vertical, curved anteriorly; antennae with eleven antennomeres, antennomere ten reaching apex of posterior angles; antennomere fourth through antennomere eleven serrate; vestiture semi-erect; mandibles bidentate, maxillary and labial palps with apical segments securiform.

**Prothorax**

Not convex medially or anteriorly; [pronotal index: 0.94–1.0]; narrowed anteriorly to receive head; lateral margins entirely carinate, almost all its length straight, except at posterior angle base; inclined mesodorsally; lateral carina directed ventrally, visible only posteriorly; pronotal lateral margin joining pronotosternal suture apex; pronotal punctures puncticulate, or punctate; pronotal basal area declivous to prescutum; pronotal basal margin curved; small notch at each side of base of pronotum, near base of posterior angles; prescutum notch small, V-shaped; posterior angles small, acute, uncarinate, straight or slightly divergent; prosternum longer than wide, convex; pronotosternal lobe bent, border thick; antennal groove present, carinate in pronotosternal hypomeral side; pronotosternal suture thickened giving a double appearance, marginate at procoxal margin, curved at procoxal margin; prothoracic sternite around procoxae marginate; prosternum with furrow along pronotosternal suture, 2/3 of pronotosternal suture length; pronotosternal spine more or less horizontal with a ledge

immediately after procoxae; procoxae globular, marginate.

**Scutellum**

Tongue shape; mesosternal cavity more or less oval, deep; posterior margin of mesosternal cavity extending shortly in distance posteriorly; mesocoxae longer than wide; mesocoxal cavity deep, open to mesepimeron and mesepisternum; mesosternum and metasternum separated by distinct external suture.

**Elytra**

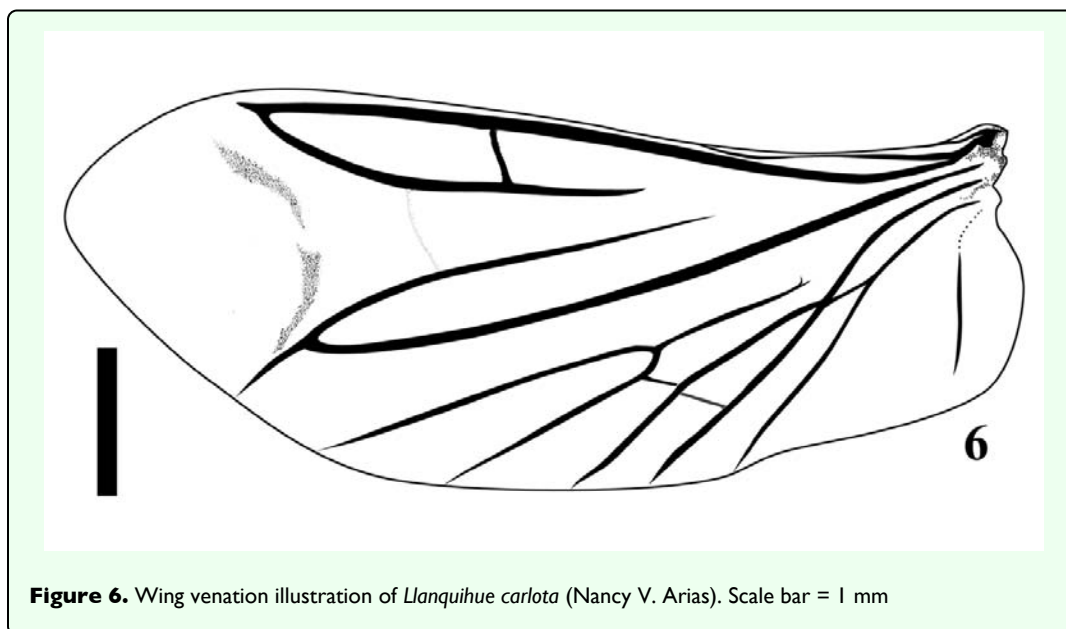
Parallel-sided on half of its anterior length; 2.5–3.1X pronotal length; striate, striae with pits tear shape and or circular; apex truncate or dentate.

**Metathoracic wings**

Apical portion of the wing with 2 soft plates; r4 present, wedge cell present width 3.78X its length, joint of MP<sub>3</sub>+MP<sub>4</sub>+CuA<sub>1</sub> slightly bifurcate at origin; radial cell 4X its width, MP<sub>4</sub> + CuA<sub>1</sub> connected with CuA<sub>2</sub>, base of wedge cell not contiguous with connective vein between MP<sub>4</sub> + CuA<sub>1</sub> and CuA<sub>2</sub> (Figure 6). Metathoracic coxal plate widest region closest to medial body line; with setae semi-decumbent, gold.

**Legs**

Yellowish; femur globate yellow; tarsomeres 1 through 4 decreasing in length distally, tarsomere 3 cordate, tarsomere 4 very small in size compared with other tarsomeres.



### Abdomen

Ventrites with punctures, last ventrite angulate.

### Genitalia

Female: vagina without sclerotized internal structures; strongly elongate and enlarged towards the apex, slightly wrinkled at apex; before bursa, 2 globular gland similar in shape; bursa copulatrix 0.73 mm in diameter; globular, with two sclerotized fan shaped structures with teeth alternating between long and short and another long sclerotized structure dorsal; after bursa spermathecal gland with a minimum of 2 small sclerotized structures comb-shaped, and one delicate nonsclerotized sinuate structure attached (Figures 5 a, b). Male: parameres not reaching apex of aedeagus, wider than width of aedeagus (Figures 13–14).

### Distribution

Llanquihue province, and Chiloé island, Region X of Chile. Temperate Rainforests.

### Biology

Adult specimens were collected during spring season. Species from this new genus do not have distinctive sexual dimorphism and specimens need to be dissected to discriminate between males and females.

### Etymology

The designation of this genus is after the *Llanquihue* Lake that in Mapudungun means immerse placed. The Llanquihue Lake is the second largest lake in Chile, with an area of 860 km<sup>2</sup>.

### Remarks

The new genus *Llanquihue* belongs to the subfamily Elaterinae (Leach 1815) because the adults are

characterized by (Calder 1996): head distinctly convex anteriorly; frontal carina usually complete across front between eyes or incomplete medially; antennae nearly always serrate; prosternal spine usually longer than the procoxal diameter; mesocoxal cavity open to both mesepimeron and mesepisternum; hind wing with a short radial cell; vein MP<sub>4</sub> with apparent cross vein to CuA<sub>2</sub>. The new genus *Llanquihue* belongs to the tribe Pomachiliini (Candèze, 1878) because adults are characterized by: presence of a frontal carina across the frons (Platia 1994); prosternum with prosternal suture thickened on the hypomeral side giving an appearance of a suture double (Hayek, 1990).

***Llanquihue vittipennis* (Candèze), new comb.**  
(Figures 1a, 5, 7, 9, 11, 13, 15)

*Deromecus vittipennis* Candèze, 1900: 91.

### Description

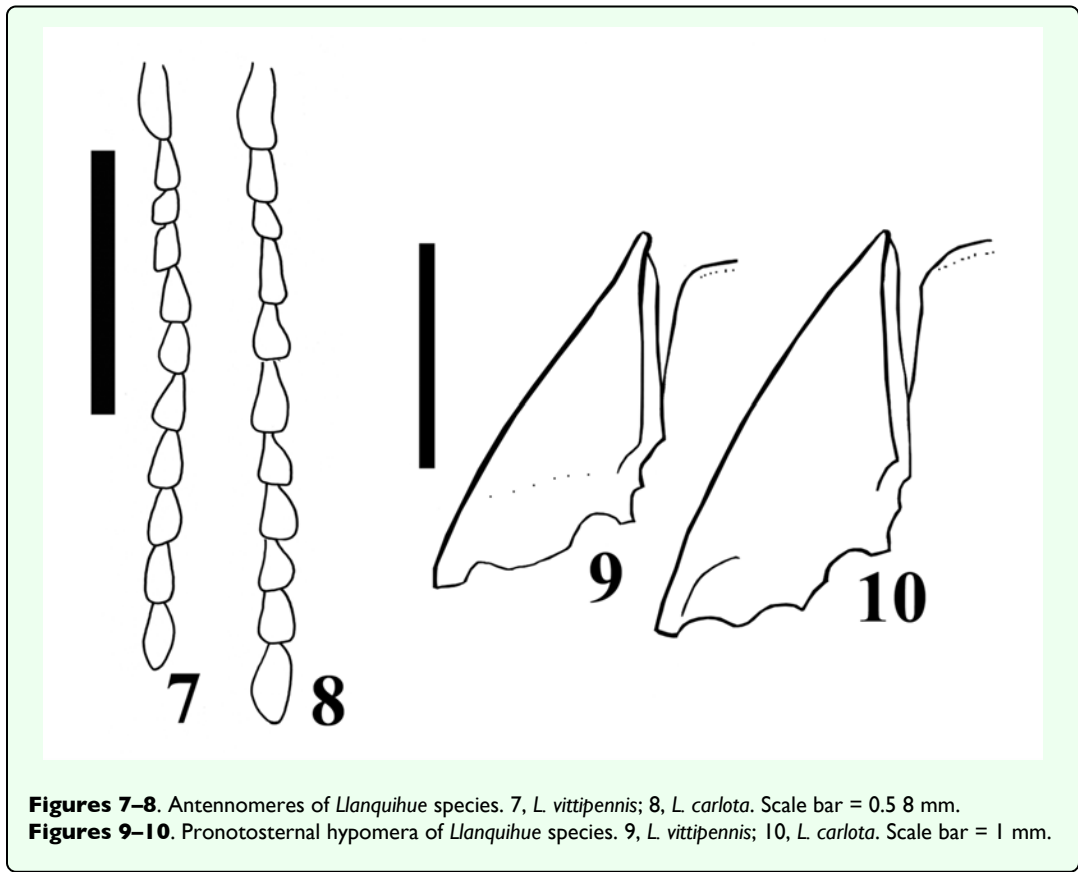
Body stout (Figure 1a); total body length 6.3 mm including head (head 0.14 mm), width 2.84 mm measured at widest point; general body color dark brown, blackish; integument semi-shiny; vestiture semi-erect, gold; [pronotal elytral index: 3.19].

### Head

Black; labrum 1.66X as long as wide; antennomeres 3–11 serrate, antennomere 2 bigger in size than antennomere 3 [antennomere proportion: 8.3-7.0-8.3-11.0-9.7-10.5-11.0-10.5-10.5-13.2] (Figure 7).

### Prothorax

Brown reddish; integument semi-shiny; punctate, punctures separated by one or 2 own diameters; [pronotal index: 0.94]; posterior angles straight; distinctive



longitudinal impression at pronotal base; prosternum convex; pronotosternal hypomeron rugulose; antennal groove carinate on pronotosternal hypomeral side, (Figure 9); procoxae separated by 0.94X procoxal diameter; pronotosternal spine 1.1X procoxal diameter.

**Scutellum**

Dark brown; 1.2X as long as wide; mesocoxae separated by 0.45X mesocoxal diameter; posterior margin of mesosternal cavity extending posteriorly 0.18X mesocoxal diameter.

**Elytra**

Pits dense; anterior pits not surrounded by a darker area; elytral anterior border carinate; vestiture dense; apex truncate.

**Leg**

Yellowish; vestiture light yellowish; [tarsomere proportions: 38.6-15.8-15.8-3.5-26.3] (Figure 11).

**Male genitalia**

Aedeagus 0.53 mm long, 0.27 mm wide, as Figure 13.

**Material Studied**

Holotype. Male: 0.53 mm in length, 0.27 mm in width. *Deromecus vittipennis* (card name hand written, border of card with a green line). Collection E. Candèze, Coll. R. I. Sc. N. B. (Figure 1b) [ISNB]. When Candèze designated

types, he drew a color line on the label, depending on the region the animal was from (Hayek 1974). Other material studied. One male 528 Chiloé [MNNC]; 2 females Chiloé [MNNC]; male, Chiloé, Candèze [MNNC].

**Biology**

There is no other currently available information on the biology of this species.

**Distribution**

Chiloé island. X Region (Figure 15).

**Remarks**

*Llanquihue vittipennis* can be recognized by its semi-shiny brown reddish punctate pronotal integument, gold vestiture, and posterior angles straight.

***Llanquihue carlota* sp. nov.** (Figures 2, 3, 4, 6, 8, 10, 12, 14, 15)

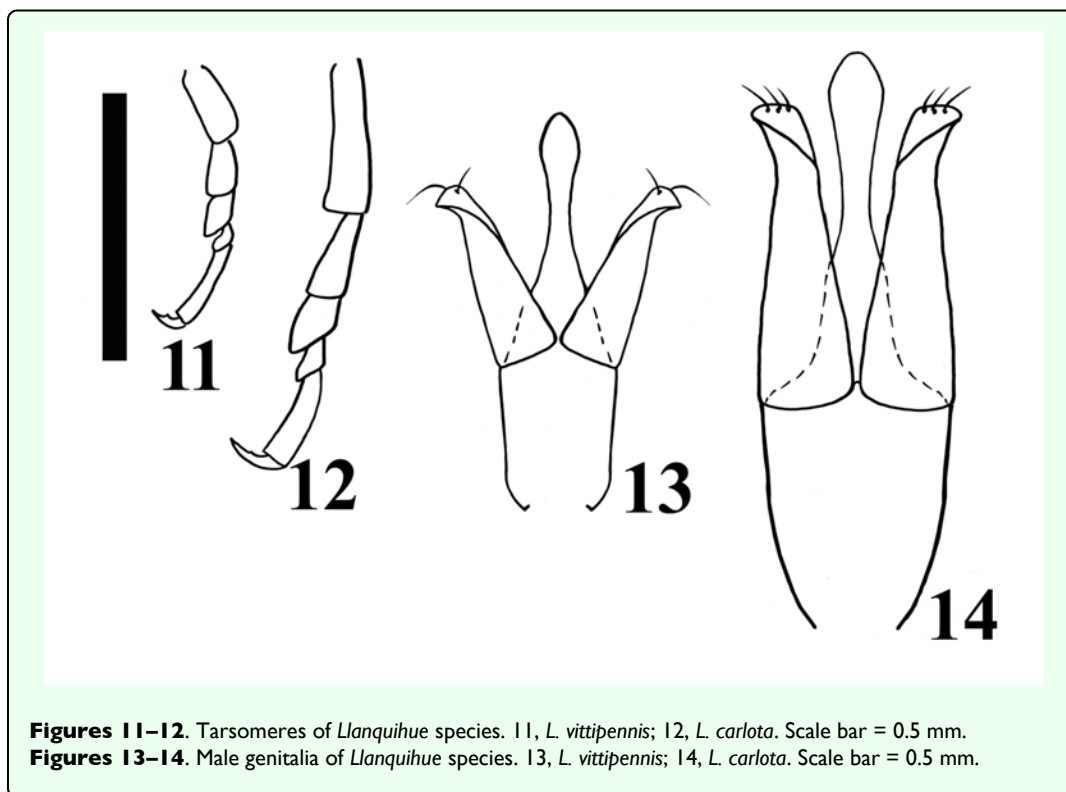
**Description**

Body stout (Figure 2 and 3); length 6.07 mm including head (head 0.4 mm), width 1.84 mm measured at widest point; color brown; integument shiny; vestiture semi-erect, gold; [pronotal elytral index: 3.0].

**Head**

Brown; labrum 1.56X as long as wide; antennomeres 3 through 11 sub-serrate, antennomere 2 bigger in size





than antennomere 3, [antennomere proportions: 9.9-6.6-10.8-9.1-9.9-9.9-9.9-11.5-9.1-13.3], (Figure 8).

### Prothorax

Dark brown; integument shiny; [pronotal index: 1.0]; puncticulate; posterior angles slightly divergent; distinctive longitudinal impression from pronotal base to middle; prosternum convex; pronotosternal hypomer on punctate; antennal groove carinate on pronotosternal hypomeral, (Figure 10); procoxae separated by 1.0X procoxal diameter; pronotosternal spine 1.0X procoxal diameter.

### Scutellum

Dark brown; 0.88X as long as wide; mesocoxae separated by 0.75X mesocoxal diameter; posterior margin of mesosternal cavity extending posteriorly 0.45X mesocoxal diameter.

### Elytra

Pits dense, anterior pits surrounded by a darker area; elytral anterior border carinate; vestiture sparse; apex truncate.

### Leg

Vestiture light yellowish; [tarsomere proportions: 36.5-22.2-12.7-3.2-25.4] (Figure 12).

### Male genitalia

Aedeagus 0.79 mm long, 0.27 mm wide, as Figure 14.

### Material Studied

Holotype. Male: 6.07 mm in length, 1.84 mm in width. CHILE, Fresia, Llanquihue, XI.1982. L. E. Peña [MNNC]. Paratypes here designated. 6 males, 2 females [MNNC]. Other material studied: 18 males, CHILE, Fresia, Llanquihue, XI.1982. L. E. Peña [ETA].

### Biology

There is slight chromatic variation among specimens of this species, mainly posterior angles reddish or brownish reddish, and humeral area light yellowish or yellowish. There is no other currently available information on the biology of this species.

### Distribution

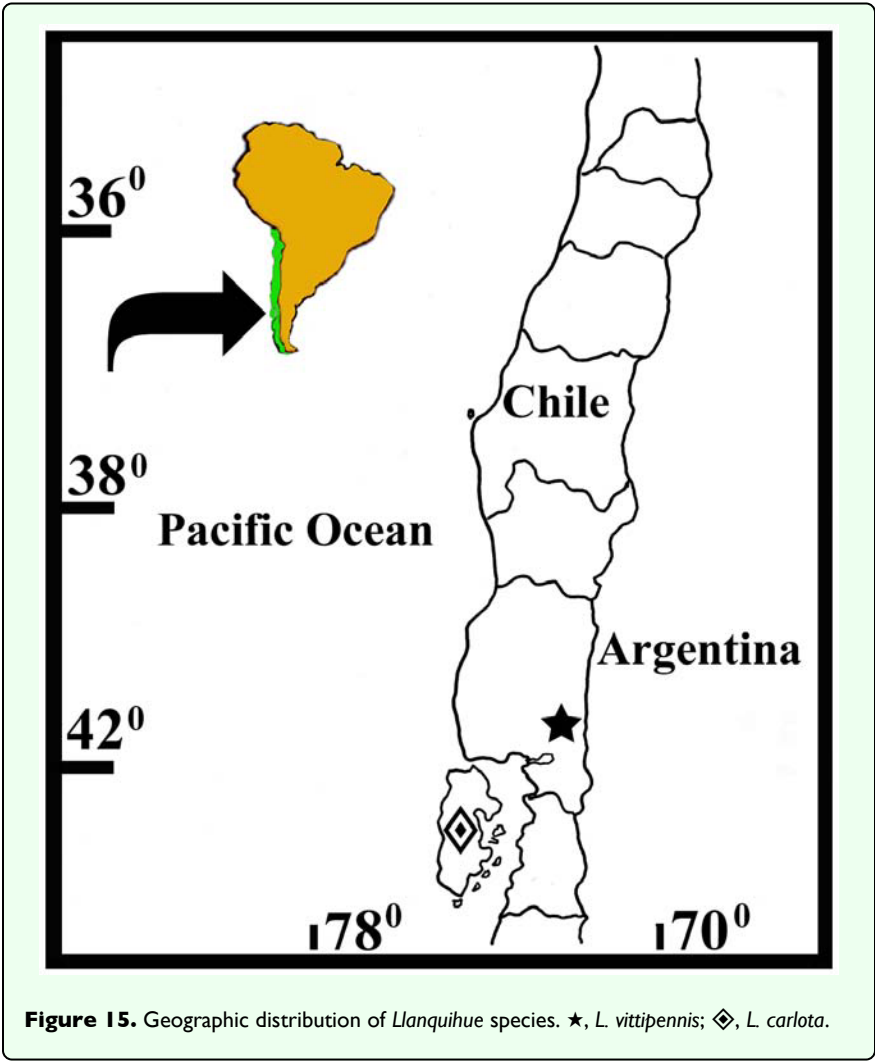
Llanquihue, X Region (Figure 15).

### Etymology

This genus is dedicated to my mother Carlota, who always took me, when I was young, to Southern Chile, especially to Llanquihue Lake, to know and appreciate nature. I have kept the feminine name on the species name.

### Remarks

*Llanquihue carlota* can be recognized by its dark brown semi-shiny puncticulate pronotal integument, pale vestiture, and posterior angles slightly divergent.



Discussion

The genus *Llanquihue* differs from the genus *Deromecus* because of the following main characters: body stout; frontoclypeal region sloping to base of clypeus; frontoclypeal carina not protruding; clypeus narrow at center; base of pronotum with 2 notch; elytra with a dark stripe; wing venation lacks patch over  $rp_1$ , whereas the genus *Deromecus* presents: body cylindrical; protruding frontoclypeal carina; clypeus broadly vertical, not narrow at middle, not intercepted by frontoclypeal carina; base of pronotum without a notch; elytra without a dark stripe; wing venation with a patch over  $rp_1$ .

The phylogeny of the members of the subfamily Elaterinae is still uncertain. Future surveys and collections are needed to have a better understanding of the members of Elaterinae, such as the tribe Pomachiliini to which the genus *Deromecus*, and the new genus *Llanquihue*, belong.

Editor’s Note

Paper copies of this article will be deposited in the following libraries. Senckenberg Library, Frankfurt Germany; National Museum of Natural History, Paris, France; Field Museum of Natural History, Chicago, Illinois USA; the University of Wisconsin, Madison, USA; the University of Arizona, Tucson, Arizona USA; Smithsonian Institution Libraries, Washington D.C. U.S.A.; The Linnean Society, London, England.

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providing Chilean elaterids for these studies. Thanks to Nancy V. Arias for her illustrations, Susan Crutchfield for editing this manuscript, and to an anonymous reviewer. Special thanks are given to Professor Richard M. Bohart, for his constant encouragement and support of my research. Financial support was provided by the National Science Foundation, DEB 0445413.

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