Tunon, a new genus of Protelaterini (Elateridae: Lissominae) from southern Chile

Author(s): Elizabeth T. Arias-Bohart
Source: Pan-Pacific Entomologist, 89(3):159-167. 2013.
Published By: Pacific Coast Entomological Society
DOI: http://dx.doi.org/10.3956/2012-58.1
URL: http://www.bioone.org/doi/full/10.3956/2012-58.1

THE PAN-PACIFIC ENTOMOLOGIST
89(3):159–167, (2013)

Tunon, a new genus of Protelaterini (Elateridae: Lissominae) from southern Chile

Elizabeth T. Arias-Bohart

Essig Museum of Entomology, University of California,
Berkeley 1101 Valley Life Sciences Building, Berkeley, California 94720
e-mail: etarias.bohart@berkeley.edu

Abstract. *Tunon* **gen. nov.**, a new genus of Protelaterini from southern Chile is here described and illustrated with one species *Tunon guinezi* **sp. nov**. Its relationships with other members of the Protelaterini such as the Chilean genera *Anaspasis* Candèze 1881 and *Valdivelater* Lawrence & Arias 2009 are discussed.

Key Words. Elateridae, Protelaterini, *Anaspasis*, *Valdivelater*, *Tunon*, click beetles, Chile.

Introduction

In Chile the tribe Protelaterini is represented by the genus *Anaspasis* Candèze 1881, with four species, *A. germaini* (Fleutiaux 1898), *A. parallela* (Solier 1851), *A. penai* Golbach 1970, and *A. solieri* (Fleutiaux 1898), and the genus *Valdivelater* Lawrence & Arias 2009, with two species *V. krahmerii* Lawrence & Arias 2009 and *V. oncolensis* Lawrence & Arias 2009. In the recent course of my studies, I found a new peculiar Protelaterini that appears to be closely related to the genus *Anaspasis*.

Materials and Methods

Types repositories are indicated in the descriptions, and acronysms of the institutions and private collections follow Arnett et al. (1993).

CAS—California Academy of Sciences, San Francisco, California, U.S.A.
ETA—Elizabeth Arias-Bohart private collection (Berkeley, California)
JEB—Juan Enrique Barriga Tuñon private collection (Curicó, Chile)
MNNC—Colección Nacional de Insectos, Museo Nacional de Historia Natural, Santiago, Chile
VDC—Victor Dieguéz private collection (Santiago, Chile)

Specimens from which the genitalia were removed were first relaxed in 10% KOH solution over 1 to 3 days. For examination of the male genitalia, the last abdominal segments were removed and placed in water with a few drops of soap in a Petri dish and left overnight. Then, male genitalia were extracted and placed into a small vial with 90% alcohol, or on a card, and placed on the pin under the specimen. Becker (1958) was followed for female genitalia examination. Female genitalia were placed in a small vial with glycerin and placed on the pin under the specimen.

Measurements. Measurements were made with a calibrated ocular micrometer as follows: total body length from the frontal margin to elytral apex; pronotal length and maximum width of the pronotum, when both sides are in focus, and elytral length and maximum width of the elytra, when both sides are in focus.

Label Information. Places and names of the material studied are from the original spellings from the recorded specimen labels. The following symbols are used in the recorded label information as follows: / means line separation within label, // means

label separation. Juan Enrique Barriga's collection labels include the following http://www.coleoptera-neotropical.org, which I have excluded from the label information.

Photos and Drawings. Scanning electronic microscopic photos were obtained by Julien Cillis, and color photos were obtained by Yves Laurent and Isabelle Bachy, at the Institut Royal des Sciences Naturelles de Belgique. Drawings were made using a camera lucida on a Leica MZ7 dissecting scope.

Terminology. Terms for adult morphology follows Platia (1994) and Calder (1996). Wing vein nomenclature follows that of Dolin (2004), Kukalová-Peck & Lawrence (1993, 2004). Female genitalia dissection follows Becker (1958).

Key to Tribes of Lissominae and Genera of Protelaterini
(Modified from Lawrence & Arias 2009)

1. Base of pronotum with paired sublateral incisions; frontal region at midline gradually declined; tarsomeres simple; antennal serrations or rami beginning on antennomere 3; North America . . . . . Oestodini
- Base of pronotum without sublateral incisions; frontal region at midline more abruptly declined; tarsomeres with membranous lobes; antennal serrations or rami beginning on antennomere 4 2
2. Prothorax on each side with deep antennal cavity opening at anterior end of notosternal suture and extending laterally beneath the surface of the hypomeron; prosternal chin piece well developed and rounded; pro- and mesotrochanters at least 3 times as long as wide; tarsomeres 1–4 with long membranous lobes, those on 2–4 usually longer than base of tarsomere. . . . . Lissomini
- Prothorax without deep antennal cavities; prosternal chin piece short and truncate; pro- and mesotrochanters less than twice as long as wide; membranous lobes on tarsomeres shorter, those on 1 and 2 sometimes highly reduced [Protelaterini] 3
3. Prothorax distinctly wider than long, with posterior angles not or barely diverging, without sublateral carinae; antennal fossae absent; antennomeres 4–10 in male each with a flattened ramus about twice as long as antennomere; prosternal spine distinctly shorter than coxa; Australia . . . . . *Austrelater* Calder & Lawrence, in Calder et al. 1993
- Prothorax usually longer than wide or, if not, then sublateral carinae present; posterior pronotal angles distinctly diverging; antennal fossae at least weakly developed; antennomeres 4–10 either serrate or with long subcylindrical rami; prosternal spine distinctly longer than coxa 4
4. Antennal fossae weakly developed, with edges not carinate, and more or less laterally oriented; nasale more or less flattened; mesocoxal cavities separated by less than 0.33 times shortest diameter of a cavity; antennomeres 4–10 in male each bearing a subcylindrical ramus, articulated at base and more than twice as long as antennomere; those in female very weakly serrate, almost filiform; Chile. . . . . *Valdivelater* Lawrence & Arias 2009
- Antennal fossae distinct, with edges at least partly carinate, and anteriorly oriented; nasale convex; mesocoxal cavities separated by at least 0.4 times shortest diameter of a cavity; antennomeres 4–10 serrate in both sexes 5
5. Prothorax not or only slightly longer than wide; posterior pronotal angles with distinct sublateral carinae; mesal edges of antennal fossae not at all

carinate; nasale strongly and evenly convex; sides of mesoventral cavity curved and weakly defined; New Zealand . . . . . *Sphaenelater* Schwarz 1902

- Prothorax distinctly longer than wide; posterior pronotal angles with or without sublateral carinae; mesal edges of antennal fossae at least partly carinate; nasale convex to somewhat flattened; sides of mesoventral cavity subparallel and sharply defined 6

6. Prothorax distinctly wider anteriorly, notosternal sutures sinuate, mesosternal cavity posterior edge acute (Fig. 5), antennomeres 6–10 more elongate, length of each more than 3.0 times its width; Chile. . . . . *Tunon* **gen. nov.**

- Prothorax not wider anteriorly, notosternal sutures more less straight, mesosternal cavity posterior edge broadly rounded, antennomeres 6–10 less elongate, length of each less than 3.0 times its width 7

7. Mesal edges of antennal fossae sharply carinate; antennomere 3 elongate, length of antennomere 4 less than 1.5 times antennomere 3 (Fig. 11); nasale evenly convex; elytra distinctly wider than narrowest width of pronotum; New Zealand . . . . . *Protelater* Sharp 1877

- Mesal edges of antennal fossae not sharply carinate; antennomere 3 short, length of antennomere 4 more than 1.5 times antenomere 3 (Fig. 10); nasale more abruptly declined and flattened to slightly convex; elytra only slightly wider than narrowest width of pronotum; Chile . . . . *Anaspasis* Candèze 1881

Taxonomy

Tunon **gen. nov.**

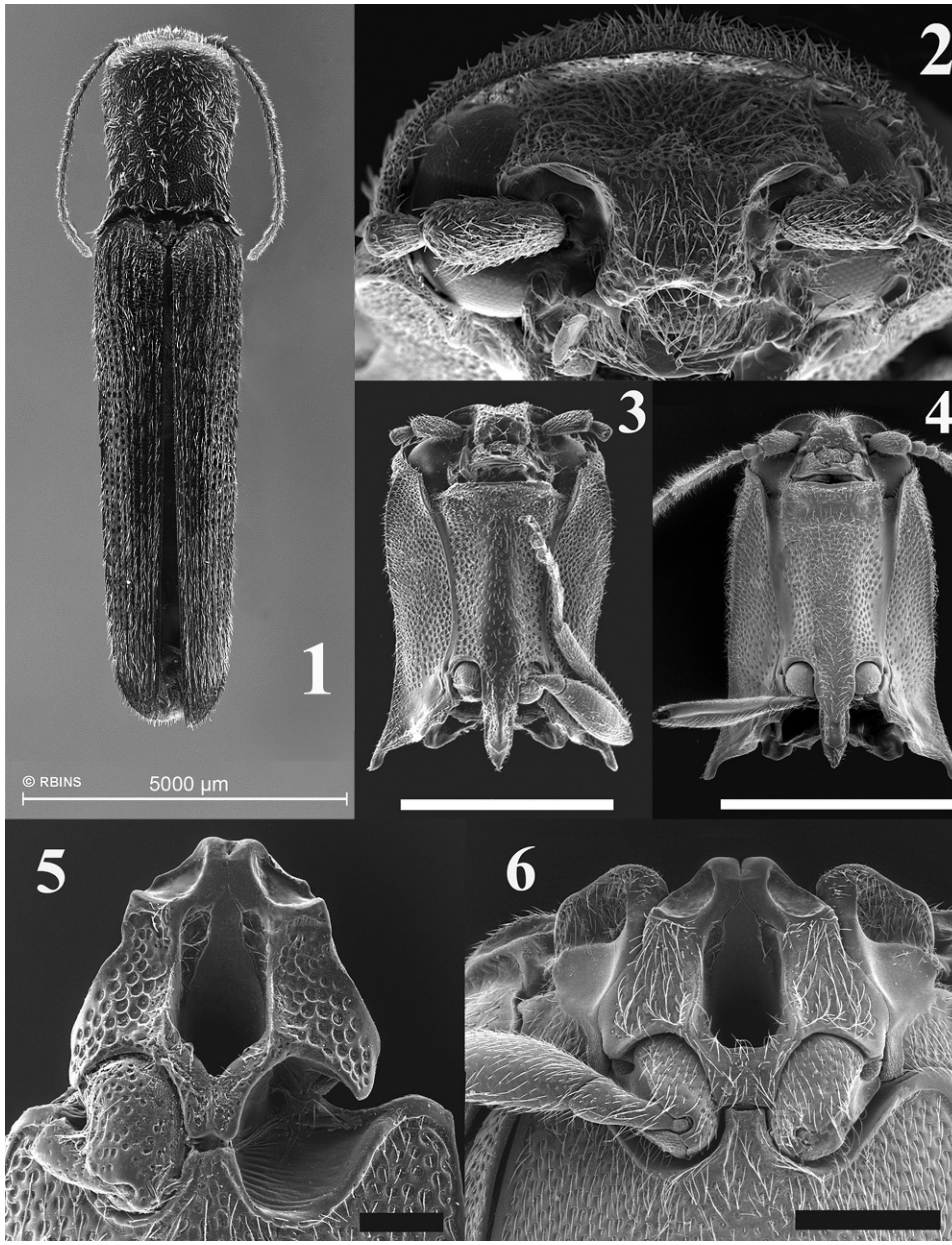
Figs. 1–3, 5, 7–8

Type Species. Tunon guinezi **sp. nov.**, here designated. Gender masculine.

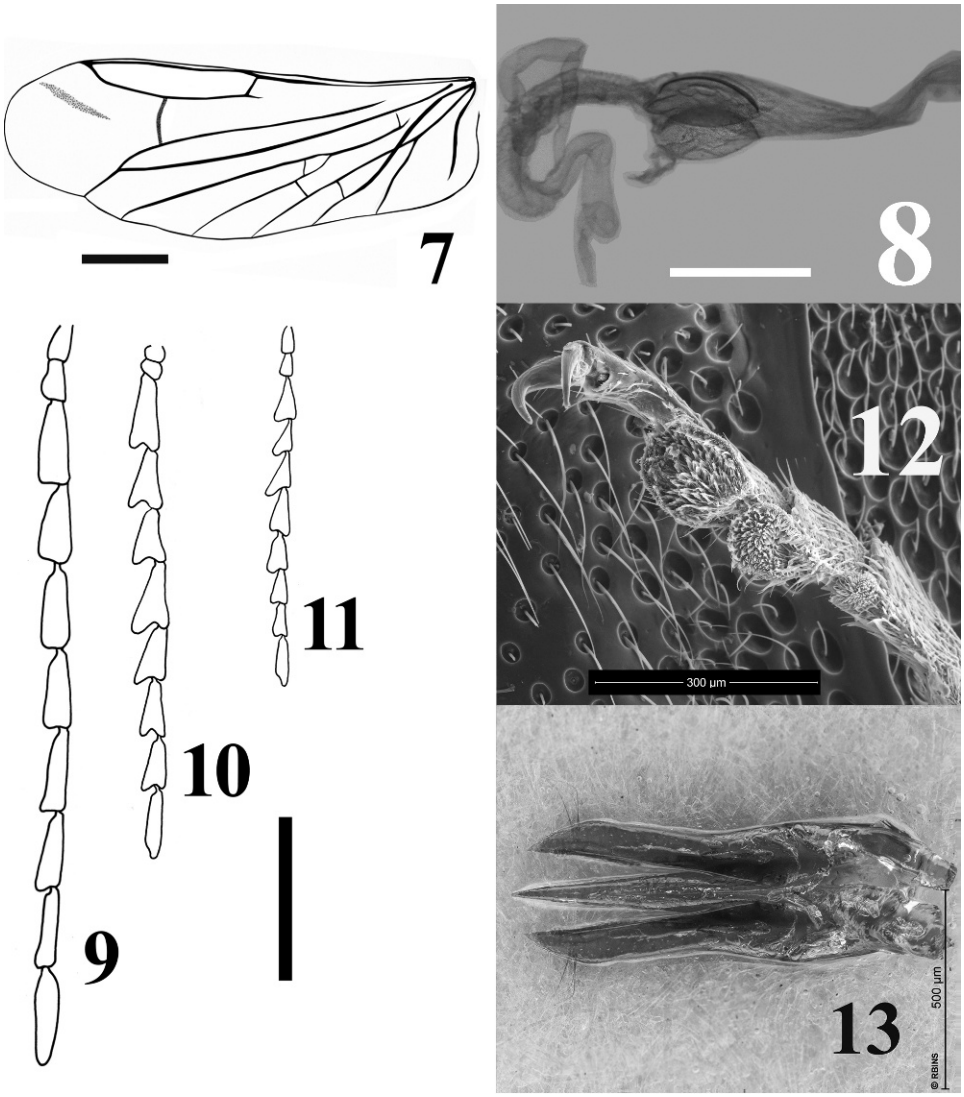
Diagnosis. This genus differs from all other elaterid genera in the structure of the pronotum, which is strongly expanded anteriorly concealing the eyes, the frontoclypeal region, which is produced forward, concealing the labrum anteriorly, the labrum, which is very small and transverse (about a third as long as wide), and elytra, which are strongly elongate and subcylindrical.

Description. Body about 4.5–5.3 times as long as wide, widest at anterior part of pronotum, mostly parallel-sided. Dorsal vestiture thin decumbent golden hairs. General coloration brown, pronotum anteriorly yellowish (Fig. 1).

Head. Strongly declined at base, almost concealed from above. Eyes large in both sexes; finely facetted, without interfacetal hairs, concealed from above by the pronotum, ratio of median length to greatest postocular width 0.75–0.80; frontoclypeal region anteriorly abruptly declined, strongly produced forward and then recurved, almost concealing labrum, which is attached well behind anterior edge of frontoclypeus. Labrum very small, strongly transverse, sclerotized, about 0.31 times as long as wide. Mandible about 2 times as long as wide at base, apex bidentate (Fig. 2). Antennae with 11 antennomeres, most of them strongly elongate, antennomeres 6–11 more than 3.0 times as long as wide, in male serrate beginning on antennomere 4, all antennomeres densely clothed with long, erect hairs. Supra-antennal ridges well developed and strongly elevated, the frons behind each one slightly concave; antennal insertions not visible from above; antennal fossae facing frontally; antennal insertion with deep, curved invagination.



Figures 1–6. Figure 1. Adult of *Tunon guinezi.* Figure 2. Scaning electron micrograph of frontal head of *Tunon guinezi.* Scale bar = 1.0 mm. Figure 3. Scaning electron micrograph of prosternum of *Tunon guinezi.* Scale bar = 2.0 mm. Figure 4. Scaning electron micrograph of prosternum of *Anaspasis parallela.* Scale bar = 2.0 mm. Figure 5. Scaning electron micrograph of mesosternal cavity of *Tunon guinezi.* Scale bar = 0.5 mm. Figure 6. Scaning electron micrograph of mesosternal cavity of *Anaspasis parallela.* Scale bar = 1.0 mm. All photos by Julien Cillis except Figure 1 by Yves Laurent and Isabelle Bachy.



Figures 7–13. Figure 7. Wing venation illustration of *Tunon guinezi.* Scale bar = 1 mm. Figure 8. Female genitalia *Tunon guinezi.* Scale bar = 0.5 mm. Figure 9. Antennomeres of *Tunon guinezi.* Scale bar = 1.0 mm. Figure 10. Antennomeres of *Anaspasis parallela.* Scale bar = 1.0 mm. Figure 11. Antennomeres of *Protelater.* Scale bar = 1.0 mm. Figure 12. Scaning electron micrograph of tarsomeres of *Tunon guinezi*. Photo by Julien Cillis. Figure 13. Male genitalia of *Tunon guinezi.* Photo by Yves Laurent and Isabelle Bachy.

Prothorax. Elongate, about 1.26–1.38 times as long as wide; sides almost straight, strongly expanded anteriorly; slightly convex anteriorly and concave posteriorly; lateral margins entirely carinate, carina directed ventrally, anteriorly not visible from above; posterior angles long, strongly narrow, acute, produced posterolaterally; posterior edge with scutellar notch broad, sharply define. Disk convex, one impression at each side near base, with long strong decumbent setae; sublateral carinae extending from posterior angles to about posterior third of disc. Prosternum

more or less convex. Anterior edge produced forward forming a truncate chin-piece. Procoxae subglobular, separated by 0.66 times coxal cavity diameter. Prosternal process elongate, sides mostly parallel, straight, extending well behind procoxae, about 1.2 times as long as diameter of coxal cavity; notosternal sutures sinuate, open anteriorly. Hypomeron simple, impressed posteriorly (Fig. 3). Scutellar shield slightly oblique, anteriorly weakly curved, posteriorly acute.

Elytra. About 3.3–4.6 times as long wide, parallel-sided most of their lengths, converging posteriorly; apices curved, meeting at midline; subcylindrical. Anterior edge carinate. Humeri well developed. Disc with 10 distinct striae. Epipleura narrow, slightly concave. Mesoventral cavity moderately large and deep, posterior edge subacute, sides subparallel. Mesocoxae slightly projecting. Mesocoxal cavities narrowly separated, partly closed laterally by both mesepimeron and mesanepisternum. Metacoxae obliquely oriented; metacoxal plates extending to lateral edge (Fig. 5).

Hindwing. Length 9.71 mm, 2.8 times as long as wide. Apical field about 0.31 times as long as wing length, with one oblique linear sclerite; radial cell 5.1 times as long as wide; distinct medial embayment at end of medial spur; basal portion of RP very long, extending almost to wing base, MP_{3+4} with distinct basal cross-vein and spur; CuA_1 meeting MP_4; wedge cell present; anal embayment absent (Fig. 7).

Hind Legs. Distinctly longer than anterior two pairs. Tarsomeres 1–3 elongate and more or less equal in length, tarsomere 4 very small; tarsomeres 1–4 each with anteroventrally projecting a membranous lamella, tarsomeres 1–2 each with highly reduced lamella (Fig. 12).

Abdomen. First four ventrites connate; ventrite 5 almost twice as long as 4, apically subtruncate; anterior edge of sternite IX in male broadly rounded.

Female Genitalia. Ovipositor heavily sclerotized. Styli palpiform, attached apically. Vagina without sclerotized structures, anterior end of vagina gradually enlarged. Bursa copulatrix elongate, 2.03 times as long as wide with 2 lateral semicurved sclerotized structures (Fig. 8).

Male Genitalia. Symetrical. Median lobe acute, attached to parameres with well developed pair of struts; parameres acute at apex, not reaching apex of median lobe (Fig. 13).

Etymology. The name of this genus honors Juan Enrique Barriga Tuñon, a Chilean colleague, who owns a well curated insect collection, and provided me with beetles for my studies during our long term friendship.

Tunon guinezi sp. nov.
Figs. 1–2, 5, 7–9, 12–13

Description. Total length 11.1–12.7 mm. Head and mandibles brown, prothorax reddish-brown, with a distinctive yellowish band anteriorly; elytra brown; ventral surfaces mainly dark brown; most of legs and antennae yellowish-brown; palps, tarsi and antennomeres brown. Surface almost all clothed with fine, decumbent yellow and whitish setae, and erect gold setae; most elytral setae decumbent, gold.

Head. Punctate, punctures deep. Frontal ridges elevated. Frontal clypeal region posteriorly produced forward. Antennae yellowish brown, densely covered by erect gold setae. Antennomere 3 about 1.3 times antennomere 2, antennomere 4 about 1.9 times antennomere 3, antennomeres 6 through 10 similar in size, antennomere 11 about 1.2 times length of antennomere 10. Female antennae shorter than males.

Pronotum. Length 1.26–1.43 times as long as wide; parallel-sided most of their lengths, posterior angles reaching outer edges of elytral humeri. Mostly brown, anteriorly with a yellowish band. Prosternal spine with a keel, apex acute, directed upwards.

Scutellum. Scutellar shield densely covered by long yellowish decumbent hairs.

Elytra. Length 3.3–4.6 times as long as wide. Stria strongly impressed, interstria slightly convex.

Hindwing. Wedge cell 2.16 times as long as wide (Fig. 7).

Legs. Brown, tarsomere 4, 0.76 length of tarsomere 3, lamella of tarsomere 3 same length as tarsomere 3, lamella of tarsomere 4 two times length of tarsomere 4.

Aedeagus. Length 1.09 mm, 2.86 times as long as wide. Median lobe strongly acute. Parameres apex with at least 3 strong setae (Fig. 13).

Etymology. This species honors Basilio Guiñez who has always provided me with specimens from his Coleoptera collection (Temuco, Chile).

Distribution. Chile provinces: Cauquenes, ñuble, Cautín, Valdivia.

Type Material. Holotype. Male on a point // La Isla Purén / 16-11-2000 / B. Guiñez // wing on a card // aedeagus on a CARD // HOLOTYPE / *Tunon guiñezi* / ET Arias-Bohart 2012. [MNNC].

Paratypes. Male on a pin // Ñuble Tregualemu / 20-1-1994 / Col. J. Mondaca E. // abdomen in a vial // PARATYPE / *Tunon guiñezi* / ET Arias-Bohart 2012. [VDC]. Male on a card // Aedeagus on a card // Chile, Cauquenes / Tregualemu 500 / 27.I.91 / L. Peña // Chilelater / gayi / n. sp. / det. J. Valencia // Ex-COLECCION / Jorge Valencia / JVCC / Chile 003375 // COLECCION JEBC / Juan Enrique / Barriga-Tuñon / Chile 0204541 // PARATYPE / *Tunon guiñezi* / ET Arias-Bohart 2012. [CAS]. Female on a pin / Chile, Cautín / Lago Villarrica / 20.I.1954 J. Vargas // Alotipo (red card) // Ex- COLECCION / Jorge Valencia / JVCC // Chile 003062 / COLECCION JEBC / Juan Enrique / Barriga-Tuñon / Chile 020004 / [JEB] // PARATYPE / *Tunon guiñezi* Female / ET Arias-Bohart 2012. [ANIC]. Female on a card // Chile, Valdivia / Santo Domingo / 17.I.82 Krahmer R // Ex- COLECCION / Jorge Valencia / JVCC // Chile 003097 // COLECCION JEBC / Juan Enrique / Barriga-Tuñon / Chile 0201446 // [JEB] // PARATYPE / *Tunon guiñezi* Female / ET Arias-Bohart 2012. [JEB]. Male on a pin // Aedeagus on a card // Chile, Cautín / Lago Villarrica / 20.I.1954 J. Vargas // Holotipo (red card) // Ex-COLECCION / Jorge Valencia / JVCC // Chile 003062 // COLECCION JEB C / Juan Enrique / Barriga-Tuñon / Chile 020004 / [JEB] // Head & Pronotum on a vial // PARATYPE / *Tunon guiñezi* Female / ET Arias-Bohart 2012. [JEB].

Male on a pin // Chile Ñuble Province / Alto Tregualemu 500 mts / ca. 20 km SE. Chovellen / 26–27 January 1979 D. M. Davis & B. Ackenbergs // PARATYPE / *Tunon guiñezi* Male / ET Arias-Bohart 2012. [ETA].

Other Material. Male & female on a pin // 10 mi N. E. of / Pucon, CHILE / I-12-51 // Ross and Michelbacher / collectors //. [CAS]. Male on a pin // 30 km S of / Valdivia / CHILE I-13-51 // Ross and Michelbacher / collectors //. [CAS].

Discussion

The tribe Protelaterini, of southern hemisphere distribution, includes the following genera: *Austrelater* from Australia, *Sphaenelater* and *Protelater* from New Zealand and *Anaspasis*, *Valdivelater* and the new genus *Tunon* from Chile. The members of the tribe Protelaterini are characterized by lacking deep antennal cavities on the prothorax, presence of a short and truncate prosternal chin piece and membranous lobes on tarsomeres, those on 1 and 2 sometimes highly reduced.

The new genus *Tunon* differs from the genus *Protelater* in having antennomeres 6–10 strongly elongate (Fig. 9), edges of antennal fossae not entirely sharply carinate, pronotum anteriorly expanded, with posterior angles not reaching outer edges of elytral humeri, notosternal sutures strongly sinuate for most of their lengths, and elytra subcylindrical; while in the species of *Protelater* antennomeres 6–10 are elongate (Fig. 11), edges of antennal fossae are entirely sharply carinate, the pronotum is not anteriorly expanded, with posterior angles reaching outer edges of elytral humeri, more less straight notosternal sutures, and elytra not subcylindrical.

The new genus *Tunon* differs from the genus *Anaspasis* because the former has well produced subquadrate frontoclypeal region (Fig. 2), without a posterior impression at midline, pronotum anteriorly expanded, posterior angles not reaching outer edges of elytral of humeri; sinuate notosternal sutures, and mesosternal cavity posterior edge acute (Fig. 5); while the genus *Anaspasis* has a produced subtriangular frontoclypeal region, the pronotum is not anteriorly expanded, with a posterior impression at midline, posterior angles reaching outer edges of elytral of humeri, a mostly straight notosternal suture, and mesosternal cavity posterior edge broadly rounded (Fig. 6).

The new genus *Tunon* differs from the genus *Valdivelater* because the former has well developed supraantennal ridges, eyes not visible from above, serrate antenae, and elytral apices meeting at midline, while species of *Valdivelater* have weakly developed supraantennal ridges; ramose antennae with articulated rami, eyes visible from above, and rounded elytral apices not meeting at midline.

When larvae specimens from *Valdivelater* and *Tunon* will be available, their study will clarify its relationships with other members of the Protelaterini tribe.

Acknowledgments

Patrick Grootaert provided access to the Candèze collection, type material and space to conduct my research in the Institut Royal des Sciences Naturelles de Belgique. Julien Cillis took the scanning electronic micrograph photos at IRScNB. Yves Laurent and Isabelle Bachy took and processed the color photos at IRScNB. Stephane Boucher and Antoine Mantilleri kindly provided access to the type material and facilities at the Museum d'Histoire Naturelle, Paris. Terry Cuneo for editing this ms. The Fulbright Commission of Educational Exchange, Brussels, Belgium, the National Science Foundation DEB 435413, to Elizabeth T. Arias and Kip W. Will, the Evert and Marion Schlinger Foundation, provided financial support. John F. Lawrence kindly reviewed, edited, and added excellent comments to this work and provided material for this work.

Literature Cited

Arnett, R. H. Jr., G. A. Samuelson & G. M. Nishida. 1993. *The Insect and Spider Collections of the World*. Sandhill Crane Press, Inc., Gainesville, Florida, 310 pp.

Becker, E. C. 1958. The phyletic significance of the female internal organs of reproduction in the Elateridae. *Proceedings of the Tenth International Congress of Entomology* 1:201–205.

Calder, A. A. 1996. *Click Beetles: Genera of the Australian Elateridae (Coleoptera). Monographs on Invertebrate Taxonomy*, Volume 2, CSIRO Publishing, Collingwood, Victoria, x + 401 pp.

Calder, A. A., J. F. Lawrence & J. W. H. Trueman. 1993. *Austrelater*, gen. nov. (Coleoptera: Elateridae), with description of the larva and comments on elaterid relationships. *Invertebrate Taxonomy* 7:1349–1394.

Candèze, E. C. A. 1881. Élatérides nouveaux. Troisième fascicule. *Mémoires Société Royale des Sciences de Liège*, série 2, 9:1–117. Bruxelles, F. Hayez.

Dolin, V. G. 1975. Wing venation in click beetles and its significance for the taxonomy of the family. *Zoologicheskii Zhurnal* 54:1618–1633. [in Russian.]

Kukalová-Peck, J. & J. F. Lawrence. 1993. Evolution of the hind wing in Coleoptera. *Canadian Entomologist* 125:181–258.

Kukalová-Peck, J. & J. F. Lawrence. 2004. Relationships among coleopteran suborders and major neopteran lineages: evidence from hind wing characters. *European Journal of Entomology* 101(1):95–144.

Lawrence, J. F. & E. T. Arias. 2009. *Valdivelater*, a new genus of Protelaterini (Elateridae: Lissoominae) from the forests of central and southern Chile. *Annales Zoologici* 59(3):319–328.

Platia, G. 1994. Coleoptera Elateridae Fauna d'Italia XXXIII. 429 pp. Calderini Bologna.

Schwarz, O. 1902. Ueber die elateriden-gattunngen Sharp und Cand. und ihr systematische stellung nebst beschreibung einer neuen gattung und art. *Deutsche Entomologische Zeitschrift* 46:364–366.

Sharp, D. 1877. On the elateridae of New Zealand. *Annals and Magazine of Natural History* (4)19:396–413.

Received 6 Dec 2012; Accepted 26 June 2013 by F. W. Shockley; Publication date 30 Oct 2013.