

**Research article**

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Description of *Sharon* gen. nov. for the Chilean species *Asaphes amoenus* Philippi, 1861 (Coleoptera: Elateridae)

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Abstract. *Sharon* gen. nov. is here described to include *Asaphes? amoenus* Philippi, 1861 comb. nov. from Chile. A redescription of the species is based on the female holotype and material from different geographic locations. Candèze (1891) placed *Asaphes amoenus* and *Parasaphes elegans* in the suprageneric group Asaphites. We discuss differences between *Sharon* gen. nov. and *Hemicrepidius* Germar, 1839, where *Asaphes amoenus* was later placed by Blackwelder (1944). Based on morphological characters, *Sharon* gen. nov. appears to be related to *Parasaphes* Candèze, 1881, *Wynarka* Calder, 1986, and *Tasmanelater* Calder, 1996, all from Australia, suggesting Gondwanan relationships.

Keywords. Coleoptera, *Asaphes*, *Sharon* gen. nov., Chile, new genus.

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Introduction

Kirby (1837) erected *Asaphes* as a subgenus of *Pedetes* Kirby, 1837. Philippi (1861) described *Asaphes? amoenus* from Chile, based on one specimen only and stated that he was unsure of its generic placement. Apparently unaware of Philippi's earlier description, Candèze (1878) described the same species as *Asaphes elegans*. Candèze (1881) described *Parasaphes elegans*, from Queensland, Australia and placed it in "Asaphites" (based on its type genus *Asaphes* Kirby, 1837, *nec Asaphes* Walker, 1834 in Hymenoptera and therefore an unavailable name). Candèze (1891) included *Asaphes* Kirby, *Parasaphes* Candèze, *Compsoctenus* Philippi and *Tibionema* Solier in the "XIX tribu Asaphites", and placed *amoenus* within *Asaphes*. Calvert (1897) agreed with this combination. Fleutiaux (1907), however, placed *amoenus* within *Parasaphes*. Later, Blackwelder (1944) placed *amoenus* in the genus *Hemicrepidius* Germar, 1839. Bouchard *et al.* (2011) note that *Asaphites* Candèze, 1863: 207 belongs under the subfamily Oxynopterinae Candèze, 1857.

Here, we transfer *amoenus* from *Hemicrepidius* to *Sharon* gen. nov., which we place within the subfamily Oxynopterinae.

Materials and Methods

Specimens and primary types repositories are from institutional and private collections. Acronyms follow those provided by the institution or Arnett *et al.* (1993).

ANIC	=	Australian National Insect Collection, Canberra, Australia
BMNH	=	British Museum of Natural History, London, England
CAS	=	California Academy of Sciences, San Francisco, California, USA
CDFA	=	California Department of Food and Agriculture, Sacramento, California, USA
EMEC	=	Essig Museum of Entomology, Berkeley, California, USA
ETA	=	Elizabeth T. Arias-Bohart, private collection, Sacramento, California, USA
JEB	=	Juan Enrique Barriga Tuñon, private collection, Curicó, Chile
MNNC	=	Colección Nacional de Insectos, Museo Nacional de Historia Natural, Santiago, Chile
NMV	=	Melbourne Museum Discovery Centre, Melbourne, Australia

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

The following procedure, as detailed by Becker (1958), was used for examining male and female genitalia: the last few abdominal segments were removed and placed overnight in a Petri dish with soapy water in order to soften the tissues. Male genitalia were extracted, examined and stored in small genitalia vials with 90% alcohol, or glued to a card, pinned under the specimen. Measurements using a calibrated ocular micrometer are as follows: total body length from the frontal margin to elytral apex; pronotal length and maximum width of the pronotum and elytral length and maximum width of elytra.

Methodology and adult morphology follow Platia (1994), Calder (1996), Lawrence & Arias (2009), Lawrence *et al.* (2010a,b) and Arias-Bohart (2013, 2014). Wing vein nomenclature follows that of Dolin (1975) and Kukulová-Peck & Lawrence (1993, 2004).

Label information includes original spellings of place names from specimen labels. Label data follows the following format: / = line separation within label, // = label separation. Juan Enrique Barriga's collection labels include the URL <http://www.coleoptera-neotropical.org>, which is not included here. Approximate GPS values are given in parentheses. Drawings were made using a camera lucida on a Leica MZ7 dissecting microscope. Type material has been databased with a unique number indicated on the label consisting of the acronym EMEC followed by the identification number, which can be accessed at <http://essigdb.berkeley.edu>.

Results

Order Coleoptera Linnaeus, 1758
Family Elateridae Leach, 1815
Subfamily Oxynopterinae Candèze, 1857

Sharon gen. nov.

urn:lsid:zoobank.org:act:A9250D0D-9E9D-4A12-B1E7-3C55FE9D8592

Type species: *Asaphes? amoenus* Philippi 1861: 743, here designated.

Diagnosis

This genus differs from all other elaterid genera by the following combination of characters: strongly serrate antennae from antennomere 4; frontoclypeal carena over antenna distinctive, diffuse at middle; frontoclypeal region advanced forward, concealing labrum at base; pronotum longer than wide, sides carinate and visible from above in almost all its entirety; in males pronotal sides straight, except at posterior angles; broad, protruding posterior angles, apices upwards; mesocoxa open to mesepimeron and mesepisternum; apical field of wing with one oblique, long narrow plate, reaching border of the wing. Sexual dimorphism present. Morphological characters of *Sharon* gen. nov. (Figs 1A–B, 2) are further discussed with *Hemicrepidius* (Fig. 3), where the species *amoenus* was last placed by Blackwelder (1944).

Etymology

This generic name honors Sharon P. Lawler of Davis, California, a long time friend.

Description

Female

Body about 4.27–4.97 times as long as wide; pronotal sides narrower than elytral sides; elytral maximum width at anterior third; elytral apices softly rounded, not meeting at mid-line (Fig. 1A–B. Holotype of type species MNNC).

Head slightly declined at base, transverse, ratio of median length to greatest postocular width 0.14–0.22; eyes medium size, protuberant in both sexes, faceted, without interfacetal hairs; supra-antennal ridges raised above, each antennal fossa with deep curved invagination between antennal insertion and eye; antennomeres 2 and 3 significantly smaller than remaining antennomeres; 4–11 serrate, tubular-shaped. Female antennae shorter than male antennae (Fig. 2); frontoclypeal carena over antenna distinctive, slightly curved, diffuse at middle; frontoclypeal region advanced forward; labrum small, 1.6 times as long as wide; mandibles unidentate (Fig. 4A).

Prothorax elongate, about 1.19–1.30 times as long as greatest width; sides sinuate narrower anteriorly, carinate and emarginate; strongly convex medially; posterior angles broad, produced posterolaterally, apices upwards; base of pronotum without incisions; hypomera simple, basally non excavate; prosternum strongly combed; notosternal suture marginate, sinuated at procoxae, open at anterior end; prosternal process slightly narrower near base, then gradually expanded posteriorly, following procoxae in lateral view, extending well behind procoxae; hypomeron basally impressed to accommodate leg (femur), enlarged, covering epipleura; procoxae subglobular.

Scutellar shield convex, elongate, parallel-sided, anterior border diffuse, posteriorly with a small notch; elytra striate, about 2.34–3.16 times as long at midline as greatest width and 2.63–2.9 times as long as pronotum; parallel-sided at anterior third, narrowing towards posterior third, converging posteriorly, apices rounded, not meeting at central midline; humeri well developed; disc with 10 defined striae, each stria strongly punctate, deep punctures separated by less than one own diameter; mesoventrite not on same plane as metaventrite; articulating lobes of mesosternite rugose; anterior articulating surfaces of mesosternite almost perpendicular to median body line; mesocoxae projecting, mesocoxal cavities narrowly separated, open laterally to mesepimeron and mesepisternum; mesocoxal distance 0.25 times mesocoxal diameter; mesosternal posterior region sinuated, length 0.25 times mesocoxal diameter; mesosternal cavity sides mostly parallel, except at base (Fig. 5A); metacoxae obliquely oriented, with plates extending towards body side; posterior region of mesosternite with length 0.25 times mesocoxal diameter; metasternum between metacoxae elevated.

Hind wing about 2.46–3.0 times as long as wide; apical field about 0.17 times as long as total wing length, apical field with one oblique long, narrow plate, reaching border of the wing; radial cell well developed, elongate, length 5.0 times as long as wide; cross-vein r_3 long, length about 4.16 times length of radial cell, horizontal and arising away from r_4 ; base of RP very long, extending to wing base; R-M loop forming narrowly acute angle; MP_{3+4} branching in 2 straight long veins (arrow); wedge cell length about 2.7 times its width (Fig. 7A).

Genitalia: Bursa copulatrix elongate, at base with two globular glands, posterior area of bursa with more than 10 long spinules, anterior area of bursa with small sclerotized spicules (Fig. 8A, globular glands not visible on figure).

Tarsomeres 1–3 narrow at base, distally wider; tarsomeres 1–4 with lamellae (Fig. 10); tarsomere 4 significantly smaller than precedents; pretarsal claws simple; empodium short, not extending between claws.

Male

Same characters as female unless indicated as follows.

Body about 4.45–4.73 times as long as wide; pronotal sides straight; elytral length about 3.11–3.42 times pronotal length; antennomere 11 reaching posterior angles, antennomere 11 elongate, similar in size to antennomeres 4–8 (Fig. 2).

Prothorax elongated dorso-ventrally, somewhat flattened, except slightly combed medially, pronotal sides strongly emarginate, about 1.04–1.47 times as long as greatest width.

Genitalia: aedeagus symmetrical. Median lobe attached to parameres (Fig. 11).

Distribution

Southern Chile, provinces Arauco, Malleco, Cautín, Valdivia and Coihaique.

Sharon amoenus (Philippi, 1861) comb. nov.

Figs 1AB, 2, 4A, 5A, 6A, 7A, 9–11

Asaphes? amoenus Philippi, 1861: 743.

Asaphes elegans Candèze, 1878: clxxxix.

Asaphes amoenus – Philippi 1887: 704. — Candèze 1891: 182. — Calvert 1897: 844–855.

Asaphes elegans – Philippi 1887: 704. — Fleutiaux 1907: 216. — Blackwelder 1944: 293.

Parasaphes amaenus [sic] – Fleutiaux 1907: 216–217.

Hemicrepidius amoenus – Blackwelder 1944: 293.

Material examined

Holotype

CHILE: ♀, 14.47 mm; number 2223. Corral, Valdivia (39°52' S 73°26' W) EMEC113160 [MNNC].

Non type material studied

CHILE: *Sharon amoenus*. ♀: Prov. Valdivia / Sto. Dgo. / Valdivia / 28-10-90 / E. Krahmer. (39°48'51" S 73°14'45" W) [ETA]; ♂: Prov. Valdivia / Sto. Dgo. / Valdivia / 28-10-90 / E. Krahmer. (39°87' S 73°39' W) [ETA]; ♂: Cautín 700 m / Nueva Imperial / 15-XI-81 L Peña // Ex Colección Valencia / 005249 [JEB]; ♂: Pichinahuel / Cord Nahuelb. / Arauco Enero 59 / Leg: G. Barría // Ex Colección Valencia 005231 // *Hemicrepidius amoenus* (Phil.) / Valencia Det 1972. (37°48.341' S / 0 73°02.112' W) [JEB]; ♂: Valdivia

/ Santo Domingo / 4-XI-84 Krahmer // Ex Colección Valencia 005187 (39°87'S 73°39'W) [JEB]; ♂: Valdivia Panguipulli / 13.XI.77 Krahmer / Ex Colección Valencia 004976 (39°38'40"S 72°19'50"W) [JEB]; ♂: Chile / Las Mellizas / 27-ii-2010 / Leg.: A. Fierro // [EMEC]; ♂: Chile / Las Mellizas / 27-ii-2010 / Leg.: A. Fierro // [MNNC]; ♂: Chile Cautín / P. N. Los Paraguas 17-8-1991 / Col. J. Mondaca E. // Ex Colección Valencia / 003033. (39°87'S 73°39' W) (same as National Park Conguillio 38°40'00" S 71°39'00" W) [JEB]; ♀: (Arauco) 750 m / 1, 19-Enero-54 / Coll. L. E. Peña / Ex Colección Valencia 005010 (37°46' S 73°20' W) [MNNC]; ♀: Aysén / Coyhaique 7. / Km w 21-I-68 // *Hemicrepidius amoenus* (Phil.) / Valencia Det 1976. Ex Col Valencia / JVCC / CHILE 003033 (43°46' S 72°04' W) [JEB]; ♀: Valdivia / Fdo Caupolicán / 22-X-1965 // HOMOTIPO / Ex Col Valencia / JVCC / CHILE 005180 (39.87°S 73.39°W) [JEB]; ♀: Nahuelbuta Arauco Chile // Colección J. E. Barriga. (37°48.341' S / 73°02.112' W) [JEB].

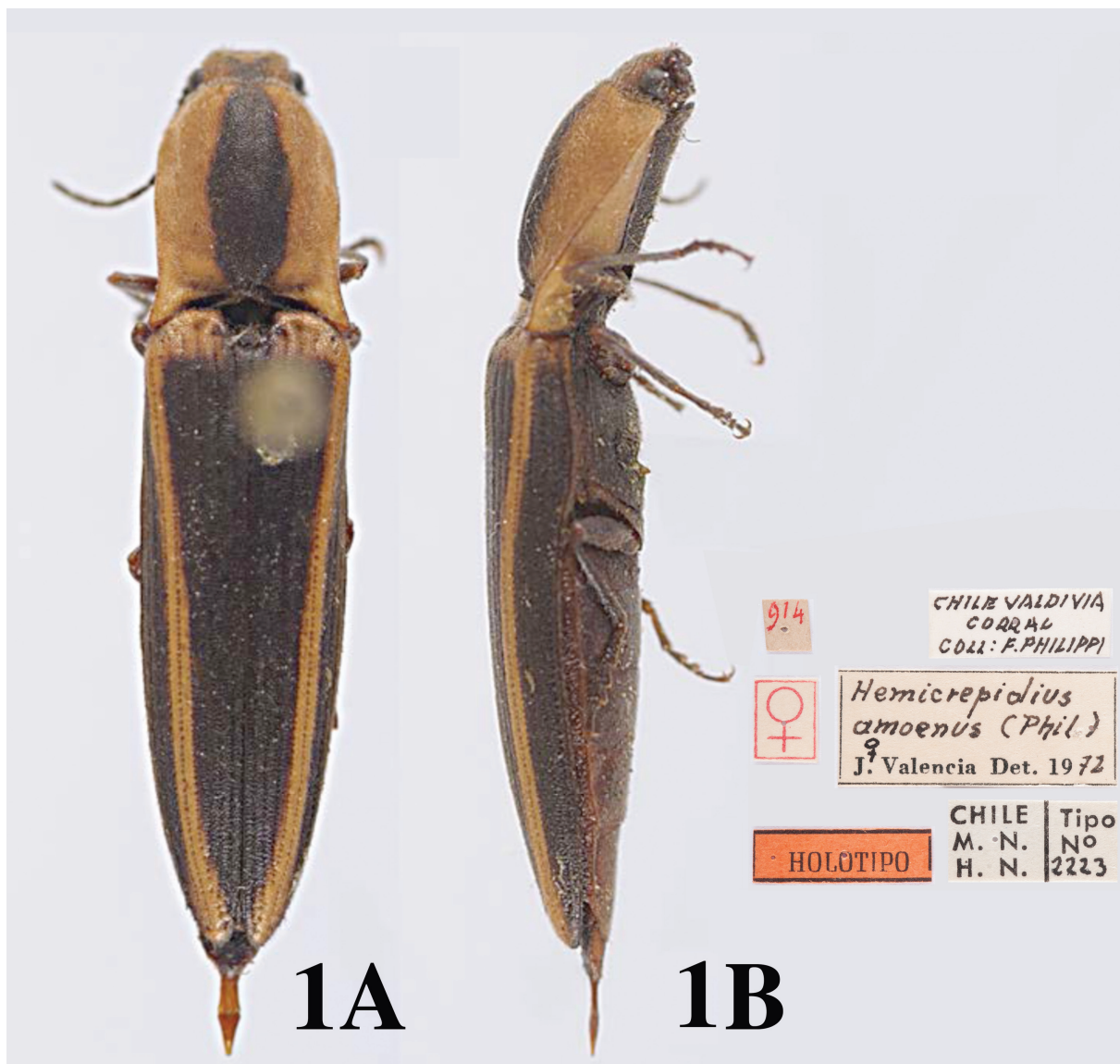


Fig. 1. Holotype of *Sharon amoenus* (Philippi, 1861) comb. nov., ♀, adult (MNNC). A. Dorsal view. B. Lateral view. Body length: 14.47 mm. Photo by Cristian Becker (MNNC).



Fig. 2. Adult of *Sharon amoenus* (Philippi, 1861) comb. nov., ♂. Valdivia. Scale bar = 1 mm.



Fig. 3. Adult of *Hemicrepidius memnonius* Herbst, 1806 [= *Asaphes thomasi* Germar, 1839, holotype, approximate body length = 18 mm]. Photo by Helena Maratheftis (BMNH).

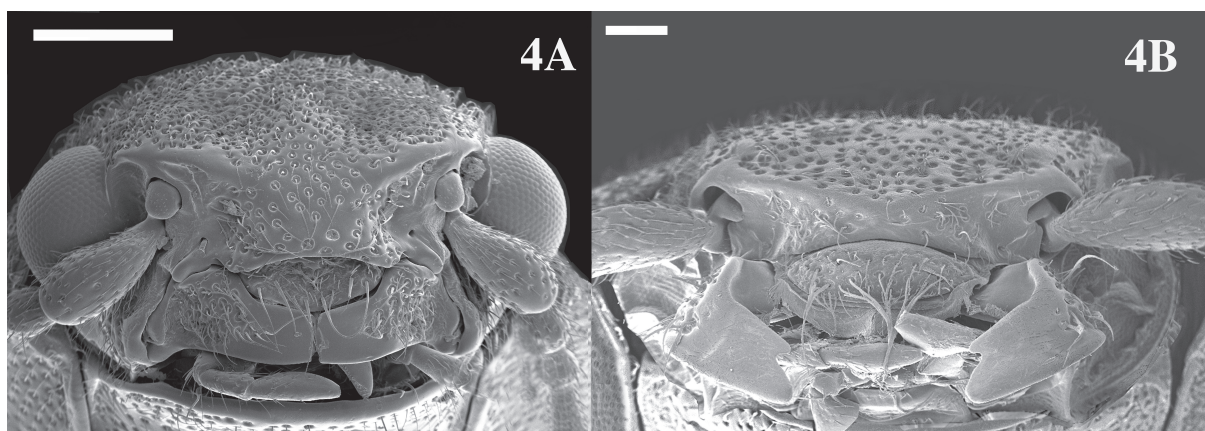


Fig. 4. SEM photographs of head, frontal view. A. *Sharon amoenus* (Philippi, 1861) comb. nov. B. *Hemicrepidius memnonius* Herbst, 1806. Scale bars = 0.5 mm.

Comparative material of *Hemicrepidius*

♂: *Asaphes thomasi* Germar, 1839. Holotype studied from photograph material from BMNH in Fig. 3.

♂: Kaweah Power House Reservoir #3 Calif. / Tulare County / Vi.21.1977/ / E. A. Kane Collector/ / *Hemicrepidius dilaticollis* (Most) M.W. Stone [CDFA]; ♂: Kaweah Power House Reservoir #3 Calif. / Tulare County / VI.14.1973/ / E. A. Kane Collector / / [CDFA], as *Hemicrepidius dilaticollis* no label present; ♀: N. Y./ / *Hemicrepidius dilaticollis* [ETA]; ♀: Pine Ridge / Sharon Co / S. Dak; [EMEC]; ♂: Quincy, 4mi W plums Co., / Calif. Vi-24-49 / / *Hemicrepidius dilaticollis* / det M.W. Stone H.U. Hunt / Collector; ♀: Buffalo N-Y/7-10-69 / E.P.V. Coll E. P. Van Duzen [EMEC]; ♀: Fort Lee /New Jersey / W.S. Cook / Collector *H memnonius* [ETA]; ♂: Putnam Park/18 J 1.39 ct / Almelander/ / *H memnonius* (Hbst)/Det. Marshall W. stone Collection [CAS].

Comparative material from Australia

Parasaphes sp. #446. ♂: Australia: Vic.: Mt Donna Buang / 1200 mt 11-17i80/Eucalyptus-Nothofagus forests A. Newton & M. Thayer / / ANIC Specimen / / [ANIC]; ♀: 37.43 S 145.42 E VIC / / Cement

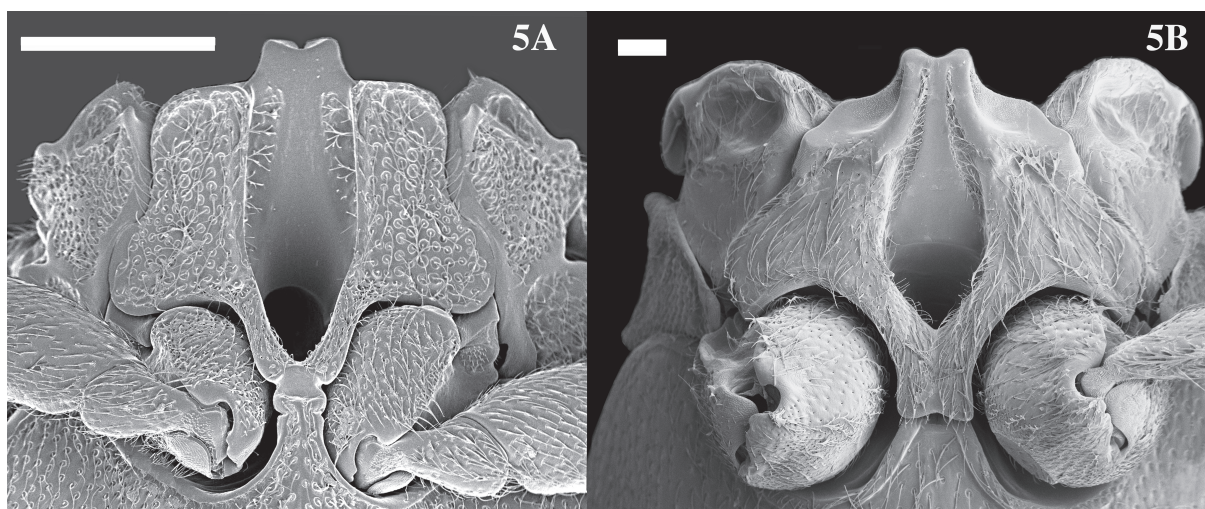


Fig. 5. SEM photographs of mesoventral cavity. A. *Sharon amoenus* (Philippi, 1861) comb. nov. B. *Hemicrepidius memnonius* Herbst, 1806. Scale bars = 0.5 mm.

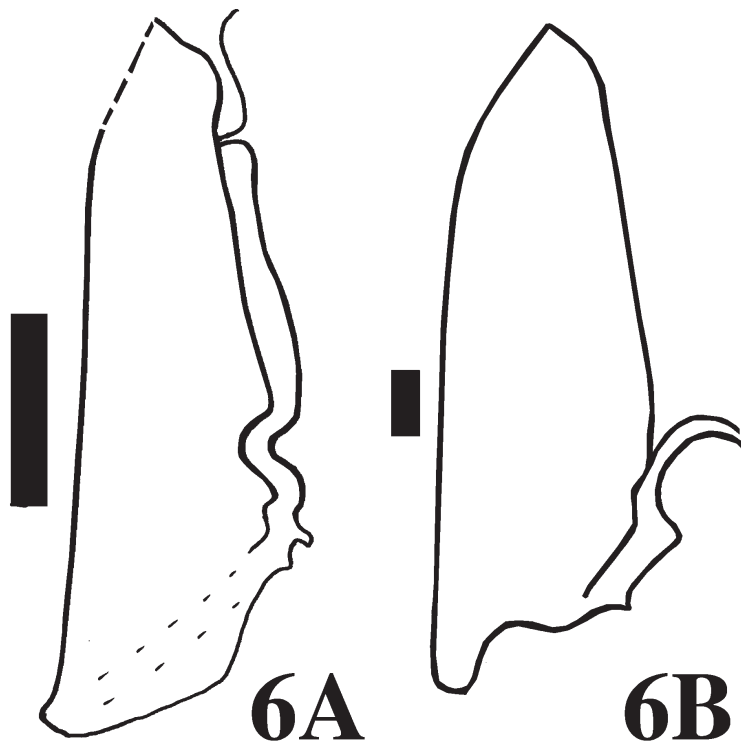


Fig. 6. Hypomeron. **A.** *Sharon amoenus* (Philippi, 1861) comb. nov. **B.** *Hemicrepidius memnonius* Herbst, 1806. Scale bars = 1 mm.

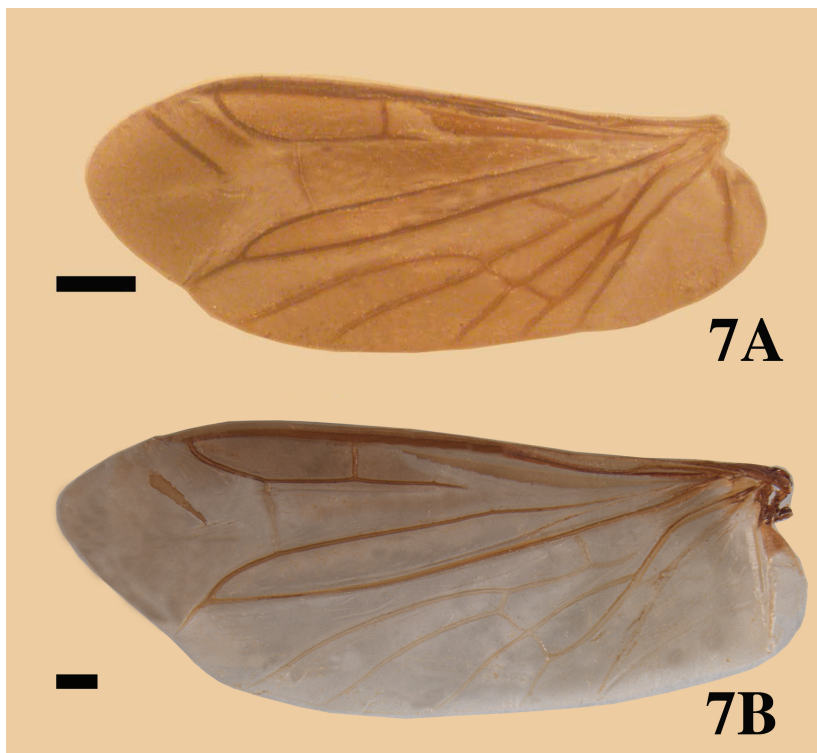


Fig. 7. Wing. **A.** *Sharon amoenus* (Philippi, 1861) comb. nov. **B.** *Hemicrepidius memnonius* Herbst, 1806. Scale bars = 1 mm.

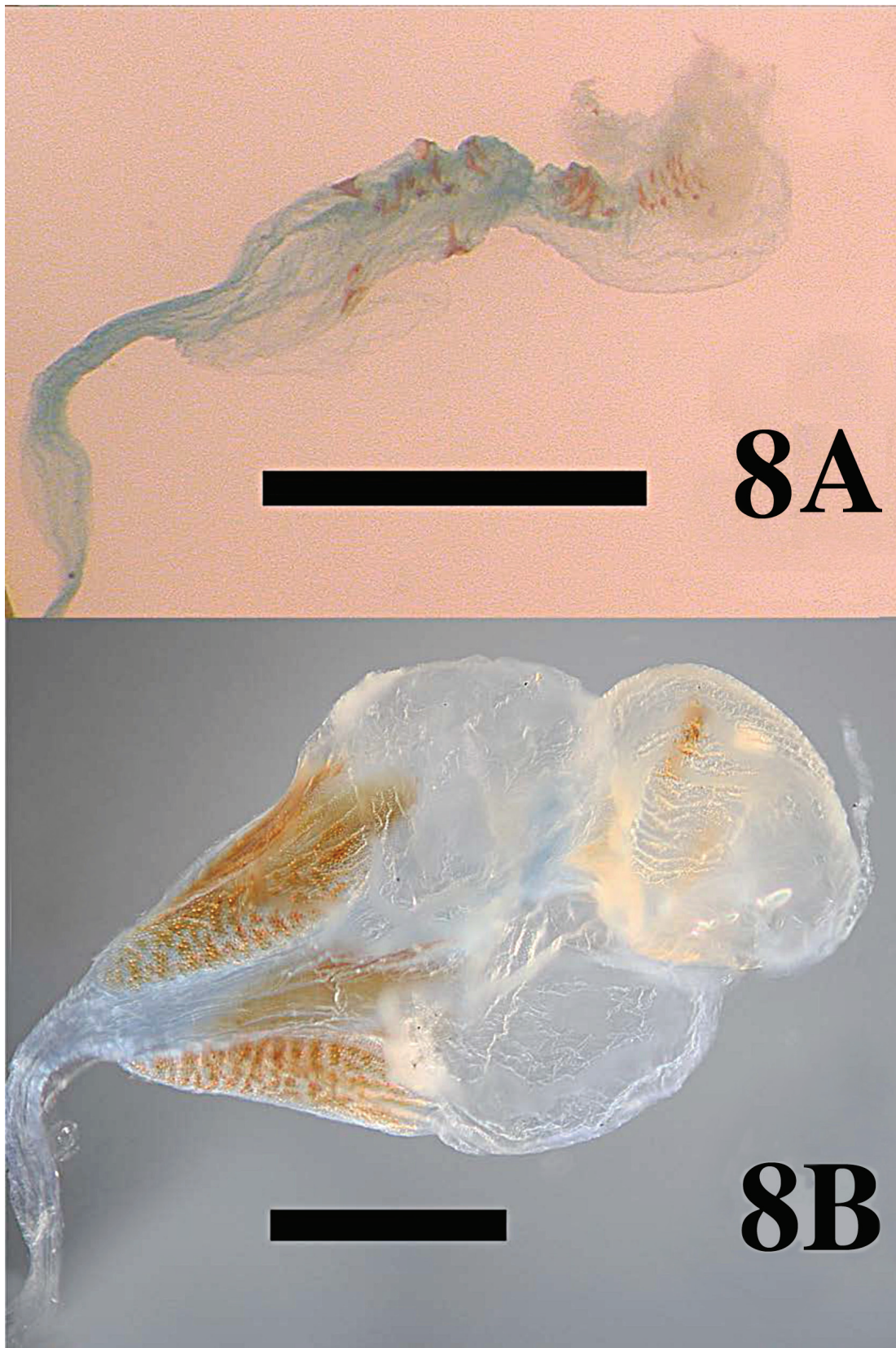


Fig. 8. Female genitalia. **A.** *Sharon amoenus* (Philippi, 1861) comb. nov. **B.** *Hemicrepidius memnonius* Herbst, 1806. Scale bars = 0.5 mm.

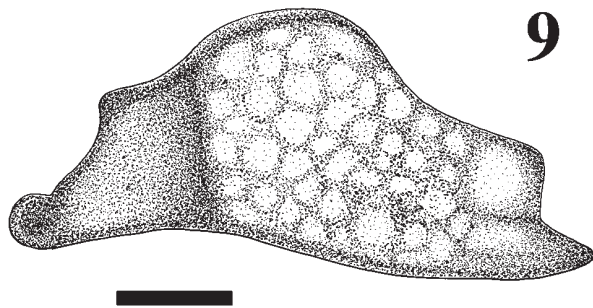


Fig. 9. Mandible of *Sharon amoenus* (Philippi, 1861) comb. nov. Scale bar = 0.5 mm.

Creek, 670m / N. of Warburton / 812 26 Jan.-11 Feb.1997 / A. Newton & M. Thayer// Euc. regnans-
Noth.cunn/pyrethrin fogging / old fungus logs [ANIC]. [ETA]

Parablax sp. ♂: 43.07 S 146.47 E / Edwards rd. TAS. Hartz Mtns. 4 Feb. 1983. I.D. Naumann / J.C.
Cardalle Coll. [ANIC] [ETA].

Parablax ooliekirra Calder, 1986. ♂: A.H. Elston Collection// Tasmania/Australian Museum K436880
// Calder. Det A. Calder 1980 // *Parablax ooliekirra* Det A. Calder 1980 // [NMV].

Parablax moorda Calder, 1986. ♂: National Park // NSV / A. Museum 16.x.1921. National Museum
K436878 // *Parablax ooliekirra*. Det A. Calder 1980 // *Parasaphes elegans?* / Candz. [NMV].

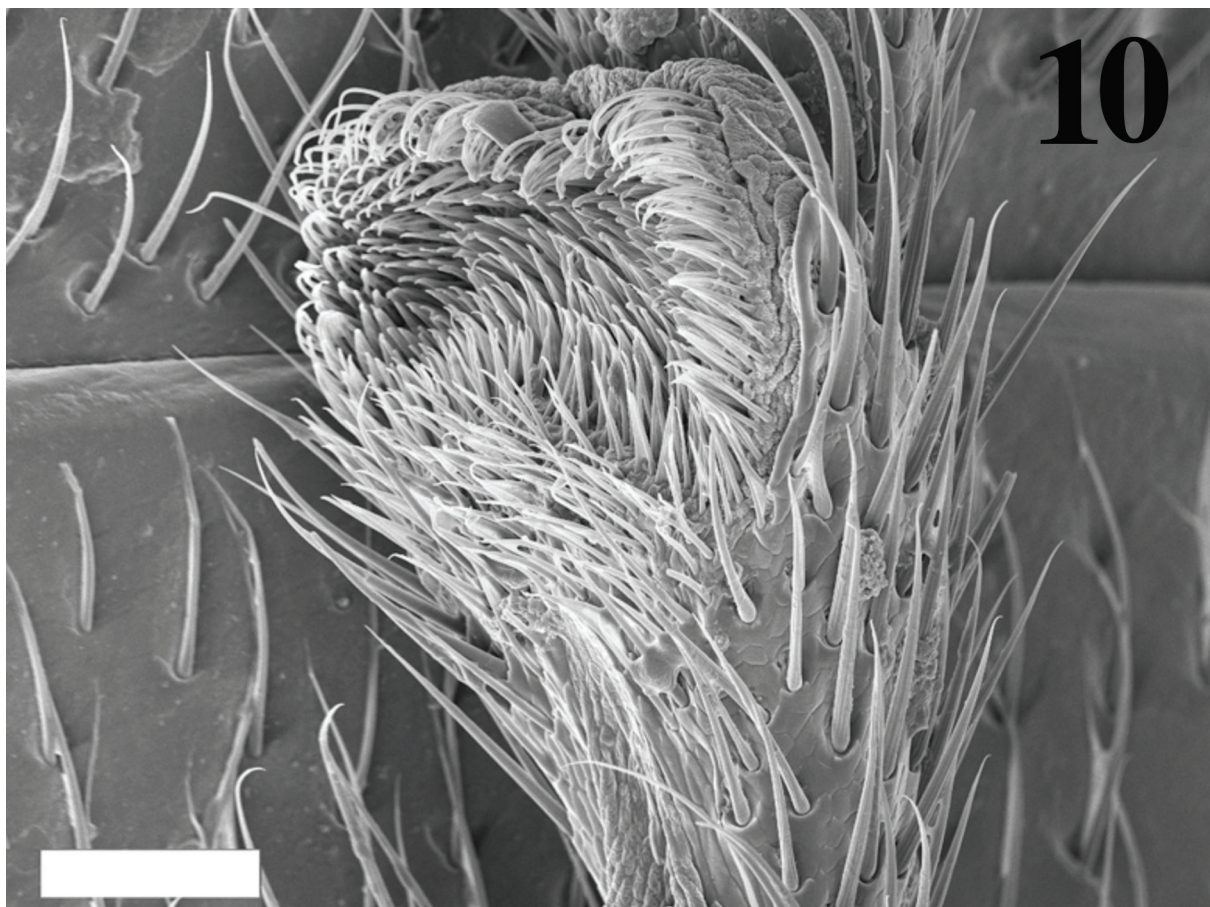


Fig. 10. Tarsomere 3 of *Sharon amoenus* (Philippi, 1861) comb. nov. Scale bar = 0.5 mm.

Tasmanelater pelionensis Calder, 1996. ♂: 880mt 30Nov-8Jan./1991 E Nielsen / E. Edwards malaise#3 / closed forest // *Tasmanelater pelionensis* / Det A Calder 1996 // ANIC database No / 25-029504 [ETA]; ♂: Paratype 42.52S 146.03E TAS / 2km NE by Mt Ossa / 29 Nov 1990 / T. Weir in Swarm on ground 1000 // Paratype // *Tasmanelater pelionensis* Det A Calder 1996 [BMNH].

Wynarka silvestre Calder, 1986. ♂: Blue Mts N.s. Wales g.E. Bryant 27 Xii 08. *Wynarka silvestre* Det. A. Calder 1980 [BMNH]; ♂: Mt. Disappointment, Vic sweeping grass // 27 oct 1974 // A. A. Calder *Wynarka silvestre* Det. A. Calder 1980 // Paratype 20305 // Mus. Vic. / Ento 2015-21 [NMV]; ♀: Unreadable // Female genitalia in a vial // A.A. Calder 1976 // *Wynarka silvestre* Det. A. Calder 1980 // Paratype 20305 // Mus. Vic. / Ento 2015-21 [NMV].

Redescription

Female (holotype)

Total body length 14.47 mm, pronotal width 3.12 mm, elytral width 3.15 mm (Fig. 1A–B).

Head yellow, with a brown stripe medially; short, semi-erect, gold vestiture; surface finely punctate; antenna not reaching base of posterior angles, same color as head, all antennomeres clothed with erect short hairs; antennomere 2 and antennomere 3 smaller than antennomere 4, antennomere 2 about 0.45 times as long as antennomere 4, antennomere 3 about 0.39 as long as antennomere 4; mandibles brown, with at least 3 long setae (Fig. 9).

Prothorax sides slightly sinuate, narrowing towards head; yellow, with a brown stripe longitudinally, wider near base, with semi-decumbent, curved, gold hairs; punctate, fine punctures separated by more than one own diameter, prosternal spine about 0.25 times as long as diameter of procoxal cavity; hypomeron light yellow, finely punctate.

Scutellum dark brown. Elytra with striae impressed, strongly striate-punctate; most of elytral surface yellow, including humeri; a long lateral brown stripe, narrowing towards elytral apices; abdomen dark brown, finely punctate, with decumbent gold, hairs; legs brown, vestiture black; tarsomeres with lamellae of a lighter color, lamellae 3–4 with strong set of short hairs distally.

Legs brown, vestiture black; tarsomeres 2–3 with heart-shaped lamellae, medially lighter than the rest of the tarsomere; tarsomere 4 about 0.5 times length tarsomere third (Fig. 10).

Male

Total body length 11.25–12.76 mm, pronotal width 1.75–2.23 mm, elytral width 2.37–2.76.

Head dark brown; short, semi-decumbent goldish hairs; posterior angles, humeri and elytral apices yellow; antennae same color as head, not reaching apex of posterior angles, all antennomeres clothed with erect, short hairs; antennomere 2 and antennomere 3 smaller than antennomere 4, antennomere 2 about 0.41 times as long as antennomere 3, antennomere 3 about 0.32 times as long as antennomere 4; mandibles same color as head.

Prothorax dark brown, semi-decumbent long, gold hairs; parallell-sided for almost all their lengths; somewhat flat, punctate, punctures separated by less than one own diameter; prosternal spine about 1.15 times as long as diameter of procoxal cavity.

Scutellum black. Elytra black, with elytral humeri and apices yellow; with striae impressed, strongly striate-punctate There is variation in the size of the yellow band yellow covering posterior angles, humeri and elytral apices, might be smaller covering only apex of posterior angles, humeral border, small spot



Fig. 11. Male genitalia of *Sharon amoenus* (Philippi, 1861) comb. nov. Scale bar = 0.5 mm.

on elytral apices, or larger covering posterior angles and along the pronotal side, extending humeral area as long as scutellar length and almost all elytral apices.

Legs dark brown, vestiture black; tarsomera similar to female.

Aedeagus about 1.25–1.37 mm long; apex of parameres globose, median lobe much longer than parameres (Fig. 11).

Distribution

Southern Chile. *Sharon amoenus* comb. nov. is distributed from the Bio Bío region to the Aysén region (provinces of Arauco, Malleco, Cautín, Valdivia and Coihaique), especially in humid areas of the coastal range (from 37°46' S to 39°55' S) and in similar habitats of the Andean Cordillera (from 38°43' S to 43°46' S).

Remarks

We believe that Philippi based his description of *Asaphes amoenus* on a unique specimen, which he deposited at the MNNC, Chile.

Discussion

Sharon amoenus comb. nov. was previously placed in *Asaphes* and subsequently transferred by Blackwelder (1944) to *Hemicrepidius* (type species *H. memnonius* (Herbst, 1806), Fig. 3). However, *S. amoenus* comb. nov. does not share the generic characters of *Hemicrepidius* and we have therefore erected *Sharon* gen. nov. to accommodate this species. *Sharon* gen. nov. differs from *Hemicrepidius* by the following characters (contrasting characters for *Hemicrepidius* in parentheses): frontoclypeal region advanced forward (frontoclypeal region flattened); antennomeres 2–3 about 0.6 times length of antennomere 4 (antennomeres 2–3 similar in length to antennomere 4); prothorax elongate (Figs 1A, 2) (prothorax subquadrate (Fig. 3)); prothorax basally without a notch (prothorax basally with a notch); hypomeron basally non excavate (Fig. 6A) (hypomeron basally excavate (Fig. 6B)); prosternal suture marginate (prosternal suture non marginate); sides of mesosternal cavity mostly parallel (Fig. 5A) (sides of mesosternal cavity curved (Fig. 5B)); wing with a long narrow sclerotized plate reaching edge of wing (Fig. 7A) (wing with an elongate irregular-shaped plate, not reaching edge of wing (Fig. 7B)); anterior section of bursa copulatrix elongate with sclerotized spinules (Fig. 8A) (anterior section of bursa copulatrix globose with 2 sets of elongate, comb-shaped sclerotized structures (Fig. 8B)).

Sharon gen. nov. appears to be related to a group of Australian click beetles presently classified within the subfamily Pityobiinae, that includes *Parasaphes* Candèze, *Wynarka* Calder, 1996 and *Tasmanelater* Calder, 1996, suggesting Gondwanan relationships. Other members of Pityobiinae from Australia that might be related to *Sharon* gen. nov. are *Parablax* Schwarz, 1906 and *Xuthelater* Calder, 1996. Previously, Calder (1986) placed *Parablax* and *Wynarka* within the subfamily Crepidomeninae. However, we believe that *Parasaphes*, *Wynarka* and *Tasmanelater* are incorrectly placed within Pityobiinae since they do not share tribal or subfamilial characters with its other included members: *Pityobius* LeConte, 1854, from North America and *Tibionema* Solier, 1851, from Chile.

In a future publication we will discuss the relationships between *Sharon* gen. nov. from Chile and *Parasaphes*, *Wynarka*, *Tasmanelater* and *Parablax* from Australia, which may be Gondwanan.

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