

Two new species of *Aulacoscelis* Duponchel & Chevrolat 1842 from Mexico (Coleoptera: Orsodacnidae: Aulacoscelidinae)

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Abstract - Two new species of *Aulacoscelis* are described from the same locality (Guadalajara, Mexico): *A. caroli* n. sp. and *A. nahuatl* n. sp. With *A. grandis* Jacoby they form a group of taxa characteristic in the elytra completely spectrum orange in color, with shiny black head, thorax (at least in large part for *A. grandis*), legs and ventral parts. *A. caroli* n. sp. is characterized by a relatively small size, smooth pronotum, sides of pronotum sinuate proximally starting from nearly mid length, straight tibiae, straight and sharpened apex of aedeagus. *A. nahuatl* n. sp. is characterized by a relatively large size, with irregular surface of pronotum, sides of pronotum straight in their basal half, bent mesotibiae and sinuate apex of aedeagus.

Key Words: Aulacoscelidinae, *Aulacoscelis*, Mexico, new species.

Riassunto - Due nuove specie di *Aulacoscelis* Duponchel & Chevrolat, 1842 del Messico (Coleoptera: Orsodacnidae: Aulacoscelidinae).

Sono descritte due nuove specie del genere *Aulacoscelis* provenienti dalla stessa località (Guadalajara, Messico): *A. caroli* n. sp. e *A. nahuatl* n. sp. Insieme ad *A. grandis* Jacoby formano un piccolo gruppo di specie caratteristiche per il colore uniformemente arancio neutro delle elitre, con capo, torace (almeno in parte per *A. grandis*), zampe e addome nero brillante. *A. caroli* n. sp. si distingue per le dimensioni minori, il pronoto liscio, con le sole due impressioni basali caratteristiche del genere, i lati del pronoto sinuati nella metà posteriore, le tibie diritte, l'apice dell'edeago diritto e appuntito. *A. nahuatl* n. sp. ha dimensioni maggiori, superficie del pronoto irregolare, segnato da diverse impressioni più o meno profonde, lati del pronoto rettilinei nella metà prossimale, mesotibie incurvate, apice dell'edeago sinuato in vista laterale.

Parole chiave: Aulacoscelidinae, *Aulacoscelis*, Messico, nuove specie

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INTRODUCTION

Systematic arrangement and phylogenetic relationship of genus *Aulacoscelis* Duponchel & Chevrolat 1842 are still debated. Jacoby (1888), in a first revision of the genus, ranged it near *Orsodacne* Latreille 1802 in the family Chrysomelidae. In the present contribution we follow the recent wider consensus ranging Aulacoscelidinae (with the only genera *Aulacoscelis* and *Janbechynea* Monrós 1953) as a subfamily of Orsodacnidae which is intended as a separate family, distinct from Chrysomelidae (Löbl & Smetana 2010).

As far as it is known, Aulacoscelidinae are mainly linked with plants of the genera *Cycas* L. and *Zamia* Miquel and are nearly restricted to the Neotropical Region. The only *A. candezei* Chapuis 1874 reaches South Western U.S.A., *A. vogti* Monrós 1959 is known from Southern Texas, *A. melanocera* Duponchel & Chevrolat, 1842 reaches Colombia. Remaining fifteen known species are characteristic of the Mesoamerican Dominion (Mexico, Honduras, Guatemala, Nicaragua, Belize, Costa Rica, Panama) (sensu Morrone, 2014).

Pre-imaginal stages had been carefully described for *A. appendiculata* Cox & Windsor 1999 by the same authors. For any information related to the etymology of name *Aulacoscelis*, history and classification of the genus, coevolution with *Cycas* plants, geographic distribution, phenology, reproduction, pre-imaginal stages, cytogenetics, molecular biology and updated taxonomy refer to Santiago-Blay (2004).

Having had the opportunity to visit the Zoologische Staatssammlung (München, Bavaria), one of us (M. D.) detected, among the unidentified material of the collection, a small series of *Aulacoscelis* that can be referred to two new species whose description is the object of the present contribution. All of the specimens were collected in the same locality, as proved by identical labels pinned under each specimen, by prof. Ernst Josef Fittkau, authoritative entomologist and herpetologist.

MATERIALS AND METHODS

Observations and figures were done with binocular stereo-microscopes and a connected drawing device. Photos were made by one of us (S. Z.) with a DSLR camera and Zeiss Luminar lenses; photos with SEM (Scanning

Electron Microscope) were made by our colleague Michele Zilioli at the Museo di Storia naturale di Milano.

All specimens are preserved dried; where a dissection was made, the dissected part is glued on a label pinned with the related specimen.

***AULACOSCELIS CAROLI* N. SP. (Figs. 1-15)**

Diagnosis

An *Aulacoscelis* distinct in the black body with orange elytra, pronotum transverse and smooth with arcuate edges, all tibiae straight, apex of aedeagus straight, sharpened.

Examined material

Holotype ♂ - Mexico. Guadalajara, Jal. leg. Fittkau (Zoologische Staatssammlung München, Germany coll.); Paratypes (2 ♀♀) - same data as holotype (1 ♀ Zoologische Staatssammlung München, Germany coll.; 1 ♀ Daccordi collection, Verona, Italy).

Description of holotype

Head, thorax, scutellum, ventral parts, legs and antennae shiny black; elytra spectrum orange (Figs. 1-3).

Body length 10.3 mm, maximum width 4.0 mm at nearly elytral mid length. Head prognathous; labrum with nearly straight distal margin; antennal sockets raised and separated from distal part of frons and proximal part of clypeus; this latter strongly transversally depressed, by a longitudinal elevated carina; clypeus wide, impunctate; frons sparsely and very finely punctate; maxillary palps with slender and lengthened palpomere, third one nearly as long as basal two together (Fig. 9); apex of mandibles divided into two short rounded off teeth; eyes roundish and prominent; antennae reaching the basal fifth of the elytra, distal three antennomeres slender than seventh (Fig. 7).

Prothorax transverse (length 1.8 mm, width 2.4 mm) with distal margin not bordered; maximum width of pronotum at nearly mid length, sides proximally sinuate and separated from the disc by a relatively deep and wide gutter; pronotum on each side with a deep basal impression (Fig. 6); surface of disc of pronotum shiny, smooth, with only a few very fine punctures; basal corners of pronotum distinct, with two setiferous pores.

Elytra lengthened (length 6.5 mm), narrow, nearly subparallel till over mid length, the apex rounded; humeral callus wide, oblong, moderately prominent; lateral gutter starting at level of the humeral callus and gradually flattening through the elytral apical corner; elytral punctation irregular, fine, isodiametric, in average the distance between two adjacent punctures is nearly 3 to 4 times the diameter of single puncture; epipleura narrow, flat, with sharp outer edge; metathoracic wings fully developed.

Appendix of prosternum narrow between coxae; cotyloid cavity closed; mesosternum wide, proximally lightly transversally impressed, posteriorly narrow and impressed in middle; metasternum bulgy at sides, widely longitudinally impressed in middle.

First abdominal segment strongly prominent between rear coxae; abdominal sternites with short thin hairs, denser on sides of abdominal sternites.

Legs slender and long; femora slightly widened; tibiae straight bearing two short symmetrical spines on the inner side of apex; first protarsomere (Fig. 12) and first mesotarsomere widened; onychium as long as the first tarsomere; claws simple, wide apart.

Median lobe of aedeagus narrow, long, slightly impressed at the apex (Figs. 14-15). Apex of tegmen divided in two lobes bearing sparse hairs, their outer edges short, bent, convergent (Figs. 4-5).

Observations and comparative notes

♀♀ do not significantly differ from ♂ in body size (body: length 9.7 mm, maximum width 4 mm; pronotum: length 2.0 mm, width 2.5 mm; elytra: length 7.0 mm), differing in the not widened first protarsomere (Fig. 11) and mesotarsomere; antenna as in Fig. 8. The 8th sternite with a long, straight arm, slightly widened and bent at the apex, base widened in a paddle shape. Styli darkened in their apical part with close long hairs. Spermatheca as in Fig. 13.

A. caroli n. sp., *A. nahuatl* n. sp. and *A. grandis* Jacoby form a group of species characterized by the completely yellowish-orange coloration of elytra, black thorax (at least in a large part) and black remaining parts of body. Both *A. nahuatl* n. sp. and *A. grandis* are bigger in size than *A. caroli* n. sp.

A. grandis is the more distinctive taxon among the three, having the the sides of prothorax brownish, the disc of pronotum with long white hairs arranged in a shape of a fork; moreover, the elytra show a dense hairiness that is missing in the other two taxa, which bear only very sparse and short hairs.

Derivatio nominis

The new taxon is dedicated with affection to our friend and colleague Carlo Leonardi, former curator entomologist of the Museo di Storia naturale di Milano.

***AULACOSCELIS NAHUATL* N. SP. (Figs. 17-32)**

Diagnosis

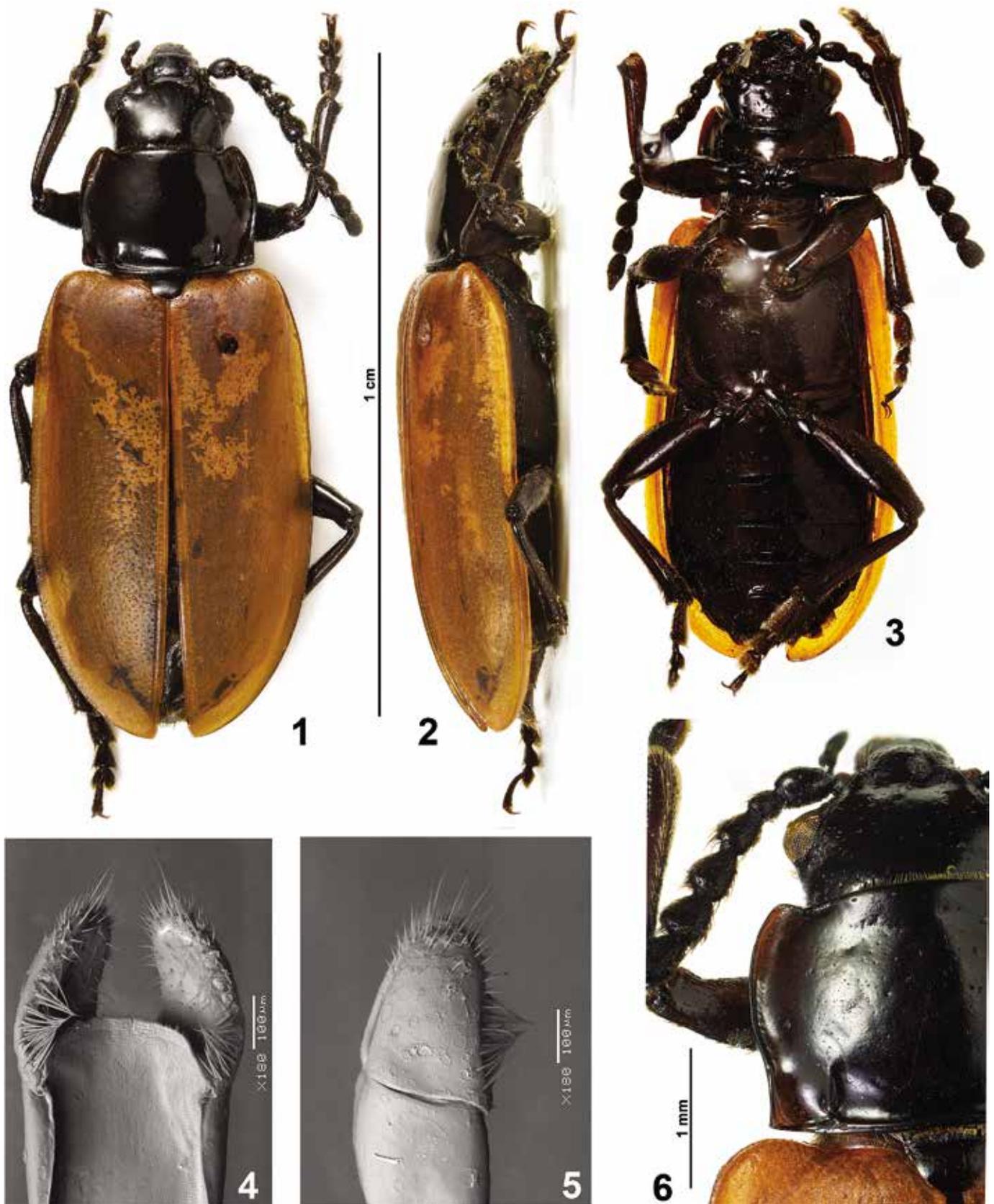
An *Aulacoscelis* distinct in the black body, orange elytra, pronotum transverse with sinuate edges and several impressions of the surface, apex of aedeagus sinuate in lateral view.

Examined material

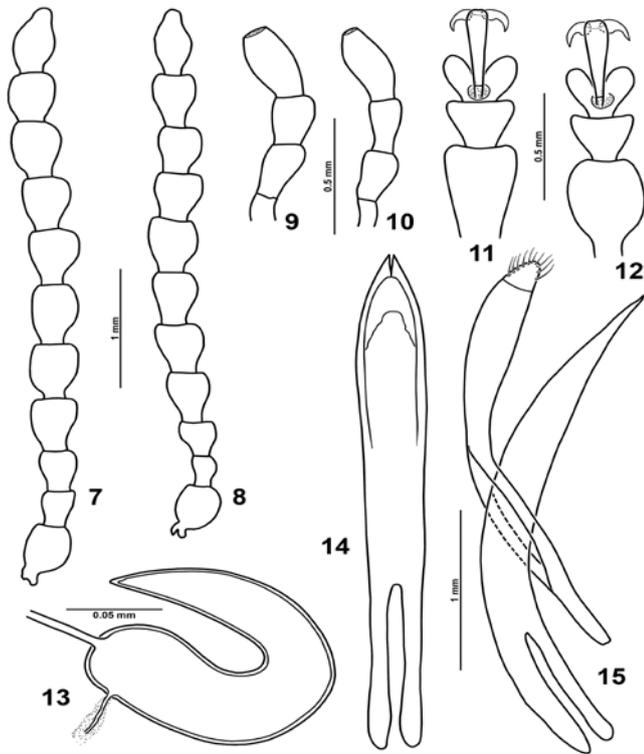
Holotype ♂ - Mexico, Guadalajara, Jal. leg. Fittkau (Zoologische Staatssammlung München, Germany coll.); Paratypes (3 ♀♀) - same data as holotype (1 ♀ Zoologische Staatssammlung München, Germany coll.; 1 ♀, Daccordi coll., Verona, Italy; 1 ♀ Zoia coll., Milan, Italy).

Description of holotype

Head, thorax, scutellum, ventral parts, legs and antennae shiny black; elytra spectrum orange (Figs. 17-19). Body length 13.3 mm, maximum width 5.8 mm at nearly 2/3 of the elytral length; head prognathous; labrum with nearly straight distal margin; antennal sockets raised and separated from distal part of frons and pro-



Figs. 1-6 - *Aulacoscelis caroli* n. sp. 1) ♂ Holotype, dorsal view. 2) idem, lateral view. 3) ♀, ventral view. 4) apex of tegmen. 5) idem, lateral view. 6) ♀, pronotum. / 1) ♂ Olotypo, vista dorsale. 2) idem, vista laterale. 3) ♀, vista ventrale. 4) apice del tegmen. 5) idem, vista laterale. 6) ♀, pronoto.



Figs. 7-15 - *Aulacoscelis caroli* n. sp.: 7) ♂ Holotype, left antenna. 8) ♀, left antenna. 9) ♂, maxillary palp. 10) ♀, maxillary palp. 11) ♀, protarsus. 12) ♂, protarsus. 13) spermatheca. 14) aedeagus, dorsal view. 15) idem, lateral view. / 7) ♂ Olotipo, antenna sinistra. 8) ♀, antenna sinistra. 9) ♂, palpo mascellare. 10) ♀, palpo mascellare. 11) ♀ protarso. 12) ♂, protarso. 13) spermateca. 14) edeago, vista dorsale. 15) idem, vista laterale.

ximal part of clypeus, which are strongly transversally depressed, by a longitudinal elevated carina; clypeus wide, at sides with fine punctures bearing moderately long, yellowish setae; frons sparsely and finely punctuate at sides, with fine and yellowish pubescence, impunctate and glabrous along the median line and distal part; maxillary palps with third palpomere nearly so long as the basal two together (Fig. 26); apex of mandibles divided into two short rounded off teeth; eyes roundish and prominent; antennae reaching the basal sixth of the elytra, distal three antennomeres more slender than seventh (Fig. 24). Prothorax wide, transverse (length 2.3 mm, width 3.4 mm) with distal margin not bordered; sides nearly straight and subparallel from mid length to rear and separated from the disc by a moderately wide gutter; pronotum on the distal third of each side with a deep impression, other three impressions, each with two setiferous pores, along the lateral edges; moreover there is a wide impression at both sides of the base of pronotum, the impression is interrupted in its middle by a longitudinal fold of pronotal surface matching with a similar fold starting from the pronotal edge; base of pronotum bordered (Fig. 20); basal corners distinct, with two setiferous pores.

Scutellum wide, ogival, with a few scattered punctures and transversally impressed in middle, proximal part finely hairy.

Elytra lengthened (length 8.2 mm), narrow, the apex rounded; humeral callus wide, moderately prominent; lateral gutter starting at level of the humeral callus and gradually flattening through the elytral apical corner; elytral punctuation irregular, fine, isodiametric, in average the distance between two adjacent punctures is nearly 3 to 4 times the diameter of single puncture; a few short hairs are present on distal third of elytra; epipleura narrow, flat, with sharp outer edge; metathoracic wings fully developed.

Appendix of prosternum narrow, bent between coxae, bearing a few long hairs; at both sides, above the cotyloid cavity, a flat, round, smooth surface is present (Fig. 23); a continuous gutter separates the edges of pronotum from proepisternum; metasternum deeply impressed in middle.

First abdominal segment strongly prominent between rear coxae; abdominal sternites finely pubescent.

Legs slender and long; femora slightly widened, mesofemora with a dense row of punctures and hairs along rear border; pro- and metatibiae nearly straight, mesotibiae bent; first protarsomere (Fig. 28) and first mesotarsomere widened and elongated, first metatarsomere slightly widened and more elongated, slightly longer than onychium; claws simple, wide apart.

Apex of median lobe of aedeagus bent in lateral view (Figs. 30-31). Apex of tegmen divided in two lobes bearing dense hairs, their outer edges oblong, straight (Figs. 21-22).

Observations and comparative notes

♀♀ are slightly bigger (body: length 14.3 mm, maximum width 6.0 mm; pronotum: length 2.3 mm, width 3.7 mm; elytra: length 10.6 mm), differing from ♂ in the not widened first protarsomere (Fig. 29), meso- and metatarsomere; maxillary palps of ♀ as in Fig. 27; antenna of ♀ as in Fig. 25. Styli darkened in their apical part with close long hairs. Spermatheca as in Fig. 32.

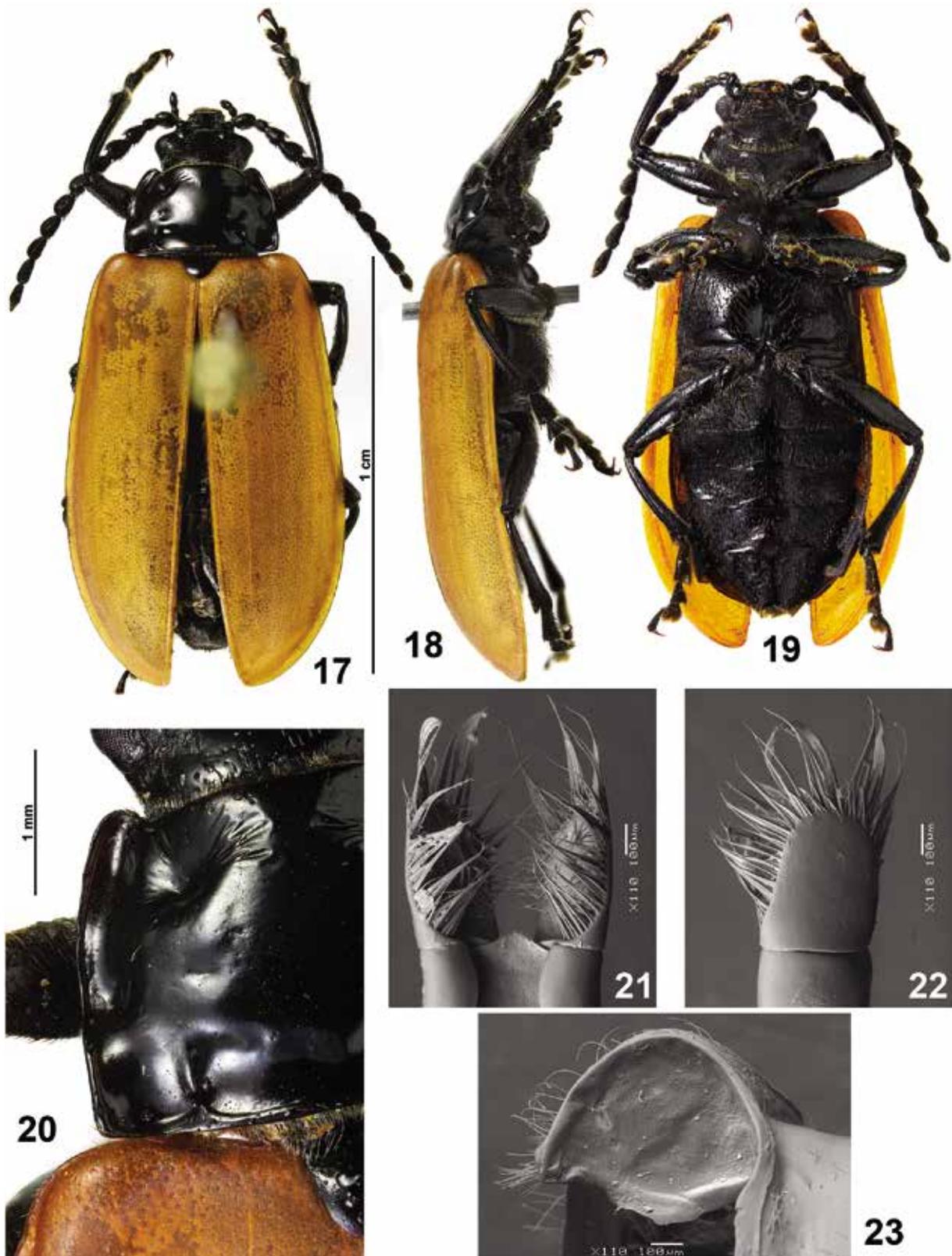
A. nahuatl n. sp. is similar to *A. grandis* in size and coloration, but the latter differs in the brownish sides of pronotum, presence of long hairs in the middle of pronotum and hairy elytra, as discussed above. From *A. caroli* n. sp., *A. nahuatl* n. sp. differs in the larger body, surface of pronotum with several evident impressions, morphology of aedeagus and of apex of tegmen.

Derivatio nominis

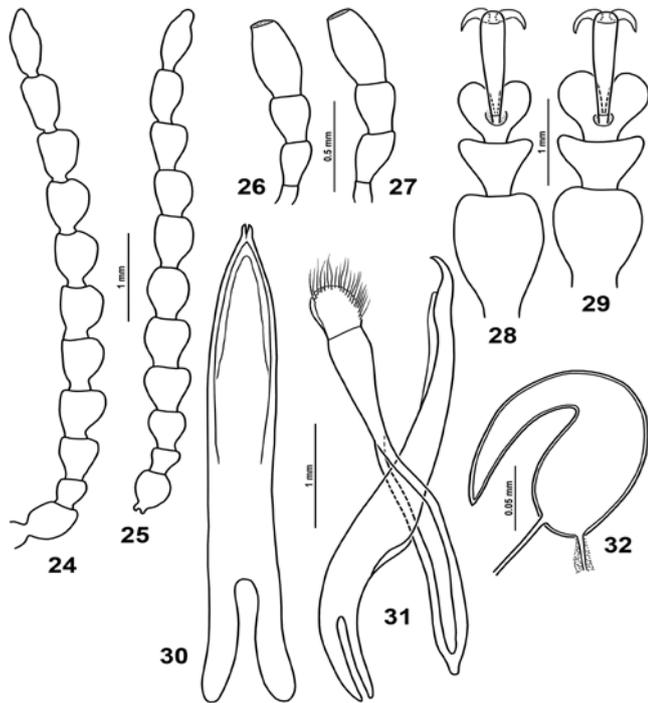
The specific epithet recalls, as a noun in apposition, the Nahuatl language of the precolombian Aztec civilization, still spoken in Mid Mexico.

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Figs. 17-23 - *Aulacoscelis nahuatl* n. sp.: 17) ♂ Holotype, dorsal view. 18) idem, lateral view. 19) ♂ Paratype, ventral view. 20) ♂, pronotum. 21) apex of tegmen. 22) idem, lateral view. 23) left side of prosternum showing a flat roundish area (rear border of prosternum and leg removed). / 17) ♂ Olotipo, vista dorsale. 18) idem, vista laterale. 19) ♂ Paratipo, vista ventrale. 20) ♂, pronoto. 21) apice del tegmen. 22) idem, vista laterale. 23) lato sinistro del prosterno con in evidenza l'area arrotondata appiattita (bordo prossimale del prosterno e zampa rimossi).



Figs. 24-32 - *Aulacoscelis nahuatl* n. sp.: 24) ♂ Holotype, left antenna. 25) ♀, left antenna. 26) ♂, maxillary palp. 27) ♀, maxillary palp. 28) ♂, protarsus. 29) ♀, protarsus. 30) aedeagus, dorsal view. 31) idem, lateral view. 32) spermatheca. / 24) ♂ Olotipo, antenna sinistra. 25) ♀, antenna sinistra. 26) ♂, palpo mascellare. 27) ♀, palpo mascellare. 28) ♂, protarso. 29) ♀, protarso. 30) edeago, vista dorsale. 31) idem, vista laterale. 32) spermateca.

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REFERENCES

- Chapuis F., 1874 – Famille des Phytophages. Volume 10. In: Histoire Naturelle des Insectes. Genera des Coléoptères, ou exposé méthodique et critique de tous les genres proposés jusqu'ici dans cet ordre d'insectes. Lacordaire J. T. & Chapuis F. (eds.). *Librairie Encyclopédique de Roret*, Paris.
- Cox M. L. & Windsor D. M., 1999 – The first instar larva of *Aulacoscelis appendiculata* n. sp. (Coleoptera: Chrysomelidae: Aulacoscelinae) and its value in the placement of the Aulacoscelinae. *Journal of Natural History*, London, 33 (7): 1049-1087. <<https://doi.org/10.1080/0022293993000083>>
- Duponchel P. A. J. & Chevrolat L. A. A., 1842 – *Aulacoscelis*. In: Dictionnaire universel d'Histoire naturelle résumant et complétant tous les faits présentés par les encyclopédies. d'Orbigny M. C. ('Dirigé'). *Chez les éditeurs L. Houssiaux et C^{ie}*, Paris, 2: 338.
- Jacoby M., 1888 – Biologia Centrali-Americana. Insecta. Coleoptera. Vol. VI. Part. 7. Supplement. Phytophaga (part). *Taylor and Francis*, London.

- Löbl I. & Smetana A., 2010 – Catalogue of Palaearctic Coleoptera. Volume 6. Chrysomeloidea. *Apollo Books*, Stenstrup.
- Monrós F., 1953 – Aulacoscelinae, eine neue Chrysomeliden-unterfamilie, mit Beschreibung einer neuen bolivianischen Gattung (Col.). *Entomologische Arbeiten aus dem Museum G. Frey*, München, 4: 19-25.
- Monrós F., 1959 – Notas sobre Chrysomelidae. *Acta Zoológica Lilloana*, San Miguel de Tucumán, 17: 1-24.
- Morrone J. J., 2014 – Biogeographical regionalization of the Neotropical region. *Zootaxa*, Auckland, 3782 (1).
- Santiago-Blay J. A., 2004 – Some aspects of the biology of the Aulacoscelinae Chapuis 1874 (Orsodacnidae or Chrysomelidae, sensu lato), with a description of seven new species of *Janbechynea*. In: New developments in the biology of Chrysomelidae. P. Jolivet, J. A. Santiago-Blay & M. Schmitt (eds.). *SPB Academic Publishing*, The Hague: 1-66. (On a DVD support, annex to the print volume).