



## A revision of the neotropical genus *Ocyolinus* (Coleoptera: Staphylinidae: Staphylinini)

STYLIANOS CHATZIMANOLIS<sup>1</sup> & JAMES S. ASHE<sup>2,3</sup>

<sup>1</sup>Department of Biological and Environmental Sciences, The University of Tennessee at Chattanooga, 615 McCallie Ave. Dept 2653, Chattanooga, TN 37403, USA. E-mail: stylianos-chatzimanolis@utc.edu

<sup>2</sup>Division of Entomology, Natural History Museum, and Department of Ecology & Evolutionary Biology, 1501 Crestline Drive – Suite 140, University of Kansas, Lawrence, KS 66049-2811, USA

<sup>3</sup>Deceased, 27 December 2005. Prior to his death, J. S. Ashe had recognized most of the species described here as new and prepared preliminary pencil drawings of the male genitalia. Owing to his intellectual contribution for this paper, J. S. Ashe is retained as a co-author

### Abstract

The Staphylinini genus *Ocyolinus* Sharp, 1884 is revised. Three species are described as new, *O. astenos* Chatzimanolis & Ashe **sp. n.**, *O. dimoui* Chatzimanolis & Ashe **sp. n.** and *O. nebulosus* Chatzimanolis & Ashe **sp. n.**, all from Panama. A lectotype is designated for *O. rugatus* Sharp, 1884 and *O. vulneratus* Bernhauer, 1906. *Ocyolinus vulneratus* Bernhauer is placed in synonymy with *O. rugatus* Sharp. Distribution maps, an identification key and illustrations of structural features are provided.

**Key words:** Xanthopygina, Staphyliniformia, identification key, taxonomy, lectotype

### Introduction

The rove beetle tribe Staphylinini has a world wide distribution and includes more than 5500 described species in nine subtribes (Newton, unpublished database). One of these, the subtribe Xanthopygina has been lately the focus of many species-level revisions (*Algon* Sharp, 1874: Schillhammer 2006; *Elmas* Blackwelder, 1952: Ashe & Chatzimanolis 2003; *Isanopus* Sharp, 1876: Chatzimanolis 2008; *Nordus* Blackwelder, 1952: Chatzimanolis 2004; *Philothalpus* Kraatz, 1857: Chatzimanolis & Ashe 2005) during the last few years, despite being not monophyletic (Solodovnikov & Schomann 2009) as currently defined (Herman 2001). Chatzimanolis (2008) hypothesized that a core-group of strictly Neotropical Xanthopygina genera, similar to the one originally defined by Sharp (1884) as the ‘group’ Xanthopygina, might form a monophyletic group. This hypothesis is currently being tested with an extensive phylogenetic analysis of the tribe Staphylinini (Solodovnikov *et al.*, in preparation) that incorporates data from morphology, DNA and fossils.

The genus *Ocyolinus* was described by Sharp in 1884 and was one of the genera originally included by Sharp (1884) in the ‘group’ Xanthopygina. The genus included two species, *O. rugatus* Sharp, 1884 from Venezuela and *O. amethystinus* Sharp, 1884 from Costa Rica. Later, Bernhauer (1906) described two more species, *O. vulneratus* Bernhauer, 1906 and *O. ganglbaueri* Bernhauer, 1906, both from Venezuela.

The type designation for *Ocyolinus* is somewhat complicated: Herman (2001: 3582) in his catalogue used the terms ‘virtual monotypy and direct implication’ to indicate that the type species of the genus is *O. rugatus*. Blackwelder (1952: 14) used the phrase ‘virtual monotypy’ to refer to genera that even though appeared to originally include more than one species, upon careful examination of the text actually included only one species (Herman, personal communication). Sharp (1884: 363) stated about *O. amethystinus* that ‘it appears to be quite congeneric...’ and thus seemed to express doubt over the inclusion of *O. amethystinus* in *Ocyolinus*.

The ICZN (1999: article 67.2.5) states that if a species is doubtfully included it is not eligible for type designation. Lucas (1920: 449) apparently did not interpret the inclusion of *O. amethystinus* as doubtful and designated *O. amethystinus* as the type species of *Ocyolinus*. However, Blackwelder (1952: 267), Herman (2001:3582; personal communication) and the first author all agree that the word ‘appears’ in Sharp (1884: 363) indicates doubt over the inclusion of *O. amethystinus*, and thus the only species originally included (‘virtual monotypy’) and eligible for type designation in *Ocyolinus* is *O. rugatus*.

*Ocyolinus* occurs in tropical rain and montane forests and similarly to *Isanopus* (Chatzimanolis 2008), it appears to be quite rare in collections. Most specimens used in this study were collected in flight intercept traps and fewer specimens were collected in leaf litter. This rarity is certainly not the norm for other Neotropical genera in the subtribe Xanthopygina such as *Nordus* (Chatzimanolis 2004), *Philothalpus* (Chatzimanolis & Ashe 2005) or the genera *Oligotergus* Bierig, 1937, *Xanthopygus* Kraatz, 1857, and *Xenopygus* Bernhauer, 1906 (Chatzimanolis, personal observation) that are quite abundant in collections.

In this paper, we revise the genus *Ocyolinus*, describe three new species and provide keys and figures for the identification of species.

## Materials and methods

**Specimens.** Body structure, mouthparts, and aedeagi were studied using an Olympus SZX10 dissecting microscope. Scanning electron micrographs were taken using a Zeiss EVO 40 Field Scanning Electron Emission Microscope at the Santa Barbara Museum of Natural History. Photographic illustrations were prepared using a Canon EOS20D or a Visionary Digital Passport system. All photographs presented, along with others not shown here, will be deposited at MorphBank ([www.morphbank.net](http://www.morphbank.net)). The habitus photographs (Figs. 1–3) were created using the auto-montage software Helicon Focus 3.79 (<http://www.heliconsoft.com/heliconfocus.html>). Dried specimens were first relaxed in warm soapy water, then apical abdominal segments containing the aedeagus were dissected from the abdomen. Mouthparts of selected individuals were also dissected for study using optical and Scanning Electron Microscopy. The apical abdominal segments were cleared using 10% KOH, and the aedeagus removed from the inside of the abdomen for study. Female genitalia were examined but no useful taxonomic characters were found since the spermathecae were not sclerotized. Relative size and density of punctures on the head, pronotum and elytra is expressed in terms of the average number of punctures in a transverse linear distance of 0.5 mm measured in the middle of the lower right quadrant of the appropriate body part (frons of head, postgena, pronotum, or right elytron). Total length is measured from the anterior margin of frons (thus excluding mouthparts) to the posterior margin of segment VIII. The comparison of the length of the parameres and the median lobe excludes the bulbous basal portion of the median lobe. For type label data, the slash “/” separates different labels. Text within square brackets [ ] is explanatory, and was not included in the original labels. Terms for structural features follow Blackwelder (1936), Smetana and Davies (2000), and Ashe and Chatzimanolis (2003). Distribution maps were created based on a careful review of the available locality data (type series labels and Additional Materials labels). They do not include specimens for which only the country or collector was mentioned on the label.

**Depositories.** Specimens used in this revision were/have been deposited in the following collections:

AMNH	American Museum of Natural History, New York, New York, U.S.A. (L. Herman)
BMNH	The Natural History Museum, London, U.K. (R. Booth)
CNCI	Canadian National Collection, Ottawa, Canada (A. Davies)
FMNH	Field Museum of Natural History, Chicago, Illinois, U.S.A. (A. Newton, M. Thayer)
INBio	Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica (A. Solis)
NMW	Naturhistorisches Museum Wien, Vienna, Austria (H. Schillhammer)
SEMC	Snow Entomological Collection, Natural History Museum / Biodiversity Research Center, University of Kansas, Lawrence (Z. Falin)

**Designation of lectotypes.** Lectotypes were selected for *Ocyolinus rugatus* Sharp and *Ocyolinus vulneratus* Bernhauer. Lectotype designations are justified under Article 74.1.1 of the Code (ICZN 1999) in order to fix the status of one specimen as the sole name-bearing type of each species for the express purpose of nomenclatural stability.

## Taxonomy

### *Ocyolinus* Sharp, 1884

(Figs. 1–49)

*Ocyolinus* Sharp, 1884: 363.

**Type species.** *Ocyolinus rugatus* Sharp, 1884, fixed by virtual monotypy and direct implication (Herman, 2001: 3582).



**FIGURES 1–3.** Habitus photographs of *Ocyolinus*. 1. *O. amethystinus*, holotype. 2. *O. rugatus*, lectotype. 3. *O. nebulosus*, paratype.

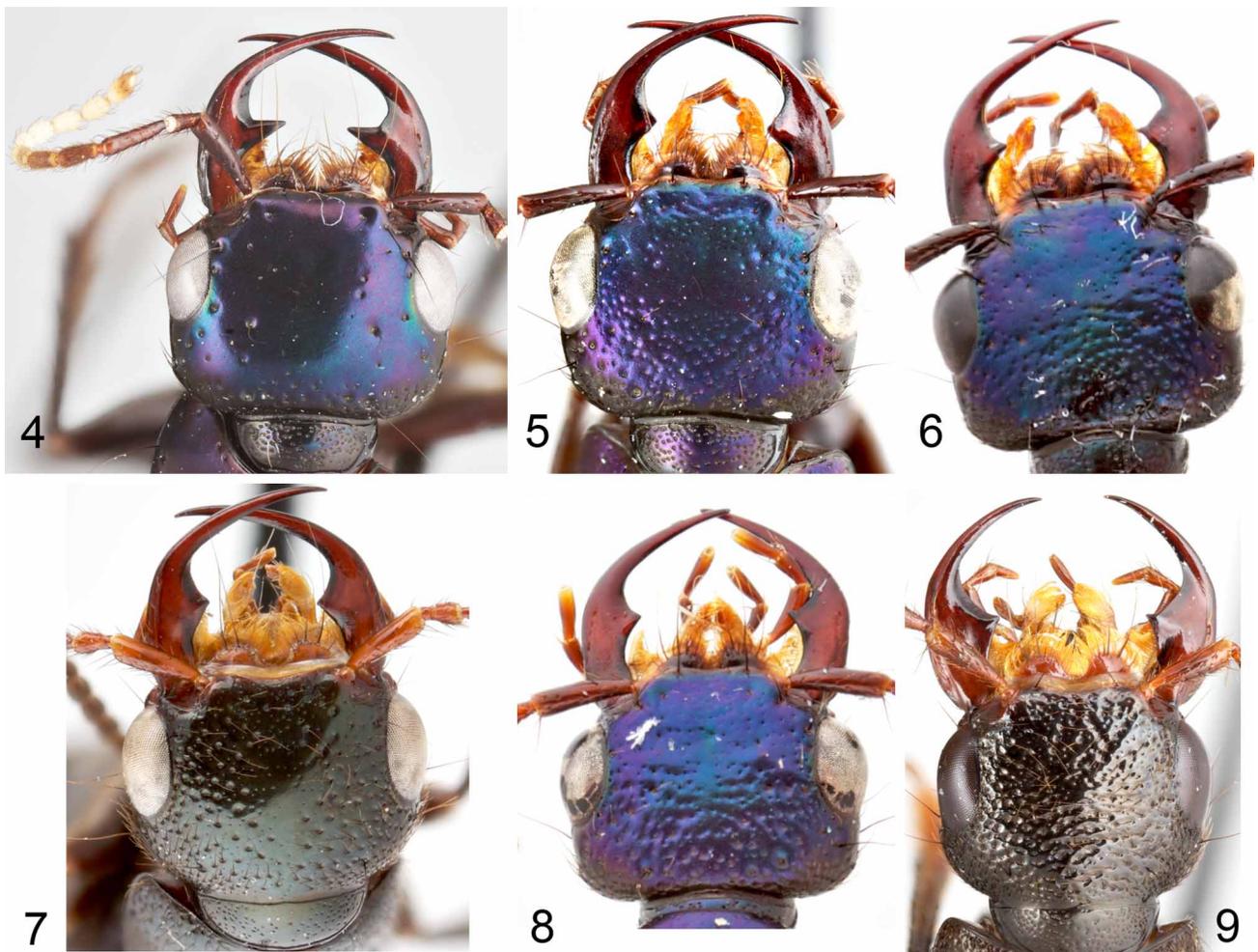
**Diagnosis.** *Ocyolinus* can be distinguished from other genera in the subtribe Xanthopygina by the combination of the following characters: a) mandibles extremely elongate, each with a single triangular tooth that is typically slightly different in right and left mandible; b) maxillary and labial palpi expanded, but never as dilated as in *Dysanellus* Bernhauer, 1911; c) antennomere 11 with a distal white patch of setae; d) head subquadrate, never trapezoid (as in *Dysanellus* or *Torobus* Herman, 2001); e) integument of head and pronotum with microsculpture; f) terga V–VI without subbasal carinae; g) median lobe of aedeagus with a pair of dorsal teeth. Due to body coloration, *Ocyolinus* looks superficially similar to several species of *Gastrisus* Sharp, 1876, *Nausicotus* Sharp, 1884 and *Torobus*, but can be easily distinguished from them because the latter species do not have elongate mandibles. *Dysanellus bruchi* Bernhauer, 1911 and *D. transverserugosus* Bernhauer, 1921 have mandibles similar in shape to the ones found in *Ocyolinus*, but they

have extremely securiform labial palpi and trapezoid-shaped head. *Torobus principalis* (Bernhauer, 1911) has similar coloration and the mandibles are as elongate as in *Ocyolinus*, but the structure of the mandibular tooth is different (appearing having a small dorsal and a large ventral tooth) as well as the overall shape of head and the pronotum punctuation pattern.

The phylogenetic relationships within *Ocyolinus* as well as its relationship with other genera such as *Dysanellus* and *Torobus* will be discussed in more details in a forthcoming paper (Chatzimanolis, in preparation).

**Description.** Habitus as in Figs. 1–3, body medium sized, 10.5–17.0 mm in total length.

**Coloration.** Color of head and pronotum similar, in most species metallic dark purple with green and blue overtones, in other species with shining metallic brown with green overtones; most species with elytra metallic dark purple with green and blue overtones or dark metallic brown with green and blue overtones. Mouthparts reddish brown to orange. Abdomen dark brown, except in some posterior segment of sternum VII and VIII orange. Surface of abdomen appearing matt in some due to polygon-shaped microsculpture.



**FIGURES 4–9.** Head of *Ocyolinus*. 4. *O. amethystinus*. 5. *O. astenos*. 6. *O. dimoui*. 7. *O. ganglbaueri*. 8. *O. nebulosus*. 9. *O. rugatus*.

Head (Figs. 4–9) subquadrate to slightly transverse; posterior angles rounded; eyes of medium size, prominent, occupying almost half of lateral margins of head; nuchal depression very prominent dorsally, forming well-defined neck 1/3 to 1/2 width of head; punctures on dorsal surface of neck various. Umbilicate punctuation on epicranium various among species, from sparsely distributed along lateral and posterior margins to very densely distributed and confluent punctures. Epicranium flat, with polygon-shaped or transverse microsculpture visible at magnifications >70X, with large prominent macrosetae along border of

head. Anteclypeus well developed, moderately sclerotized. Ventrally, head with incomplete (obsolete medially) postmandibular ridge and well developed infraorbital ridge (except in *O. rugatus* faint). Gular sutures separated in anterior third, converging to narrow separation in posterior 2/3.

Antenna (Fig. 17) with antennomeres 1–11 elongate; antennomeres 1–3 with multiple rows of macrotrichae; antennomeres 4–11 with three rows of macrotrichiae, covered with microtrichiae; antennomere 11 with round white patch lacking microsetae apically.

Labrum (Fig. 21) medially emarginate to near its base. Mandibles as in Figs. 4–9, 16; extremely elongate, curved or straight distally; mandibles with shallow fold on lateral edge (dorsal view) extending from condylar region to anterior margin of tooth, fold with pores; right and left mandibles nearly symmetrical except shape of medial tooth; left mandible with strongly convex elongate to broadly triangular tooth; right mandible with strongly convex elongate to flat broadly triangular tooth with or without constriction apically; prosthema sparingly setose. Maxilla as in Fig. 19; galea and lacinia densely setose. Maxillary palpi 4-segmented; P<sub>1</sub> (= first palpomere) short, less than 1/3 length of P<sub>2</sub>; P<sub>2</sub>–P<sub>4</sub> elongate, P<sub>2</sub> about 1.5 times as long as P<sub>3</sub>; P<sub>3</sub> subequal in length to P<sub>4</sub>; P<sub>2</sub>–P<sub>3</sub> club-like. Hypopharynx and labium as in Fig. 20. Anterior margin of mentum with broad emargination medially, mentum with two anterolateral setae in each end. Ligula short, membranous, entire. Labial palpi 3-segmented, P<sub>1</sub> slightly smaller than P<sub>2</sub>; P<sub>3</sub> longer than P<sub>2</sub>. P<sub>2</sub> with medial, lateral constriction; P<sub>3</sub> slightly securiform.

Pronotum (Figs. 10–15) subquadrate to elongate; hypomeron expanded; superior and inferior marginal lines of hypomeron separate throughout their lengths; superior line fully visible from above, prominent, extended around antero-lateral margin of pronotum and contacting inferior line at neck fossa, no portion of dorsum of pronotum visible from below. Umbilicate punctation on pronotum varies among species; sparse to densely punctuated, size of punctures varies; antero-lateral parts of pronotum densely punctuated. Pronotum appearing matt in most species due to the presence of micropunctures and microsculpture (shining in *O. ganglbaueri* and *O. rugatus*). Pronotum with row of confluent or almost confluent punctures along the lateral margins of pronotum. Microsetae directed more or less postero-medially or posteriorly. Basisternum of prosternum with pair of prominent medial setae and microsculpture; anterior marginal depression present; without medial carina. Sternacostal ridge present; intercoxal depression anterior to subcoxal ridge present. Furcasternum with prominent medial carina.

Elytra subequal in length to pronotum, moderately densely and uniformly punctate and microsetose; with large prominent macrosetae along lateral margins of elytra. Elytra depressed near mesoscutellum. Hind wings fully developed.

Mesoventrite with anterior margin reflexed into slight “lip”; with medial carina; mesoventral process triangular and pointed apically, extended about 2/5 distance between mesocoxae; metaventral processes small, triangular and rounded apically, extended about 1/5 distance between metacoxae, appearing light brown.

Tarsal segmentation 5-5-5. Protarsal articles 1–4 of both sexes slightly to moderately transverse, covered ventrally by spatulate setae. Tarsal articles of middle and hind legs symmetrical, not enlarged or dilated. Empodium with 2 small setae. Protibia with row of spurs at distal margin, without any other spurs (except in *O. amethystinus* and *O. nebulosus*), ctenidium present. Meso- and metatibia with multiple rows of spurs.

Abdomen with paired prototergal glands present in first abdominal tergum. Abdominal terga III–VII with tergal basal carina, terga III–IV with subbasal (arch-like) tergal carina in some, absent in others, terga V–VII without subbasal carina. Abdominal sterna with transverse basal ridges well developed on sterna III–VII. Sterna VII–VIII with shallow depressions 2/5 from posterior margin.

Male and female genitalia typical of Staphylinini. Male (Fig. 23) and female tergite IX composed of two elongate, narrow lateral sclerites. In females, basal valvifers with microsculpture; second gonocoxites without microsculpture; apical stylus small. Spermatheca not sclerotized. Aedeagus typical of Staphylinini, with large median lobe and single paramere. Paramere in all species with sensory spinules (peg setae) and short apical setae. Median lobe with pair of dorsal teeth in all species and with hook-like apical tooth in *O. rugatus* and *O. ganglbaueri*.

Females without obvious secondary sexual characters. Males with distal margin of sternum VII with slight broad emargination medially (Fig. 23); sternum VIII with shallow V-shaped emargination medially (Fig. 23); sternum IX with deep V-shaped emargination medially (Fig. 23).

***Ocyolinus amethystinus* Sharp, 1884**

(Figs. 1, 4, 10, 25–28, 49)

*Ocyolinus amethystinus* Sharp, 1884: 363.

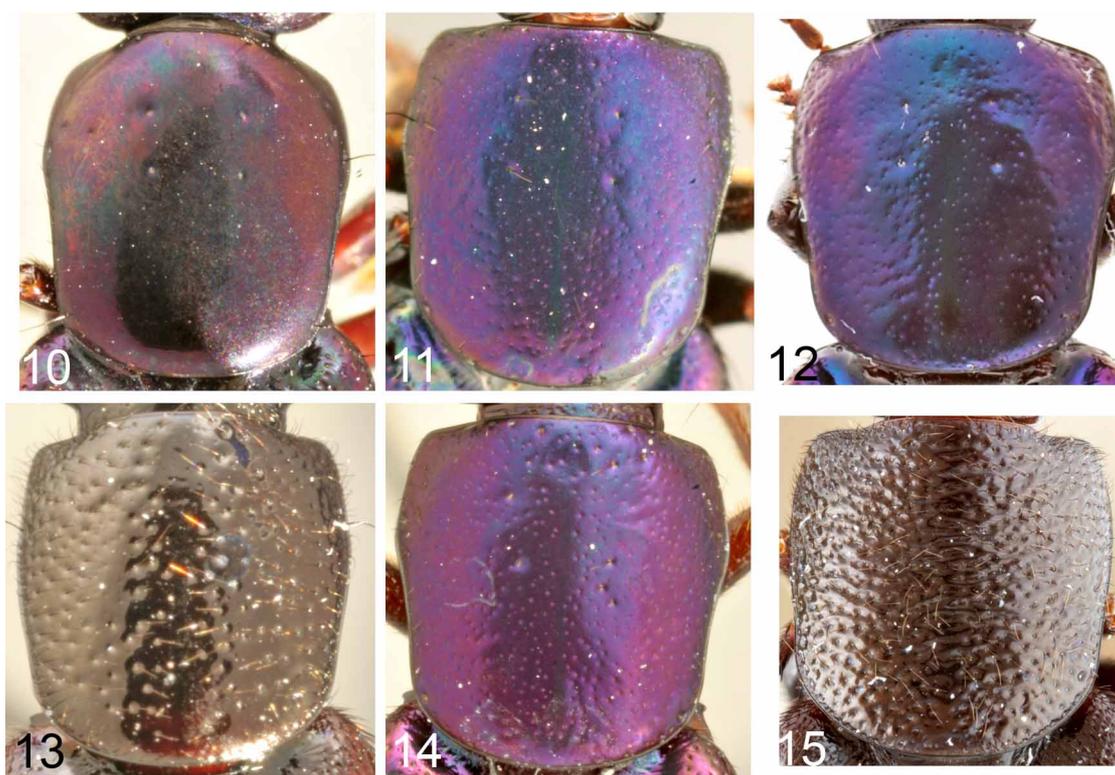
**Type material. Holotype:** female, mounted on card with D. Sharp's handwriting "*Ocyolinus amethystinus*. Type D. S. Costa Rica. van Patten", and with labels as follows: "Type" / "B.C.A. Col. I. 2. *Ocyolinus amethystinus*, Sharp" / "Costa Rica. Van Patten." / "Sharp Coll. 1905 – 313." (BMNH). Sharp (1884) specifically states in the original description that he had available only a single female specimen; that specimen is therefore the holotype for the species.

**Additional material. COSTA RICA: Alajuela Prov.:** E. B. San Ramon, R. B. San Ramon, 27 km N & 8 km W San Ramon, 10°13'30"N, 84°35'30"W, 950 m, 15.vi.1997, R. Anderson, CR1A97 015E, ex: berlese forest litter, barcode label SM0138249 (1 SEMC); Estac. Biol. San Ramon, 900 m, 1.vii–31.viii.1995, P. Hanson CR1H93-95, ex: malaise trap, barcode label SM0074322 (1 SEMC); same locality, 620 m, IV.1994, F. Quesada, LN 318100 381900, #2817, barcode label CRI001777059 (1 INBio); same locality, 620 m, 16.i–3.ii.1995, C. Cano, LN 318000 381900, # 4396, barcode label CRI002132867 (1 INBio); San Isidro, 24.ii.1940 / Field Mus. Nat. Hist. 1966, A. Bierig Colln. (2 FMNH); same locality, 31.iii.1940 (1 FMNH); Alfaro Ruiz, Zarcero, 24.iii.1989, A. Solis, barcode label CRI001025532 (1 INBio); **Cartago Prov.:** Cervantes, 1450 m, 8.iv.1940 / Field Mus. Nat. Hist. 1966, A. Bierig Colln. (2 FMNH); **Guanacaste Prov.:** Guanacaste Conservation Area, Cacao Field Station, 1150 m, 15.ii.1996, R. Anderson, CR1A96 014B, ex: wet montane forest litter, barcode label SM0084209 (1 SEMC); Cacao Biol. Station, 1100–1200 m, 10°56'00"N, 85°27'00"W, 4.v.1995, R. Anderson, CR1A95 38, berlese leaf litter, barcode label SM0072395 (1 SEMC); same locality, 1000–1400 m, R. Blanco, C. Chavez, barcode label CRI000086945 (1 INBio); Estación Pitilla 9 km S de Santa Cecilia, 700 m, x.1996, C. Moraga, LN 329950 380450, #45343, barcode label CRI002500138 (1 INBio); same locality, iv.1995, #4827, barcode label CRI002145472 (1 INBio); Est. Maritza, 600 m, lado O Vol. Orosi, 1988, ex: malaise, LN 326900 373000, barcode label CRI000294313 (1 INBio); R. San Lorenzo, 1050 m, R. F. Cord., Guanacaste, v.1991, C. Alvarado, LN 287800 4276000, barcode label CRI000504946 (1 INBio); **Heredia Prov.:** La Selva, 3.2 km SE Puerto Viejo, 105 m, 17.iii.1992, W. Bell, ex: flight intercept trap, barcode labels: SM0058342, SM0058343, SM0058341 (3 SEMC); La Selva Sta, 3 km S Puerto Viejo, 80 m, 10°26'00"N, 84°1'00"W, vi.15.2001, S. Chatzimanolis, CR1C01 049, ex: flight intercept trap, barcode label: SM0238770 (1 SEMC); **Puntarenas Prov.:** Monte Verde, 1400 m, 21.v.1989, J. Ashe, R. Brooks, R. Leschen, ex: flight intercept trap / Snow Entomol[ogical] Mus[eum] Costa Rica Exped[ition], #321, barcode label SM0058225 (1 SEMC); same locality and collectors, 9.v.1989, ex: pitfall traps, barcode labels SM0058226, SM058227, SM0058228 (3 SEMC); Monte Verde, Reserva Biologica de Monte Verde / nr. Quelorada cuecha on Sendero Rio, 1580 m, 13.v.1989, J. Ashe, R. Brooks, R. Leschen / Snow Entomol[ogical] Mus[eum] Costa Rica Exped[ition], #168, barcode label SM0058245 (1 SEMC); Monteverde, 1520 m, 30.iv.1986, J.S.Ashe, ex: leaf litter, barcode label SM0058229 (1 SEMC); 4500', Monteverde, 21–26.v.1979, JM&BA Campbell (1 CNCD); Monteverde, 15.vii.1990 / pig dung, leg. K. Vulinec (1 FMNH); Monteverde, 1400' (1 FMNH); Est. La Casona, 1520 m, Res. Biol. Monteverde, xii.1992, N. Obando, LN 253250 449700, barcode label CRI000895946 (1 INBio), same locality, v.1993, barcode label CRI001810858 (1 INBio); Cerro Plano, Res. Biol. Monteverde, 1300 m, E. Bello, xii.1990, LN 255200 446800, barcode label CRI000447477 (1 INBio); Buen Amigo, San Luis Monteverde, A. C. Arenal, 1000–1350 m, v.1994, Z.Fuentes, LN 250850 449250, #2926, barcode label CRI001894421 (1 INBio); same

locality, 1040 m, x.1993, ex: malaise, #2428, barcode label CRI002523052 (1 INBio); **San Jose Prov.:** San Antonio de Escazu, 1300 m, 9°39'16"N, 84°9'16"W, 1–30.ix.1998, W. Eberhard, P. Hanson, CR1EH99 02, barcode label SM0235842 (1 SEMC); Carpintera, 14.iv.1940 / Field Mus. Nat. Hist. 1966, A. Bierig Colln. (2 AMNH, 2 FMNH); same locality, 21.v.1939 (1 FMNH); same locality, 25.vi.1939 (1 FMNH); same locality, 26.ii.1939 (1 FMNH); same locality, 8.iv.1939 (1 FMNH); La Caja (Schmidt leg.), ii–iv.1940 / Field Mus. Nat. Hist. 1966, A. Bierig Colln. (1 FMNH); same locality, x.1939 (1 FMNH); **GUATEMALA:** Panzos (1 ZMHB); **NICARAGUA: Matagalpa Dept.:** 6 km N Matagalpa, Selva Negra, 1250 m, 12°59.9'N, 85°54.6'W, 18–22.v.2002, S. Peck 02-06, ex: flight intercept trap, NIC1P02 001, barcode label SM0560663 (1 SEMC); same locality, 1550 m, ridgetop cloud forest litter, R. Anderson, RSA2002-024, barcode label SM0452544 (1 SEMC); 6 km N Matagalpa, Selva Negra Hotel, 1240 m, 12°59.99'N, 85°54.53'W, 18–21.v.2002, R. Brooks, Z. Falin, S. Chatzimanolis, ex: flight intercept trap, Bavaria trail, NIC1BFC02 036, barcode labels SM0413247 (1 SEMC), SM0413248 (1 UTCl); **PANAMA: Bocas del Toro Prov.:** 8°34'N, 81°50'W, 1500 m, 25 km NNE San Felix, leg. J. Wagner, 11.vi.1980 / FM(HD#80-21) Berlese floor litter & root, mat. Quebrada Alicia cloud forest (1 FMNH); Fortuna / Chiriqui Grand road, 8°47'N, 82°11'W, 800 m, 14–16.vii.1987 / D.M.Olson, #540-580, premontane rain forest, pitfall trap, Field Museum N.H. (1 FMNH); **Chiriqui Prov.:** 7 km S Fortuna Dam. 15–17.v.1996,. Wappes Huether & Morris (1 FMNH).

**Diagnosis.** Among *Ocyolinus* species with dark metallic purple coloration on head and pronotum, *O. amethystinus* can be easily recognized from all other species based on the almost complete lack of punctures on the pronotum and few punctures on dorsal surface of the head. In addition, it is the only species in *Ocyolinus* with extremely elongate mandibular teeth.

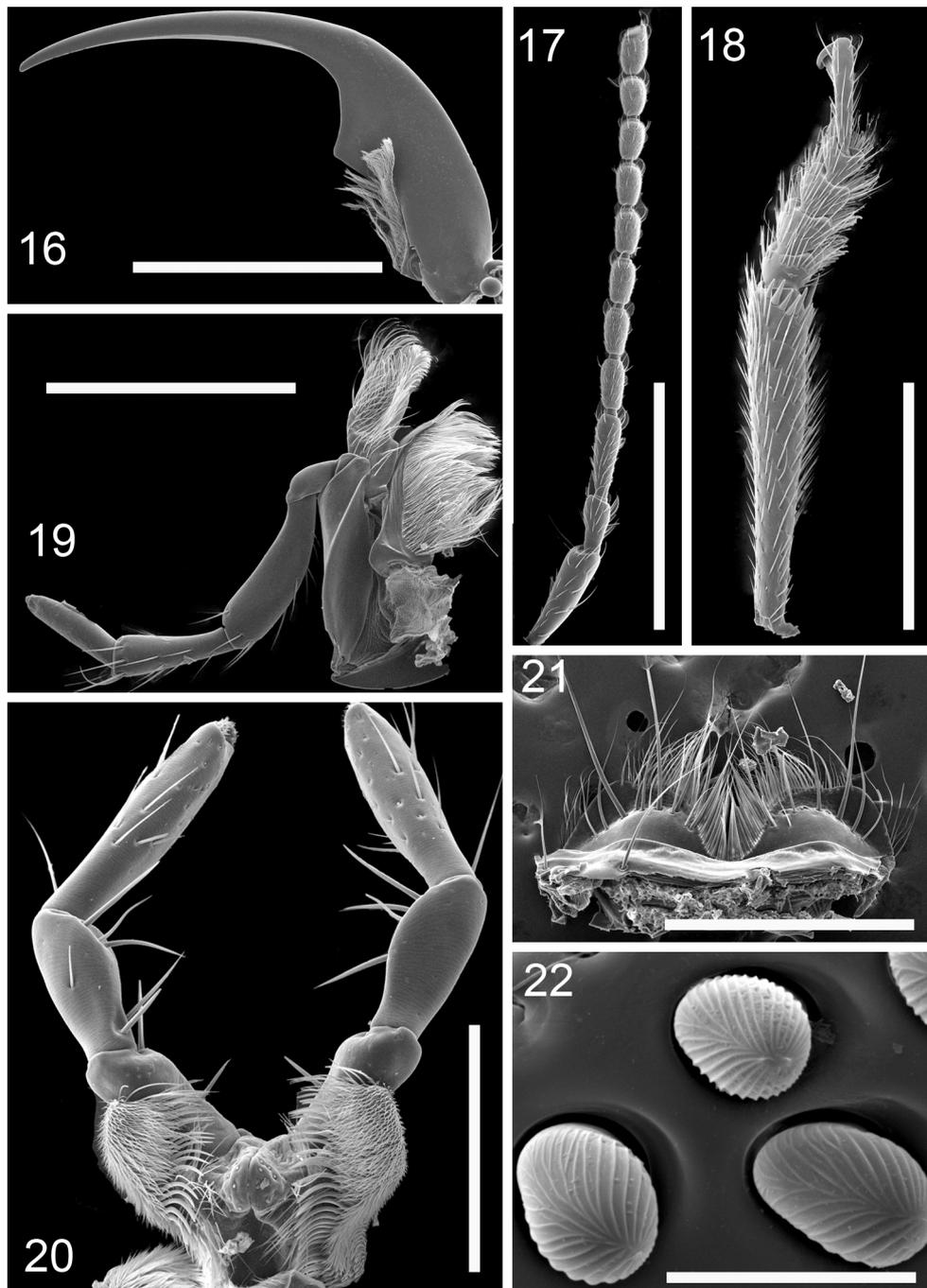
**Description.** Body length 13.0–17.0 mm.



**FIGURES 10–15.** Pronotum of *Ocyolinus*. 10. *O. amethystinus*. 11. *O. astenos*. 12. *O. dimoui*. 13. *O. ganglbaueri*. 14. *O. nebulosus*. 15. *O. rugatus*.

**Coloration.** Head and pronotum metallic dark purple with green and blue overtones. Posterior dorsal margin of head without metallic coloration, appearing dark brown to black. Ventral surface of head and pronotum dark brown. Mandibles reddish brown. Antennomeres 1–5 brown, 7–10 yellow, 6 and 11 brownish

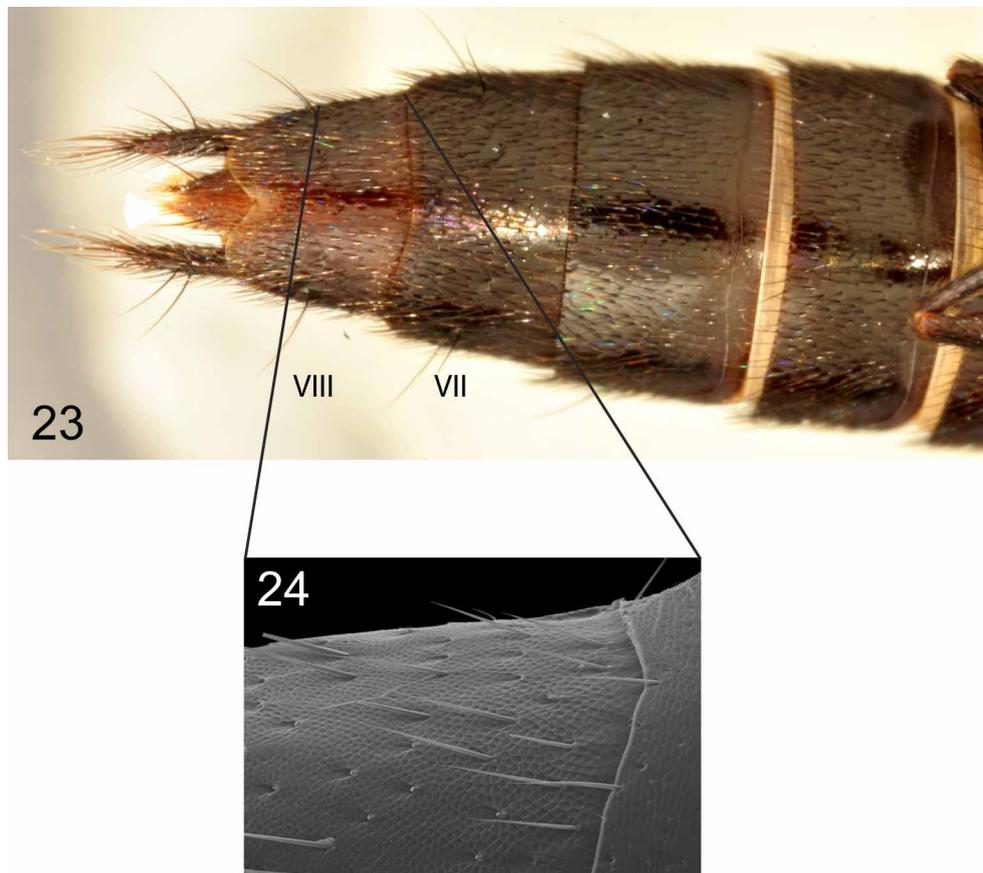
yellow. Mesoscutellum dark brown. Elytra similar to but sometimes brighter colored than head and pronotum. Abdomen dark brown, except posterior 1/5 of segment VII and VIII yellow. Legs light brown.



**FIGURES 16–22.** *Ocyolinus ganglbaueri*. 16. Ventral view of left mandible, showing the prostheca, scale bar = 1 mm. 17. Antenna, scale bar = 1.6 mm. 18. Protibia, scale bar = 1 mm. 19. Right maxilla, scale bar = 0.7 mm. 20. Hypopharynx and labial palpi, scale bar = 0.8 mm. 21. Labrum, scale bar = 0.6 mm. 22. Ventral view of paramere showing the sensory spinules (peg setae), scale bar = 0.2 mm.

Head slightly transverse, width: length ratio = 1.35. Surface of epicranium matt; with few or no micropunctures but with polygon-shaped microsculpture visible at >70X; with few large umbilicate setose punctures around margins of head, no punctures medially except two large setose punctures. Eyes medium, length of eyes / length of head ratio = 0.4, distance between eyes as wide as 2.5 times length of eye. Postgena with medium, shallow punctures (about 1–2 punctures/0.5 mm), punctures not uniformly distributed.

Mandibles (Fig. 4) with long medial tooth, left mandible with strongly convex elongate tooth, right mandible with flat tooth, distal part of mandible curved. Antennomeres with long macrosetae, antennomeres 1–11 longer than wide, antennomere 1 slightly curved, about 2.5 times as long as antennomere 2, antennomere 3 1.6 times as long as antennomere 2, antennomere 4 0.75 times as long as antennomere 3, antennomeres 6 slightly shorter than either antennomere 5 or 7, antennomere 7–10 gradually becoming shorter, antennomere 11 slightly longer than antennomere 10. Neck dorsally with micropunctures and rounded microsculpture, laterally with 3–4 small punctures.



**FIGURES 23–24.** *Ocyolinus ganglbaueri*. 23. Ventral view of male abdominal sterna. 24. Magnification of anterior part of sternum VIII showing the polygon-shaped microsculpture.

Pronotum slightly longer than wide, width : length ratio = 0.86; antero-lateral angles obtusely rounded, curved downwards. Lateral margins of pronotum concave in dorsal aspect, pronotum broadest in apical 1/4 and narrower at basal angles. Surface of pronotum flat; matt due to microsculpture, with no micropunctures. Setose punctures present around the margin of pronotum, but with no other punctures, except 4 punctures at the center of the pronotum, each one delimiting the corner of a square. Pronotum with few long black macrosetae along borders. Mesoscutellum prominent, anterior half with transverse microsculpture, posterior half with microsculpture with brown microsetae and punctures, maximum distance between punctures 0.5 times width of puncture.

Elytra subequal in length to pronotum, with large setose uniform punctures (about 5 punctures / 0.5 mm), distance between punctures 1–1.5 times width of puncture; with long yellow macrosetae along borders of elytra. Elytra appearing glossy, without microsculpture but with tiny micropunctures between larger punctures visible only at >70X.

Legs. Protarsus moderately enlarged, with yellow setae; meso- and metatarsi not enlarged. Legs almost completely covered with long yellow and brown setae.

Abdominal terga III–VII with tergal basal and no subbasal (arch-like) carina. Terga III–VII with uniform punctation patterns, densely covered with punctures and yellowish brown setae, with polygon-shaped microsculpture. Setae on abdominal terga and sterna appearing iridescent. Sterna III–VII densely punctuated, with shallow punctures and with rounded microsculpture. Lateral tergal sclerites of the abdominal segment IX long and straight, covered with long brown macrosetae.

Secondary sexual structures. Male: distal margin of sternum VII with slight broad emargination medially; sternum VIII with shallow V-shaped emargination medially; sternum IX with deep V-shaped emargination medially. Female without obvious sexual structures.

Aedeagus as in Figs. 25–28; paramere in dorsal view fairly wide, converging to flat apex, shorter than median lobe; in lateral view paramere almost straight; with sensory spinules as shown in Fig. 28. Median lobe in dorsal view wide, converging to rounded apex, with a pair of dorsal teeth; in lateral view becoming narrower from middle to apex.

**Distribution.** Known from elevations of 80–1550 m in Costa Rica, Guatemala, Nicaragua and Panama (Fig. 49).

**Habitat.** Collected in flight intercept traps, Malaise traps, treefall and forest floor litter from wet montane forests and tropical rainforests.

### *Ocyolinus astenos* Chatzimanolis & Ashe, new species

(Figs. 5, 11, 29–32, 49)

**Type Material. Holotype:** male, with labels: “Panama: Chiriquí Prov. La Fortuna, ‘Cont. Divide Trail’, 8°46’N, 82°12’W, 1100 m, 23.v.–9.vi.1995, J. Ashe, R. Brooks, #157, ex: flight intercept trap” / barcode label SM0058242 / “Holotype *Ocyolinus astenos* Chatzimanolis and Ashe, des. Chatzimanolis 2009” (SEMC).

**Diagnosis.** Among *Ocyolinus* species with dark metallic purple coloration on head and pronotum, *O. astenos* can be distinguished by the shape of the mandibles (right mandible with a tooth that is not constricted at tip) and the shape of the aedeagus: paramere apically with a shallow emargination (Fig. 32) and sensory spinules on ventral side of paramere not in two clear rows, appearing more towards the middle instead of the lateral margins (Fig. 32).

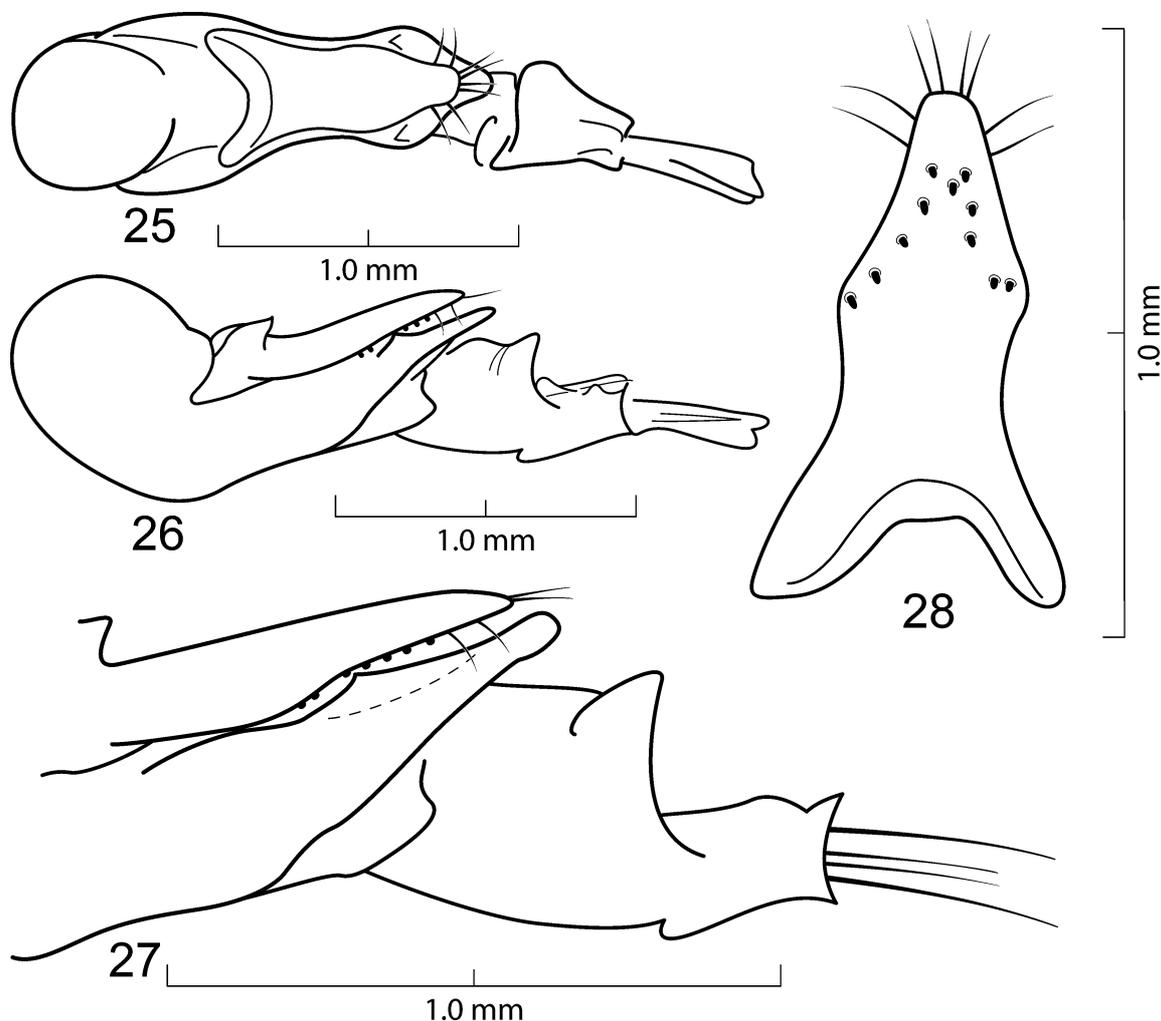
**Description.** Body length 16 mm.

**Coloration.** Head and pronotum metallic bright purple with green and blue overtones. Posterior dorsal margin of head without metallic coloration, appearing dark brown to black. Ventral surface of head and pronotum dark brown. Antennomeres 1–3 dark brown, 4–11 yellowish brown. Mesoscutellum dark brown. Elytra similar to but sometimes brighter colored than head and pronotum. Abdomen dark brown, except posterior 1/5 of segment VII and VIII yellow. Legs brown.

Head slightly transverse, width : length ratio = 1.30. Surface of epicranium matt; with many micropunctures and with rounded microsculpture visible at >70X; with medium umbilicate setose punctures irregularly arranged, distance between puncture varies. Eyes medium, length of eyes / length of head ratio = 0.46, distance between eyes as wide as twice length of eye. Postgena with medium, deep punctures (about 1–2 punctures / 0.5 mm), punctures not uniformly distributed. Mandibles (Fig. 5) with broad triangular medial tooth, left mandible with convex triangular tooth, right mandible with similar tooth, not constricted at tip, distal part of mandible curved. Antennomeres with long macrosetae, antennomeres 1–11 longer than wide, antennomere 1 slightly curved, about 2.5 times as long as antennomere 2, antennomere 3 1.6 times as long as antennomere 2, antennomere 4 0.75 times as long as antennomere 3, antennomeres 6 slightly shorter than either antennomere 5 or 7, antennomere 7–10 gradually becoming shorter, antennomere 11 slightly longer than antennomere 10. Neck dorsally with micropunctures and rounded microsculpture, laterally with 3–4 small punctures.

Pronotum subquadrate, width : length ratio = 0.93; antero-lateral angles obtusely rounded, curved downwards. Lateral margins of pronotum concave in dorsal aspect, pronotum broadest in apical 1/4 and

narrower at basal angles. Surface of pronotum flat; matt due to microsculpture and micropunctures. Medium sized punctures throughout the pronotum, irregularly arranged. Large setose punctures present around the margin of pronotum, with 4 punctures at the center of the pronotum, each one delimiting the corner of a square. Pronotum with few long black macrosetae along borders. Mesoscutellum prominent, anterior half with transverse, rounded microsculpture, posterior half with microsculpture and with brown microsetae and punctures, punctures confluent.



**FIGURES 25–28.** Aedeagus of *O. amethystinus*. 25. Dorsal view. 26. Lateral view. 27. Detail of median lobe, lateral view. 28. Detail of paramere, ventral view.

Elytra subequal in length to pronotum, with large setose uniform punctures (about 7 punctures / 0.5 mm), punctures confluent; with long yellow macrosetae along borders of elytra. Elytra appearing glossy, without microsculpture but with tiny micropunctures between larger punctures visible only at >70X.

Legs. Protarsus moderately enlarged, with yellow setae; meso- and metatarsi not enlarged. Legs almost completely covered with long yellow and brown setae.

Abdominal terga III–VII with tergal basal and no subbasal (arch-like) carina. Terga III–VII with uniform punctation patterns, densely covered with punctures and yellowish brown setae, with rounded microsculpture on anterior part. Setae on abdominal terga and sterna appearing iridescent. Sterna III–VII moderately punctuated, with shallow punctures and with rounded microsculpture. Lateral tergal sclerites of the abdominal segment IX long and straight, covered with long brown macrosetae.

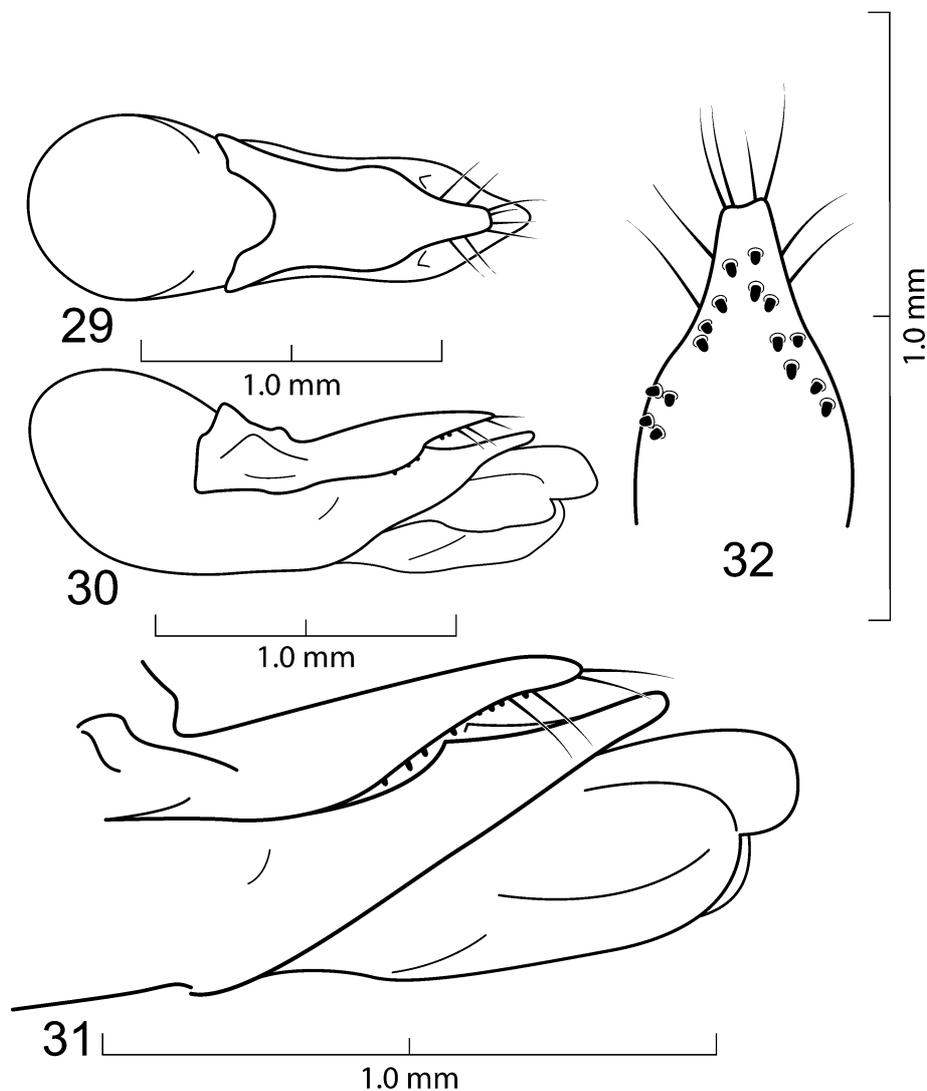
Secondary sexual structures. Male: distal margin of sternum VII with slight broad emargination medially; sternum VIII with shallow V-shaped emargination medially; sternum IX with deep V-shaped emargination medially. Female unknown.

Aedeagus as in Figs. 29–32; paramere in dorsal view fairly wide, converging to slightly emarginated apex, shorter than median lobe; in lateral view paramere slightly concave, straight; with sensory spinules as shown in Fig. 32. Median lobe in dorsal view wide, converging to rounded apex, with a pair of dorsal teeth; in lateral view becoming narrower from middle to apex.

**Distribution.** Known only from the type locality in Panama, at elevations of 1100 m (Fig. 49).

**Habitat.** Unknown, collected in flight intercept trap.

**Etymology.** The specific epithet is derived from the Greek word στενός (narrow) and the prefix *a-*, and refers to the tooth of the right mandible that is not constricted. The epithet is an adjective.



**FIGURES 29–32.** Aedeagus of *O. astenos*. 29. Dorsal view. 30. Lateral view. 31. Detail of median lobe, lateral view. 32. Detail of paramere, ventral view.

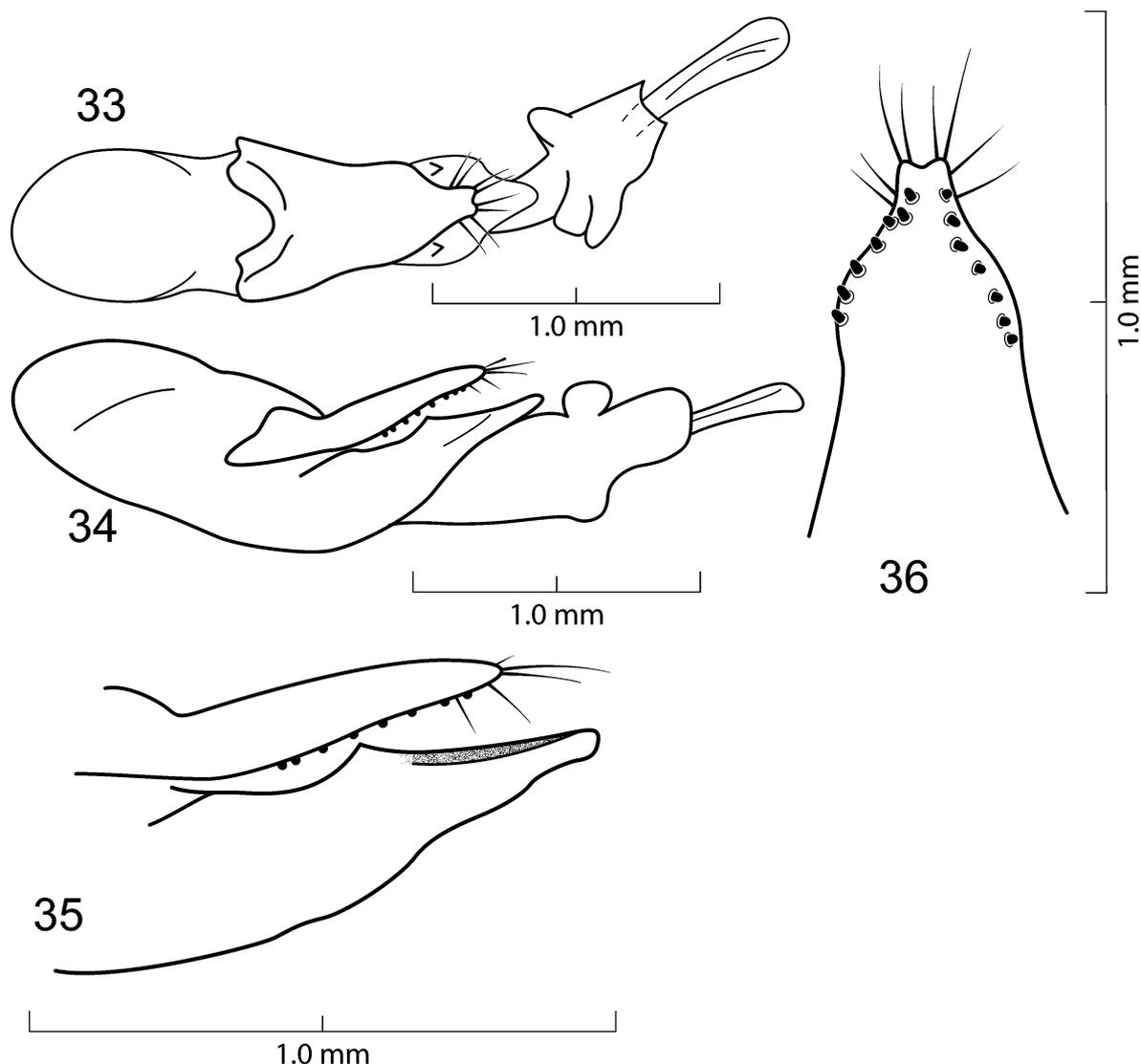
***Ocylinus dimoui*, Chatzimanolis & Ashe, new species**

(Figs. 6, 12, 33–36, 49)

**Type Material. Holotype:** male, with labels: “Panama: Chiriquí Prov. La Fortuna, ‘Cont. Divide Trail’, 8°46’N, 82°12’W, 1080 m, 21–23.v.1995, J. & A. Ashe, #043, ex: flight intercept trap” / barcode label SM0058243 / “Holotype *Ocylinus dimoui* Chatzimanolis and Ashe, des. Chatzimanolis 2009” (SEMC).

**Diagnosis.** Among *Ocylinus* species with dark metallic purple coloration on head and pronotum, *O. dimoui* can be distinguished by the shape of the right mandible (Fig. 6) and the shape of aedeagus: paramere

apically strongly emarginated (Fig. 36) and sensory spinules on ventral side of paramere arranged in two rows near lateral margins (Fig. 36).



**FIGURES 33–36.** Aedeagus of *O. dimoui*. 33. Dorsal view. 34. Lateral view. 35. Detail of median lobe, lateral view. 36. Detail of paramere, ventral view.

**Description.** Body length 16.2 mm.

**Coloration.** Head and pronotum metallic bright purple with green and blue overtones. Posterior dorsal margin of head without metallic coloration, appearing dark brown to black. Ventral surface of head and pronotum dark brown. Antennomeres 1–3 dark brown, 4–11 light brown. Mesoscutellum dark brown. Elytra similar to but sometimes brighter colored than head and pronotum. Abdomen dark brown, except posterior 1/5 of segment VII and VIII yellow. Legs brown.

Head slightly transverse, width : length ratio = 1.35. Surface of epicranium matt; with many micropunctures and with polygon-shaped microsculpture visible at >70X; with several medium umbilicate setose punctures around margins of head, anteriorly and posteriorly, distance between puncture varies; medium size umbilicate punctures absent in medial longitudinal area but micropunctures present. Eyes medium, length of eyes / length of head = 0.45, distance between eyes as wide as twice length of eye. Postgena with medium, deep punctures (about 1–2 punctures / 0.5 mm), punctures not uniformly distributed. Mandibles (Fig. 6) with broad triangular medial tooth, left mandible with convex triangular tooth, right

mandible with similar tooth but constricted at tip, distal part of mandible slightly curved. Antennomeres with long macrosetae, antennomeres 1–11 longer than wide, antennomere 1 slightly curved, about 2.5 times as long as antennomere 2, antennomere 3 1.6 times as long as antennomere 2, antennomere 4 0.75 times as long as antennomere 3, antennomeres 6 slightly shorter than either antennomere 5 or 7, antennomere 7–10 gradually becoming shorter, antennomere 11 slightly longer than antennomere 10. Neck dorsally with micropunctures and rounded microsculpture, laterally with 3–4 small punctures.

Pronotum subquadrate, width : length ratio = 0.97; antero-lateral angles obtusely rounded, curved downwards. Lateral margins of pronotum concave in dorsal aspect, pronotum broadest in apical 1/4 and narrower at basal angles. Surface of pronotum flat; matt due to microsculpture and micropunctures. Medium sized punctures throughout the pronotum, irregularly arranged. Large setose punctures present around the margin of pronotum, with 4 punctures at the center of the pronotum, each one delimiting the corner of a square. Pronotum with few long black macrosetae along borders. Mesoscutellum prominent, anterior half with transverse microsculpture, posterior half with microsculpture and with brown microsetae and punctures, punctures confluent.

Elytra subequal in length to pronotum, with large setose uniform punctures (about 7 punctures / 0.5 mm), punctures confluent; with long yellow macrosetae along borders of elytra. Elytra appearing glossy, without microsculpture but with tiny micropunctures between larger punctures visible only at >70X.

Legs. Protarsus moderately enlarged, with yellow setae; meso- and metatarsi not enlarged. Legs almost completely covered with long yellow and brown setae.

Abdominal terga III–VII with tergal basal and no subbasal (arch-like) carina. Terga III–VII with uniform punctation patterns, densely covered with punctures and yellowish brown setae, with polygon-shaped microsculpture on anterior part. Setae on abdominal terga and sterna appearing iridescent. Sterna III–VII moderately punctuated, with shallow punctures and with rounded microsculpture. Lateral tergal sclerites of the abdominal segment IX long and straight, covered with long brown macrosetae.

Secondary sexual structures. Male: distal margin of sternum VII with slight broad emargination medially; sternum VIII with shallow V-shaped emargination medially; sternum IX with deep V-shaped emargination medially. Female unknown.

Aedeagus as in Figs. 33–36; paramere in dorsal view fairly wide, converging to strongly emarginated apex, shorter than median lobe; in lateral view paramere almost straight; with sensory spinules in two lateral rows as shown in Fig. 36. Median lobe in dorsal view wide, converging to rounded apex, with a pair of dorsal teeth; in lateral view becoming narrower from middle to apex.

**Distribution.** Known only from the type locality in Panama, at elevations of 1080 m (Fig. 49).

**Habitat.** Unknown, collected in flight intercept trap.

**Remarks.** According to the label information, *O. dimoui* and *O. astenos* are virtually sympatric. However, the coordinates on the label are not very precise and since the habitat information is not known for any of these two species, it is unclear if they are really sympatric. It could be argued that these are the same species and the differences in the mandibles and the aedeagi are intraspecific variation; however the variation observed is comparable to the interspecific variation seen among the other species in the genus.

**Etymology.** The species is named in honor of Mr. Nikos Dimou, a Greek writer.

### ***Ocyolinus ganglbaueri* Bernhauer, 1906**

(Figs. 7, 13, 16–24, 37–40, 49)

*Ocyolinus ganglbaueri* Bernhauer, 1906: 199.

**Type material. Holotype:** female, with labels: “D. Moritz 1858 Venezuela” / “*ganglbaueri* Brh. Typ. unic.” / “*ganglbaueri* Bernh. Typus” / “Typus” (NMW). Bernhauer (1906) specifically states in the original description that he had available only a single specimen; that specimen is therefore the holotype for the species.

**Additional material. VENEZUELA:** Aragua, Rancho Grande Biol. Stn., 10°21'N, 67°41'W, 1450 m, 25–28.ii.1995, Robert W. Brooks, #013, ex: flight intercept trap, barcode labels SM0058237, SM0058236, SM0058239 (3 SEMC); same locality and collector, 1–8.iii.1995, #047, barcode label SM0058238 (1 SEMC); same locality and collector, 1–8.iii.1995, 1370 m, #046, barcode labels SM0058234, SM0058240 (2 SEMC); Lara Sanaré, 17.4 km SE Yacambú N.P., 1510 m, 9°42'26"N, 69°34'34"W, 16–18.v.1998, J. Ashe, R. Brooks, R. Hanley, VEN1ABH98 062, ex: flight intercept trap, barcode label SM00338031 (1 SEMC); **COUNTRY UNKNOWN:** South America (1 BMNH).

**Diagnosis.** *Ocyolinus ganglbaueri* and *O. rugatus* can be distinguished from all other known species of *Ocyolinus* by the dark brown metallic coloration of the head and pronotum (dark metallic purple in other species), the presence of a subbasal carina on tergum III, and the transverse microsculpture on the head and pronotum (rounded in other species). *Ocyolinus ganglbaueri* can be easily distinguished from *O. rugatus* because it lacks the rugose sculpture of the head and pronotum present in *O. rugatus*; by the presence of subbasal carina only medially on tergum IV (complete in *O. rugatus*); and by the shape of the aedeagus (Figs. 37–40): in *O. ganglbaueri* the apical hook-like tooth of the medial lobe is smaller than in *O. rugatus*.

**Description.** Body length 11.5–13.5 mm.

**Coloration.** Head and pronotum shining metallic brown with green overtones. Ventral surface of head and pronotum dark brown. Antennomeres dark orange. Mesoscutellum dark brown. Elytra dark metallic brown with blue overtones. Abdomen brown to dark brown. Legs brown, except tarsi dark orange.

Head transverse, width : length ratio = 1.35. Surface of epicranium shining; with micropunctures and with transverse microsculpture visible at >70X; with several medium umbilicate setose punctures, distance between puncture 0.5–1 width of puncture; medially without any punctures. Frons area near antennae appearing slightly elevated. Eyes medium, length of eyes / length of head ratio = 0.51, distance between eyes as wide as twice length of eye. Postgena with medium, shallow punctures (about 1–2 punctures / 0.5 mm), punctures not uniformly distributed. Mandibles (Figs. 7, 16) with broad triangular medial tooth, left mandible with slightly convex triangular tooth, right mandible with flat triangular tooth not constricted at tip, distal part of mandible slightly curved. Antennomeres with long macrosetae, antennomeres 1–11 longer than wide, antennomere 1 slightly curved, about 2.5 times as long as antennomere 2, antennomere 3 1.5 times as long as antennomere 2, antennomere 4 0.58 times as long as antennomere 3, antennomeres 6 slightly shorter than antennomere 5, antennomeres 6–10 gradually becoming shorter, antennomere 11 slightly longer than antennomere 10. Neck dorsally with micropunctures and transverse microsculpture, laterally with no punctures.

Pronotum subquadrate, width : length ratio = 0.98; antero-lateral angles obtusely rounded, curved downwards. Lateral margins of pronotum almost parallel-sided in dorsal aspect, pronotum broadest in apical 1/3 and narrower at basal angles. Surface of pronotum flat; shining with transverse microsculpture and micropunctures. Medium sized punctures throughout the pronotum, irregularly arranged, but distance between punctures typically 1–2 width of puncture. Large setose punctures present around the margin of pronotum. Pronotum with long yellow macrosetae along borders. Mesoscutellum prominent with transverse microsculpture throughout and punctures medially.

Elytra slightly shorter than pronotum, with large setose uniform punctures (about 7 punctures / 0.5 mm), punctures confluent; with long yellow macrosetae along borders of elytra. Elytra appearing glossy, without microsculpture but with tiny micropunctures between larger punctures visible only at >70X.

Legs. Protarsus enlarged, with yellow setae; meso- and metatarsi not enlarged. Legs almost completely covered with long yellow and brown setae.

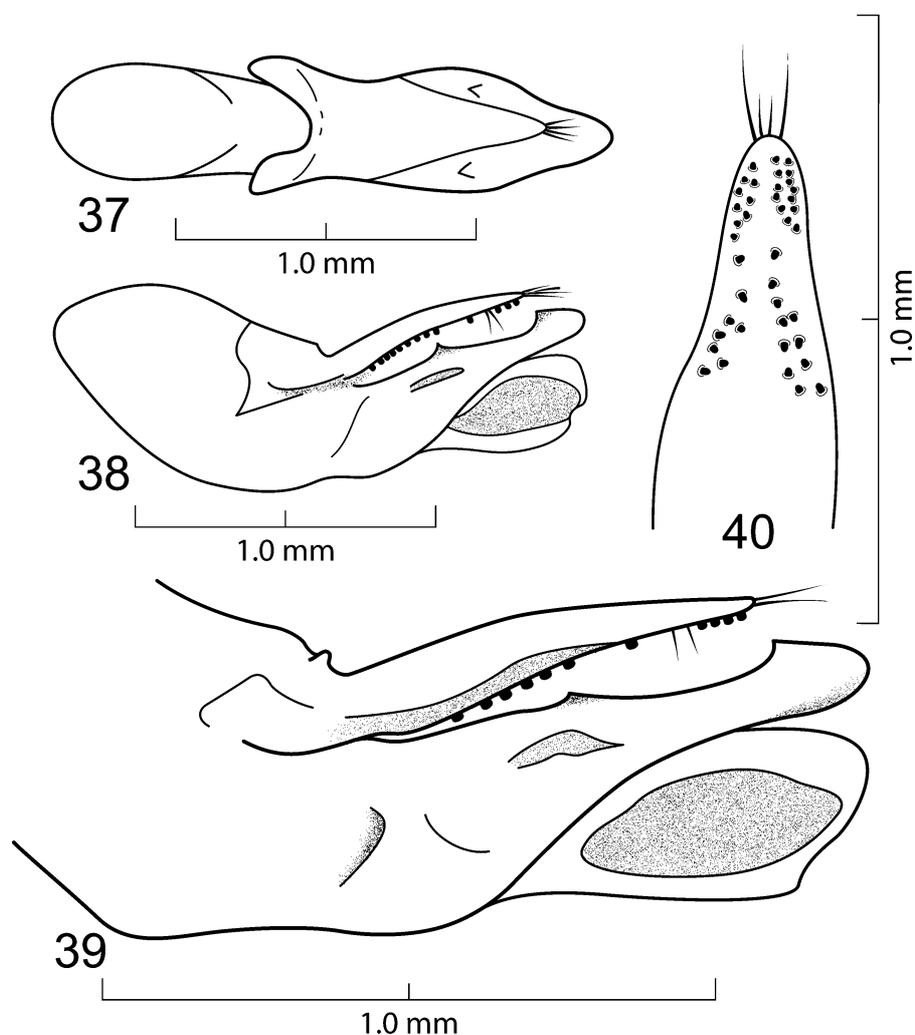
Abdominal tergum III with tergal basal and subbasal (arch-like) carina; tergum IV with basal and medial only subbasal carina; terga V–VII with basal and no subbasal carina. Terga III–VII with uniform punctation patterns, densely covered with punctures and yellowish brown setae, with rounded microsculpture on antero-lateral angles. Setae on abdominal terga and sterna appearing strongly iridescent. Sterna III–VII densely punctuated, with polygon-shaped microsculpture anteriorly, except VIII throughout. Lateral tergal sclerites of the abdominal segment IX long and straight, covered with long brown macrosetae.

Secondary sexual structures. Male: distal margin of sternum VII with slight broad emargination medially; sternum VIII with deep V-shaped emargination medially; sternum IX with deep V-shaped emargination medially. Female without obvious sexual structures.

Aedeagus as in Figs. 22, 37–40; paramere in dorsal view converging to rounded apex, shorter than median lobe; in lateral view paramere slightly concave, straight; with sensory spinules as shown in Figs. 27, 40. Median lobe in dorsal view wide, converging to rounded apex, with a pair of dorsal teeth medially and hook-like tooth apically; in lateral view becoming narrower from middle to apex.

**Distribution.** Known from elevations of 1370–1510 m in Venezuela (Fig. 49).

**Habitat.** Unknown, collected in flight intercept traps.



**FIGURES 37–40.** Aedeagus of *O. ganglbaueri*. 37. Dorsal view. 38. Lateral view. 39. Detail of median lobe, lateral view. 40. Detail of paramere, ventral view.

***Ocyolinus nebulosus*, Chatzimanolis & Ashe, new species**

(Figs. 3, 8, 14, 41–44, 49)

**Type material. Holotype:** male, with labels: “Panama: Chiriquí Prov., Hornito, Finca La Suiza, ca. 8°39’N, 82°12’W, 1220 m, 6.vi.2000” / “FMHD#2000-171, flight intercept trap, H. A. Howden, Field Mus. Nat. His.” / “Holotype *Ocyolinus nebulosus* Chatzimanolis and Ashe, des. Chatzimanolis 2009” (FMNH). **Paratypes** (4♂♂): with labels as the holotype (1 FMNH); “Panama: Darién, Cana Biological Station, Serrania de Pirre, 1380 m, 4–7.vi.1996, J. Ashe, R. Brooks, PAN1AB96 107, ex: flight intercept trap” / barcode label SM0006981 (1 SEMC); “Panama: Coclé, 7.2 km N El Copé, 730 m, 8°37’N, 80°35’W, #140, 20.v–7.vi.1995,

J. Ashe, R. Brooks, flt. Intercept trap” / barcode label SM0003427 (1 SEMC); “Panama: Chiriquí Prov., nr. Bajo Boquete; Pate de Machu Mt., 11.viii.1983, Louis N. Sorkin collector, leaf litter sift” (1 AMNH).

**Diagnosis.** Among *Ocyolinus* species with dark metallic purple coloration on head and pronotum, *O. nebulosus* can be distinguished by the shape of the right mandible (Fig. 8) and the shape of aedeagus: paramere apically rounded (Fig. 44) and sensory spinules as shown in Fig. 44.

**Description.** Body length 14.0–16.5 mm.

**Coloration.** Head and pronotum metallic bright purple with green and blue overtones but one paratype appearing more metallic green. Posterior dorsal margin of head without metallic coloration, appearing dark brown to black. Ventral surface of head and pronotum dark brown. Antennomeres light brown. Mesoscutellum dark brown. Elytra similar to but sometimes brighter colored than head and pronotum. Abdomen brown to dark brown, except posterior 1/5 of segment VII and VIII yellow. Legs light brown.

Head slightly transverse, width : length ratio = 1.25. Surface of epicranium matt; with many micropunctures and with polygon-shaped microsculpture visible at >70X; with several medium sized umbilicate setose punctures around margins of head and posteriorly, distance between puncture varies; medially with few setose punctures and with micropunctures. Eyes medium, length of eyes / length of head = 0.46, distance between eyes as wide as twice length of eye. Postgena with medium, deep punctures (about 1–2 punctures / 0.5 mm), punctures not uniformly distributed. Mandibles (Fig. 8) with broad triangular medial tooth, left mandible with convex triangular tooth, right mandible with similar tooth but constricted at tip, distal part of mandible straight. Antennomeres with long macrosetae, antennomeres 1–11 longer than wide, antennomere 1 slightly curved, about 2.5 times as long as antennomere 2, antennomere 3 1.6 times as long as antennomere 2, antennomere 4 0.75 times as long as antennomere 3, antennomeres 6 slightly shorter than either antennomere 5 or 7, antennomere 7–10 gradually becoming shorter, antennomere 11 slightly longer than antennomere 10. Neck dorsally with micropunctures and rounded microsculpture, laterally with 3–4 small punctures.

Pronotum subquadrate, width : length ratio = 0.97; antero-lateral angles obtusely rounded, curved downwards. Lateral margins of pronotum concave in dorsal aspect, pronotum broadest in apical 1/4 and narrower at basal angles. Surface of pronotum flat; matt due to microsculpture and micropunctures. Medium sized punctures throughout the pronotum, irregularly arranged. Large setose punctures present around the margin of pronotum, with 4 punctures at the center of the pronotum, each one delimiting the corner of a square. Pronotum with few long black macrosetae along borders. Mesoscutellum prominent, anterior half with transverse microsculpture, posterior half with microsculpture and with brown microsetae and punctures, punctures confluent.

Elytra subequal in length to pronotum, with large setose uniform punctures (about 7 punctures / 0.5 mm), punctures confluent; with long yellow macrosetae along borders of elytra. Elytra appearing glossy, without microsculpture but with tiny micropunctures between larger punctures visible only at >70X.

Legs. Protarsus moderately enlarged, with yellow setae; meso- and metatarsi not enlarged. Legs almost completely covered with long yellow and brown setae.

Abdominal terga III–VII with tergal basal and no subbasal (arch-like) carina. Terga III–VII with uniform punctation patterns, densely covered with punctures and yellowish brown setae, with polygon-shaped microsculpture on anterior part. Setae on abdominal terga and sterna appearing iridescent. Sterna III–VII moderately punctuated, with rounded microsculpture. Lateral tergal sclerites of the abdominal segment IX long and straight, covered with long brown macrosetae.

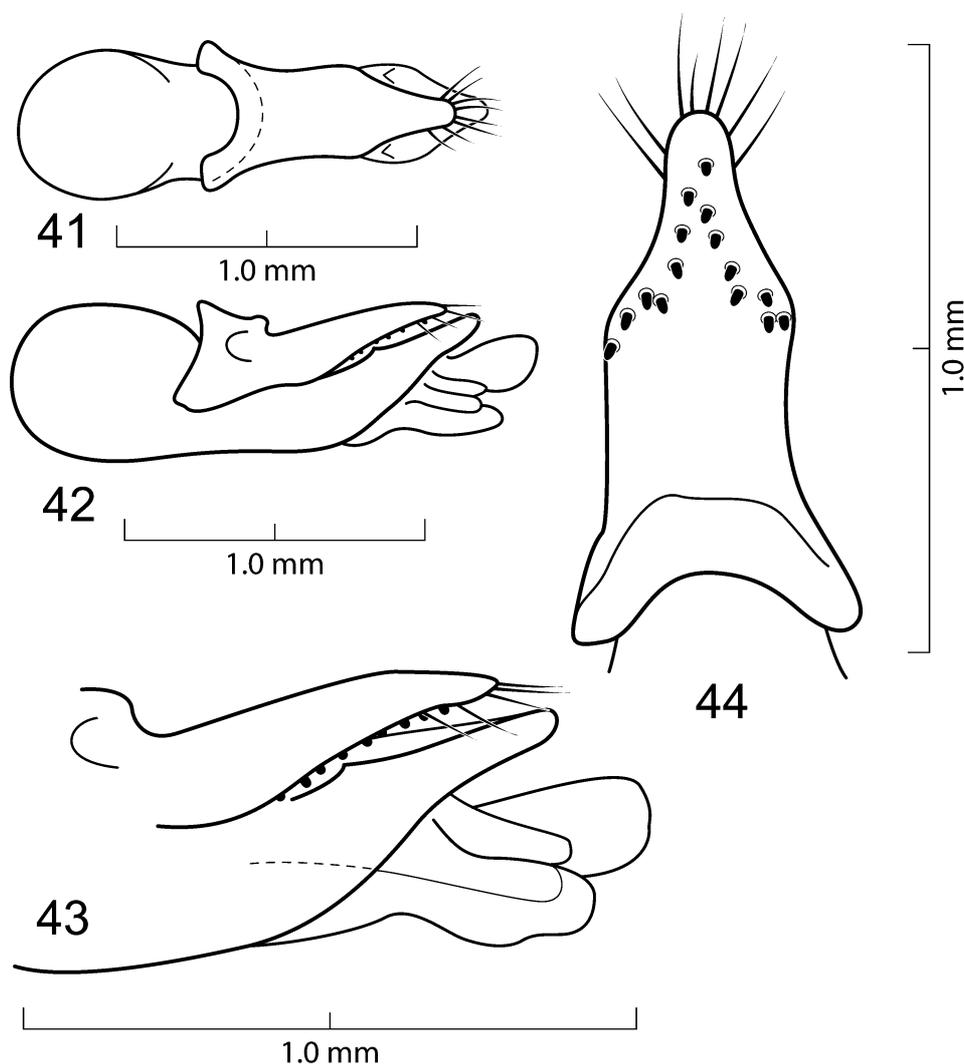
Secondary sexual structures. Male: distal margin of sternum VII with slight broad emargination medially; sternum VIII with shallow V-shaped emargination medially; sternum IX with deep V-shaped emargination medially. Female unknown.

Aedeagus as in Figs. 41–44; paramere in dorsal view fairly wide, converging to rounded apex, shorter than median lobe; in lateral view paramere slightly concave, straight; with sensory spinules as shown in Fig. 44. Median lobe in dorsal view wide, converging to rounded apex, with a pair of dorsal teeth; in lateral view becoming narrower from middle to apex.

**Distribution.** Known from elevations of 730–1380 m in Panama (Fig. 49).

**Habitat.** Collected in leaf litter and flight intercept traps.

**Etymology.** The specific epithet is derived from the Latin word *nebula* (cloudy, misty) and refers to the punctuation pattern of the micropunctures on the pronotum. The epithet is an adjective.



**FIGURES 41–44.** Aedeagus of *O. nebulosus*. 41. Dorsal view. 42. Lateral view. 43. Detail of median lobe, lateral view. 44. Detail of paramere, ventral view.

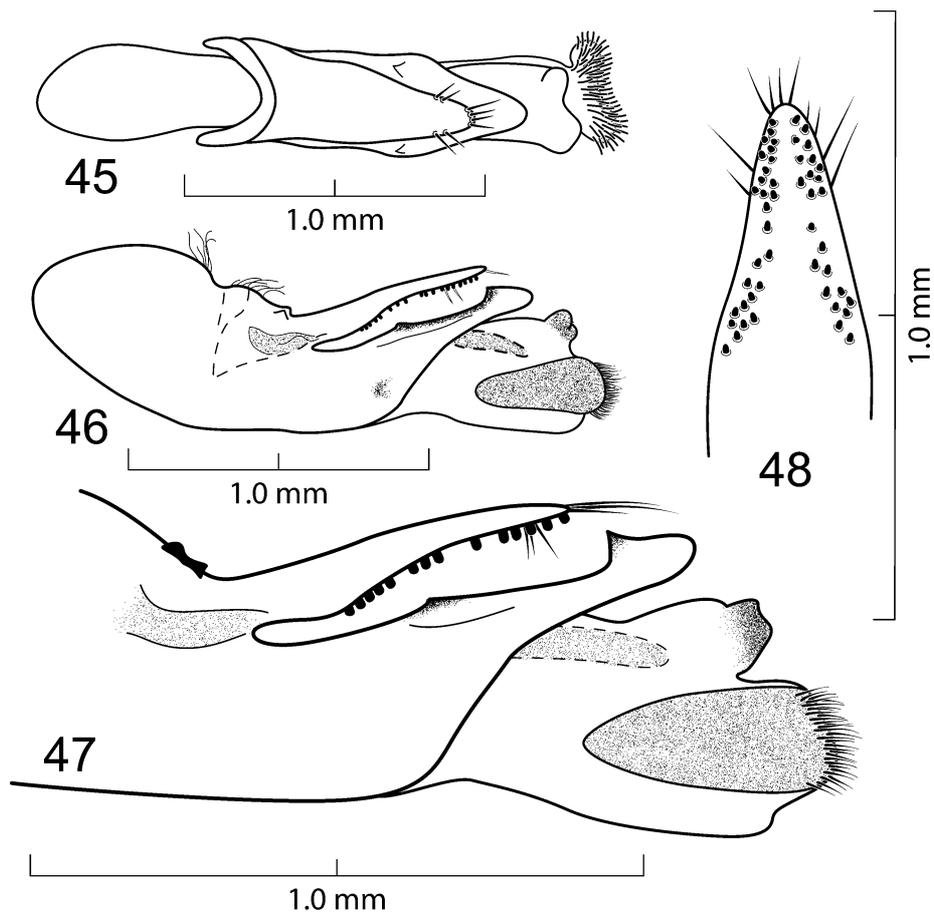
***Ocyolinus rugatus* Sharp, 1884**

(Figs. 2, 9, 15, 45–48, 49)

*Ocyolinus rugatus* Sharp, 1884: 363.

*Ocyolinus vulneratus* Bernhauer, 1906: 199, **new synonymy**.

**Type material.** **Lectotype** of *O. rugatus*, here designated: female, on card with D. Sharp's handwriting "*Ocyolinus rugatus*. Type D. S. Venezuela. (Higgins)", and with labels as follows: "Type" / "Venezuela" / "Sharp Coll. 1905 – 313." / "Venezuela" / "Lectotype *Ocyolinus rugatus* Sharp des. Chatzimanolis 2009" (BMNH). **Paralectotype**: female with labels: "Venezuela" / "Sharp Coll. 1905 – 313." / "*Ocyolinus rugatus* Shp. BM drawer 681" / "Paralectotype *Ocyolinus rugatus* Sharp des. Chatzimanolis 2009" (BMNH).



FIGURES 45–48. Aedeagus of *O. rugatus*. 45. Dorsal view. 46. Lateral view. 47. Detail of median lobe, lateral view. 48. Detail of paramere, ventral view.

**Lectotype** of *O. vulneratus*, here designated: female with labels: “Venezuela, Schmidt 1858” / “*vulneratus* Brh., Typ.” / “*vulneratus* Bernhauer Typus” / “Chicago NHMus M. Bernhauer Collection” / “Lectotype *Ocyolinus vulneratus* Bernhauer des. Chatzimanolis 2009” (FMNH). **Paralectotype**: female with labels: “D. Moritz 1858 Venezuela” / “co-Typus” / “*vulneratus* Brh. Det. Bernhauer” / “Paralectotype *Ocyolinus vulneratus* Bernhauer des. Chatzimanolis 2009” (NMW).

**Additional material. COLOMBIA**: 6185 / Columb. Mont. (1 ZMHB). **VENEZUELA**: Aragua, Rancho Grande Biol. Stn., 10°21'N, 67°41'W, 1450 m, 1–8.iii.1995, Robert W. Brooks, #047, ex: flight intercept trap, barcode labels SM0058232 (1 SEMC); same locality, date and collector, 1370 m, #046, barcode labels SM0058230, SM0058231, SM0058233, SM0058235 (4 SEMC); same locality, 1300 m, 12–14.v.1998, J. Ashe, R. Brooks, R. Hanley, VEN1ABH098 027, ex: flight intercept trap, barcode label SM0123206 (1 SEMC); same locality, Portachuelo Pass, 1100 m, 14.v.1998, J. Ashe, R. Brooks, R. Hanley, VEN1ABH98 041, barcode label SM0121667 (1 SEMC); Aragua, Rancho Grande Biol. Stn., Pico Periquitos, 1250 m, 10°21'32"N, 67°41'46"W, 12–14.v.1998, J. Ashe, R. Brooks, R. Hanley, VEN1ABH98 030, ex: flight intercept trap, barcode label SM0123328 (1 SEMC); Aragua, Rancho Grande Biol. Stn., 1550 m, 10°21'38"N, 67°41'38"W, 12–14.v.1998, J. Ashe, R. Brooks, R. Hanley, VEN1ABH98 029, ex: flight intercept trap, barcode label SM0123246 (1 SEMC); D. Moritz 1858 / *rugatus* det. Bernhauer (1 NMW, 1 FMNH); c. Eppplsh. Steinc. d. / *Ocyolinus rugatus* Shr. Venezuela (1 NMW); Mérida / Venezuela / *Ocyolinus rugatus* / ex. coll. Scheerpeltz (1 NMW); “Veneza. 55.89” (1 BMNH).

**Diagnosis.** *Ocyolinus rugatus* and *O. ganglbaueri* can be distinguished from all other known species of *Ocyolinus* by the dark brown metallic coloration of the head and pronotum (dark metallic purple in other

species), the presence of a subbasal carina on tergum III, and the transverse microsculpture on the head and pronotum (rounded in other species). *Ocyolinus rugatus* can be easily distinguished from *O. ganglbaueri* because it has rugose sculpture of the head and pronotum that is absent in *O. ganglbaueri*; by the presence of a complete subbasal carina on tergum IV (only medially in *O. ganglbaueri*); and by the shape of the aedeagus (Figs. 45–48): in *O. rugatus* the apical hook-like tooth of the medial lobe is larger than in *O. ganglbaueri*.

**Description.** Body length 10.5–15.5 mm.

**Coloration.** Head and pronotum shining metallic brown with green overtones. Ventral surface of head and pronotum dark brown. Antennomeres dark orange. Mesoscutellum dark brown. Elytra dark metallic brown with blue overtones. Abdomen brown to dark brown. Legs brown, except tarsi dark orange.

Head slightly transverse, width : length ratio = 1.28. Surface of epicranium shining, rugose, with micropunctures and with transverse microsculpture visible at >70X; with medium sized umbilicate setose punctures covering the epicranium, distance between puncture varies. Frons area near antennae appearing slightly elevated. Eyes medium, length of eyes / length of head = 0.44, distance between eyes as wide as twice length of eye. Postgena with medium, shallow punctures (about 1–2 punctures / 0.5 mm), punctures not uniformly distributed. Mandibles (Fig. 9) with broad triangular medial tooth, left mandible with slightly convex triangular tooth, right mandible with convex triangular tooth slightly constricted at tip, distal part of mandible strongly curved. Antennomeres with long macrosetae, antennomeres 1–11 longer than wide, but antennomere 10 only slightly longer than wide, antennomere 1 slightly curved, about 2.5 times as long as antennomere 2, antennomere 3 1.5 times as long as antennomere 2, antennomere 4 0.63 times as long as antennomere 3, antennomeres 6 slightly shorter than antennomere 5, antennomeres 6–10 gradually becoming shorter, antennomere 11 longer than antennomere 10. Neck dorsally with micropunctures and transverse microsculpture, laterally with no punctures.

Pronotum quadrate, width : length ratio = 0.98; antero-lateral angles obtusely rounded, curved downwards. Lateral margins of pronotum almost parallel-sided in dorsal aspect, pronotum broadest in apical 1/3 and narrower at basal angles. Surface of pronotum rugose, with elevated ridges; shining with transverse microsculpture and micropunctures. Medium sized punctures throughout the pronotum, irregularly arranged. Large setose punctures present around the margin of pronotum. Pronotum with long yellow macrosetae along borders. Mesoscutellum prominent with transverse microsculpture throughout and punctures medially.

Elytra subequal to pronotum, with large setose uniform punctures (about 7 punctures / 0.5 mm), punctures confluent; with long yellow macrosetae along borders of elytra. Elytra appearing glossy, without microsculpture but with tiny micropunctures between larger punctures visible only at >70X.

Legs: Protarsus enlarged, with yellow setae; meso- and metatarsi not enlarged. Legs almost completely covered with long yellow and brown setae.

Abdominal tergum III–IV with tergal basal and subbasal (arch-like) carina; terga V–VII with basal and no subbasal carina. Terga III–VII with uniform punctation patterns, densely covered with punctures and yellowish brown setae, with polygon-shaped microsculpture on antero-lateral angles. Setae on abdominal terga and sterna appearing strongly iridescent. Sterna III–VII densely punctuated, with rounded microsculpture anteriorly, except VIII throughout. Lateral tergal sclerites of the abdominal segment IX long and straight, covered with long brown macrosetae.

Secondary sexual structures. Male: distal margin of sternum VII with slight broad emargination medially; sternum VIII with deep V-shaped emargination medially; sternum IX with deep V-shaped emargination medially. Female without obvious sexual structures.

Aedeagus as in Figs. 45–48; paramere in dorsal view converging to rounded apex, shorter than median lobe; in lateral view paramere slightly concave, straight; with sensory spinules as shown in Figs. 48. Median lobe in dorsal view wide, converging to rounded apex, with a pair of small dorsal teeth medially and hook-like tooth apically; in lateral view becoming narrower from middle to apex.

**Distribution.** Known from elevations of 1100–1550 m in Colombia and Venezuela (Fig. 49).

**Habitat.** Unknown, collected in flight intercept traps.

**Synonymy.** The series of type specimens for *O. rugatus* and *O. vulneratus* are similar in almost all respects. Bernhauer probably described the specimens he had as *O. vulneratus* because they are somewhat smaller in size than *O. rugatus*, and there is some variation in the density of the punctuation on the head between the type specimens. Bernhauer was aware of *O. rugatus*, but it is not clear if he had seen the type series of *O. rugatus*. However, after examining the type series and several other specimens, the first author concluded that the two previously described species refer to a single species.

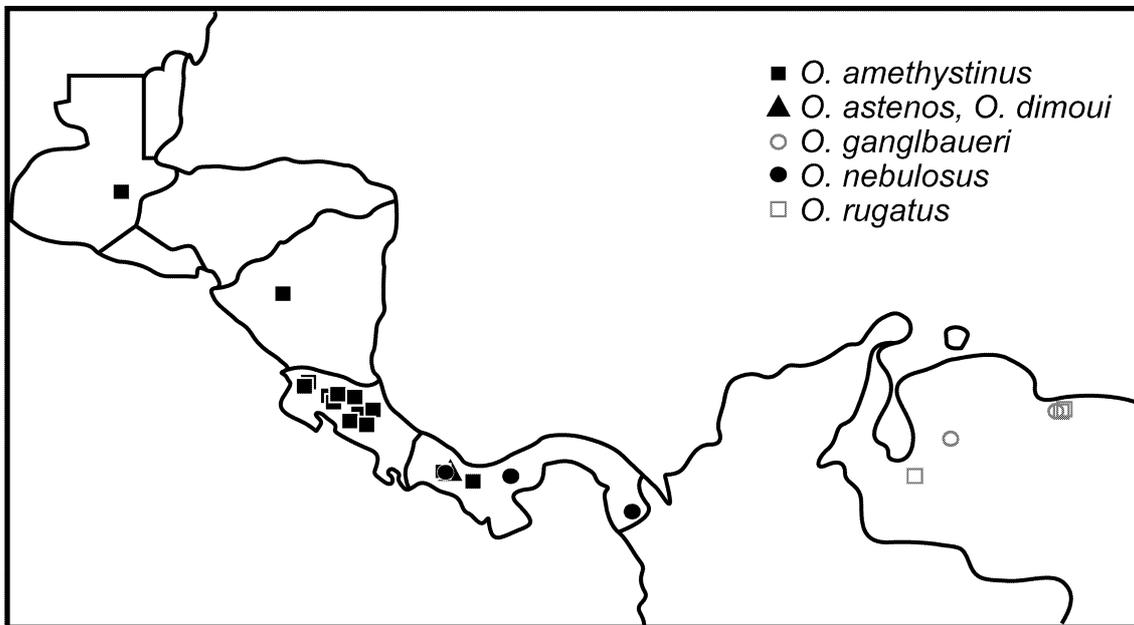


FIGURE 49. Distribution map of *Ocyolinus*.

#### List of unnamed species

##### *Ocyolinus* sp. 1

**Material examined.** A female specimen with label data: “Costa Rica: Cartago, 19km NE San Jose, 17.v.1993, 1010 m, J.S & A.K. Ashe, #015, ex: flight intercept trap” / barcode label SM0063458 (SEMC).

**Comments.** This species is similar to *O. astenos*, *O. dimoui* and *O. nebulosus* but with slightly different head and pronotum punctuation; without a male specimen the first author is unable to determine the identity of this species.

##### *Ocyolinus* sp. 2

**Material examined.** A female specimen with label data: “Panama:Veraguas, Cerro Tute, 4km W Santa Fe, 850 m, 30–31.vii.1995, Allen R. Gillogly” / barcode label SM0058241 (SEMC).

**Comment.** As *Ocyolinus* sp. 1, this species is similar to *O. astenos*, *O. dimoui* and *O. nebulosus* but with slightly different head and pronotum punctuation, in addition, the morphology of the mandible distinguish it from *Ocyolinus* sp. 1. The lack of male specimens prohibits me from determining the identity of this species. As a note here, this specimen has multiple mites on it, and it is the only specimen of *Ocyolinus* that the first author examined that had mites.

## Key to the species of *Ocyolinus*

With the exception of *O. rugatus* (rugose sculpture) and *O. amethystinus* (very few punctures on head and pronotum) the other species of *Ocyolinus* may be challenging to identify. The remaining species can be reliably identified based on the shape of the mandibles and the shape of the aedeagi; for these species females can only be identified in association with males.

1. Pronotum and head dark metallic brown, with transverse microsculpture; abdominal tergum III with a subbasal carina, median lobe of aedeagus with hook-like apical tooth (Figs. 39, 47) ..... 2
- Pronotum and head dark metallic purple, sometimes appearing more green or blue, with polygon-shaped microsculpture; abdominal tergum III without a subbasal carina; median lobe of aedeagus without hook-like apical tooth (Figs. 27, 31, 35, 43) ..... 3
2. Pronotum and head with rugose sculpture (Figs. 2, 9, 15); abdominal tergum IV with a complete subbasal carina; median lobe of aedeagus with large hook-like apical tooth (Figs. 46–47) ..... *O. rugatus*
- Pronotum and head without rugose sculpture (Figs. 7, 13); abdominal tergum IV with a subbasal carina only medially; median lobe of aedeagus with small hook-like apical tooth (Figs. 38–39) ..... *O. ganglbaueri*
3. Pronotum and head with few or almost no punctures (Figs. 1, 4, 10); mandibular teeth extremely elongate (Figs. 1, 4) ..... *O. amethystinus*
- Pronotum and head with various punctation patterns (Figs. 5–6, 8, 11–12, 14); mandibular teeth never as elongate as in *O. amethystinus* ..... 4
4. Apex of paramere emarginate (Figs. 32, 36); right mandible with tooth that is only slightly or not at all constricted at tip (Figs. 5, 6) ..... 5
- Apex of paramere rounded (Fig. 44); right mandible with tooth that is constricted at tip (Fig. 8) more than in any other described species (except *O. amethystinus*) ..... *O. nebulosus* **n. sp.**
5. Apex of paramere strongly emarginated (Fig. 36); sensory spinules on ventral side of paramere in two rows near lateral margins (Fig. 36); right mandible with tooth that is slightly constricted at tip (Fig. 6) ..... *O. dimoui* **n. sp.**
- Apex of paramere with a shallow emargination (Fig. 32); sensory spinules on ventral side of paramere not in two clear rows, appearing more towards the middle instead of the lateral margins of paramere (Fig. 32); right mandible with tooth that is not constricted at tip (Fig. 5) ..... *O. astenos* **n. sp.**

## Acknowledgements

I am grateful to the curators and collection managers of the institutions listed in the Materials and methods section for the loan of specimens and their hospitality when I visited their collections. I thank Darci Falin for digitally inking the initial pencil sketches of the aedeagi and Ashleigh Bodell for performing the original genitalic dissections for some of the specimens. I thank Charles Nelson, Vladimir Gusarov, Alexey Solodovnikov and an anonymous reviewer for comments on this paper, and Lee Herman for comments on the type designation of *Ocyolinus*. The Natural History Museum of London kindly allowed me to photograph the types of *O. amethystinus* and *O. rugatus* shown here (Figs. 1–2); they retain the copyright of the photographs. Financial support was provided in part by NSF grant DEB-0741475 to S. Chatzimanolis and M. S. Engel.

## References

- Ashe, J.S. & Chatzimanolis, S. (2003) A revision of the genus *Elmas* Blackwelder, 1952 (Coleoptera: Staphylinidae), with a preliminary reconstructed phylogeny of the species. *Scientific Papers of the Natural History Museum of the University of Kansas*, 28, 1–41.
- Bernhauer, M. (1906) Neue Staphyliniden aus Südamerika. *Deutsche Entomologische Zeitschrift*, 1906, 193–202.
- Bernhauer, M. (1911) Zur Staphylinidenfauna von Süd-Amerika (Col.). *Deutsche Entomologische Zeitschrift*, 1911, 403–422.
- Bernhauer, M. (1921) Zur Staphylinidenfauna Südamerikas, insbesondere Argentinien. *Archiv für Naturgeschichte*, (A)86(8), 170–183.
- Bierig, A. (1937) Nuevos Staphylinini neotropicales. *Memorias de la Sociedad Cubana de Historia Natural “Felipe*

- Poey*", 11(3), 191–205.
- Blackwelder, R.E. (1936) Morphology of the coleopterous family Staphylinidae. *Smithsonian Miscellaneous Collections*, 94, 1–102.
- Blackwelder, R.E. (1952) The generic names of the beetle family Staphylinidae, with an essay on genotypy. *United States National Museum Bulletin*, 200, 1–483.
- Chatzimanolis, S. & Ashe, J. S. (2005) Revision and phylogeny of the neotropical genus *Philothalpus* (= *Eugastus* Sharp and *Allostenopsis* Bernhauer) (Coleoptera: Staphylinidae: Xanthopygina). *Insect Systematics and Evolution*, 36, 63–119.
- Chatzimanolis, S. (2004) A revision of the neotropical genus *Nordus* Blackwelder (Coleoptera: Staphylinidae: Xanthopygina). *Entomologische Abhandlungen*, 62(1), 3–64.
- Chatzimanolis, S. (2008) A revision of the neotropical beetle genus *Isanopus* (Coleoptera: Staphylinidae: Staphylinini). *Journal of Natural History*, 42(25–28), 1765–1792.
- Herman, L.H. (2001) Catalog of the Staphylinidae (Insecta: Coleoptera). 1758 to the end of the second millennium. *Bulletin of the American Museum of Natural History*, 265, 1–4218.
- ICZN (1999) *International Code of Zoological Nomenclature*. 4th ed. London, The International Trust for Zoological Nomenclature, Natural History Museum, 306 pp.
- Kraatz, G. (1857). *Naturgeschichte der Insecten Deutschlands. Abt. 1. Coleoptera. Zweiter Band*. Nicolai, Berlin, Lief. 3–4 pp. 377–768, Lief. 5–6 pp. 769–1080.
- Lucas, R. (1920) Catalogus alphabeticus generum et subgenerum Coleopterorum orbis terrarum totius (famil., trib., subtr., sect. incl.). *Archiv für Naturgeschichte*, (A)84(1918), 1–696.
- Schillhammer, H. (2006) Revision of the genus *Algon* Sharp (Coleoptera: Staphylinidae: Staphylininae). *Koleopterologische Rundschau*, 76, 135–218.
- Sharp, D. (1874) The Staphylinidae of Japan. *Transactions of the Entomological Society of London*, 1874, 1–103.
- Sharp, D. (1876) Contribution to an insect fauna of the Amazon Valley (Col. Staph.). *Transactions of the Entomological Society of London*, 1876, 27–424.
- Sharp, D. (1884) Staphylinidae. In: *Biologia Centrali-Americana. Insecta. Coleoptera* 1(2). Taylor & Francis, London, pp. 313–392.
- Smetana, A. & Davies, A. (2000) Reclassification of the north temperate taxa associated with *Staphylinus* sensu lato, including comments on relevant subtribes of Staphylinini (Coleoptera: Staphylinidae). *American Museum Novitates*, 3287, 1–88.
- Solodovnikov, A. & Schomann, A. (2009) Revised systematics and biogeography of the “*Quediina*” of sub-Saharan Africa: new phylogenetic insights into the rove beetle tribe Staphylinini (Coleoptera: Staphylinidae). *Systematic Entomology*, 34, 443–466.