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REVIEW OF THE GENUS *CYLINDRINOTUS* FALDERMANN, 1837 (COLEOPTERA: TENEBRIONIDAE: HELOPINI)

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ABSTRACT

The genus *Cylindrinotus* Faldermann, 1837, with species distributed in Transcaucasia, central and eastern Anatolia, northern Iran, and Syria, is reviewed. The taxonomic history and general morphology of adults of the genus are considered. The **new species** *Cylindrinotus charlesi* Nabozhenko is described from Erzurum Province, Turkey. A **new synonymy** is proposed: *Helops (Cylindrinotus) constrictus* Seidlitz, 1896 = *Helops (Cylindrinotus) funestoides* Reitter in Bodemeyer, 1900. Lectotypes are designated for *Cylindrinotus batesi* Allard, 1876, *Helops (Cylindrinotus) nitidus* Seidlitz, 1896, *H. funestoides*, and *Helops (Cylindronotus) bellator* Reitter, 1902. The holotype of uncertain species *Cylindrinotus gibbosus* (Seidlitz, 1896) was studied, and a redescription and notes on distribution of this species are given. Bibliography, synonymy, and key for all species are given.

Key Words: taxonomy, darkling beetles, new species, new synonymy, Palearctic, Chuck Triplehorn

Cylindrinotus Faldermann, 1837 is a small genus with 10 species distributed in eastern and central Anatolia, Transcaucasia, and northern Iran. One species is known from Syria. The greatest diversity of *Cylindrinotus* is observed in eastern Anatolia (seven species, five endemic) and Armenia, especially in the mountains around Sevan Lake (three species, one endemic). Species of the genus are moderate in size (8–18 mm), usually robust, wingless beetles. They inhabit mainly alpine meadows and high mountain xerophytic steppes. Two species inhabit forests.

Currently, a key to species and species review with full bibliography and synonymies exist for only four Caucasian species (Abdurakhmanov and Nabozhenko 2011). Anatolian species have not been studied since the revision by Reitter (1922). The main difficulty with their study is the study of types, some of which are probably lost. Confusion in the taxonomy of the genus in the works of Reitter (1902, 1922) and Iablokoff-Khuzorian (1964) is associated with this lapse.

Cylindrinotus is reviewed herein, with description of a new species from Turkey. Available type specimens are studied, and taxonomic relationships in the genus are reported.

TAXONOMIC HISTORY

Cylindrinotus previously included four species from Transcaucasia (Faldermann 1837). Some of these taxa were synonymized later. The type species of the genus, *Cylindrinotus femoratus* (Faldermann, 1837), designated by Gebien (1943), was originally described in the genus *Helops* Fabricius,

1775. Designation of the type species is valid because Gebien included in his work a junior synonym of *Helops femoratus* = *Cylindrinotus lugubris* Faldermann, 1837.

The first revision of the genus was by Allard (1876) who included four species and established the synonymy of *Cylindrinotus funestus* Faldermann, 1837 with *Cylindrinotus umbrinus* Faldermann, 1837. In a second revision, Allard (1877) included six species, with two new species.

Seidlitz (1896) considered a broad interpretation of *Helops* and included *Cylindrinotus*, with ten species, as a subgenus. Three of the included species (*Cylindrinotus grandicollis* Küster, *Cylindrinotus perplexus* Ménétré, and *Cylindrinotus douei* Allard) are junior synonyms of two species in the subgenus *Heloponotus* Reitter, 1922 of the genus *Odocnemis* Allard, 1876 (Nabozhenko *et al.* 2012). Seidlitz (1896) also included his species *Hedyphanes acutangulus* Seidlitz (now in *Cylindrinotus*) in the mixed subgenus *Stenomacidius* Seidlitz, 1896 of the genus *Hedyphanes* Fisher von Waldheim, 1820. *Stenomacidius* was synonymized with *Cylindrinotus* after study and designation of the lectotype and a type species of this subgenus by Nabozhenko (2006a).

Reitter (1902) supported the classification of Seidlitz (1896) and added seven species with four varieties in the subgenus *Cylindrinotus*. Since this work, Reitter and many later specialists wrote *Cylindrinotus* as *Cylindronotus*, an unjustified emendation of the genus name by Agassiz 1846 (Bouchard *et al.* 2005). Reitter did not study the types of Faldermann and erroneously interpreted the taxa *Cylindrinotus umbrinus* Faldermann,

Helops corallipes Reitter, *Cylindrinotus gibbicollis* Faldermann, and *Cylindrinotus flavipennis* Allard as varieties of *C. funestus*.

In his second revision, Reitter (1922) broadly defined the genus *Cylindrinotus* and included in it almost all generic groups of the subtribe *Cylindrinotina sensu* current interpretation. Species of *Cylindrinotus sensu stricto* were considered in the nominative subgenus. *Cylindrinotus* again became an independent genus after the works of Antoine (1949) and Español (1956, 1961). Separation of the genus was supported by morphology of adults (Nabozhenko 2001, 2006b) and larvae (Nabozhenko and Gurgenzidze 2006).

MATERIAL AND METHODS

This study is based on the examination of adult beetles from the following institutions, museums, and private collections:

BMNH	Natural History Museum, London, UK (Maxwell Barclay)
CB	Private collection of Piotr Białooki, Sopot, Poland
CK	Private collection of Mark Kalashian, Institute of Zoology of Armenia, Yerevan, Armenia
CN	Private collection of Maxim Nabozhenko, Institute of Arid zones, Rostov-on-Don, Russia
HNHM	Hungarian Natural History Museum, Budapest, Hungary (Ottó Merkl)
GNM	Georgian National Museum, Tbilisi, Georgia (with help of Madlena Dzhambazishvili)
MNHP	Muséum National d'Histoire Naturelle, Paris, France (Antoine Mantilleri)
NMP	National Museum, Prague, Czech Republic (transfer from Ottó Merkl)
NMW	Naturhistorisches Museum Wien, Wien, Austria (Harald Schillhammer)
MPSU	Moscow Pedagogical State University, Moscow, Russia (Kirill Makarov)
SMTD	Staatliche Museum für Tierkunde, Dresden, Germany (Klaus-Dieter Klass)
SNMS	Staatliches Museum für Naturkunde, Stuttgart, Germany (Wolfgang Schawaller)
ZDEU	Zoological department of Ege University, Bornova, Turkey (Bekir Keskin)
ZIN	Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (Gleb Medvedev, Mark Volkovitsh)
ZM MSU	Zoological Museum of Moscow State University, Moscow, Russia (Nikolay Nikitsky)
ZSM	Zoologische Staatssammlung München, München, Germany (Martin Baehr)

Photographs in Figs. 64–73 and 76–77 were made by Denis Kasatkin. The photograph in Fig. 62 is by Maxim Smirnov. All other photographs are by author.

TAXONOMY

Subfamily Tenebrioninae

Tribe Helopini

Subtribe Cylindrinotini

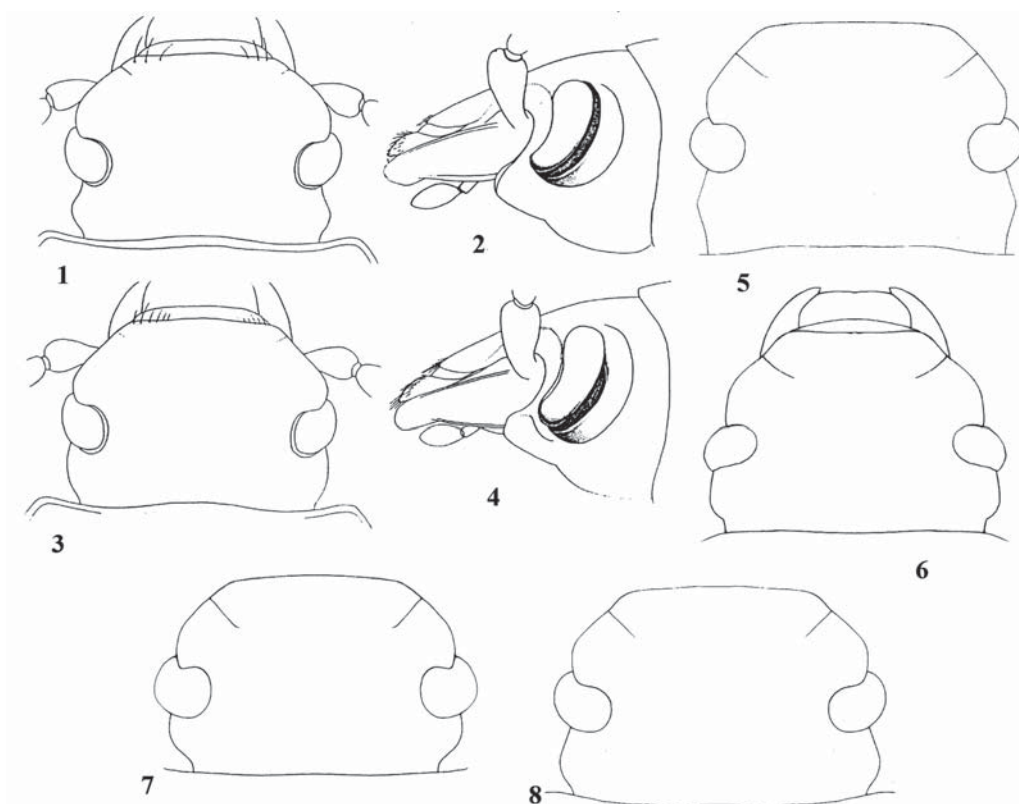
Genus *Cylindrinotus* Faldermann, 1837

Type species: *Helops femoratus* Faldermann, 1837 (designated by Gebien 1943).

Cylindrinotus Faldermann 1837: 75. Allard 1876: 4, 1877: 18, 51, 214 (*Cylindronotus*); Seidlitz 1896: 697, 720, 766 (*Cylindronotus*); Reitter 1902: 217 (*Helops* subgen.), 1922: 121, 124 (*Cylindronotus*); Nabozhenko 2001: 629 (*Cylindronotus*), 2006b: 143–146; Nabozhenko and Löbl 2008: 241; Abdurakhmanov and Nabozhenko 2011: 46, 136, 301.

Stenomacidius Seidlitz 1896: 791 (*Hedyphanes* subgenus).

General Adult Morphology. Body: Robust, rarely slender in males. **Head:** Widest across eyes. Lateral margin of head without short emargination between gena and frontoclypeus. Fronto-clypeal depression on dorsal surface weak. Temples behind eyes often completely (Figs. 1, 5, 8) or not completely (Figs. 3, 4, 6, 7) constricted near eyes (dorsally), with complete (Fig. 2) or short (Fig. 4) depression along posterior margin of eyes (laterally) and deep furrow in anterior margin (in ventral view). Antennae usually short, not reaching 1/3 length of elytra. **Thorax:** Pronotum widest after middle (Fig. 10), rarely at middle, only in *C. nitidus* widest before middle (Fig. 9). Pronotal bead thicker at base of lateral margin than elsewhere. Prothoracic hypomera with longitudinal wrinkles. Hind wings absent. **Elytra:** With 8 visible striae and 9 interstriae. Dorsal epipleural carina wide, completely visible dorsally. Epipleura and dorsal epipleural carina reaching suture angles of elytra. **Sexual dimorphism:** Males more slender and often more shiny, almost all with a hair brush on abdominal ventrites 1 and 2, with teeth on inner side of pro-, meso- and sometimes metatibiae (Figs. 11–20, 22), widened pro- and mesotarsi (Figs. 24–27); females more robust, without teeth on tibiae (Figs. 21, 23), tarsi not widened, and often with dull elytra. **Male genitalia:** Aedeagus strongly sclerotized, apical piece without spines, often with longitudinal depression in middle, parameres dorsoventrally flattened (Figs. 28–45), medial piece with acute apex and almost always with merged median lobe baculi (Figs. 28, 36–45). Gastral spicula strongly bent, S-shaped (laterally) with thick rods (Figs. 46–51) or weakly bent, not



Figs. 1–8. *Cylindrinotus* species, head. **1, 2)** *C. gibbicollis*; **3, 4)** *C. erivanus*; **5)** *C. constrictus*; **6)** *C. gibbosus*; **7)** *C. charlesi*, Palandöken Dağları; **8)** *C. charlesi*, Çat.

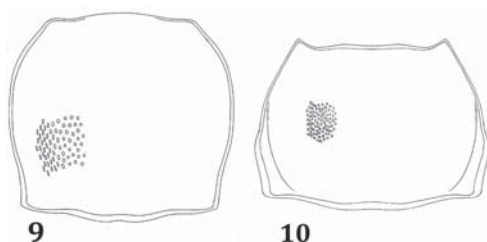
S-shaped and with thin rods (Figs. 52–59). **Female genital tubes:** Spermatheca with or without short basal duct between gland and vagina, with short processes in basal part (Figs. 60–61). Spermathecal gland very long, often 3 times as long as beetle.

***Cylindrinotus femoratus* (Faldermann, 1837)**

(Figs. 11–14, 28, 29, 46, 47, 60, 62, 63)

Helops femoratus Faldermann 1837: 71, tab. I, fig. 1.

Types are probably lost.



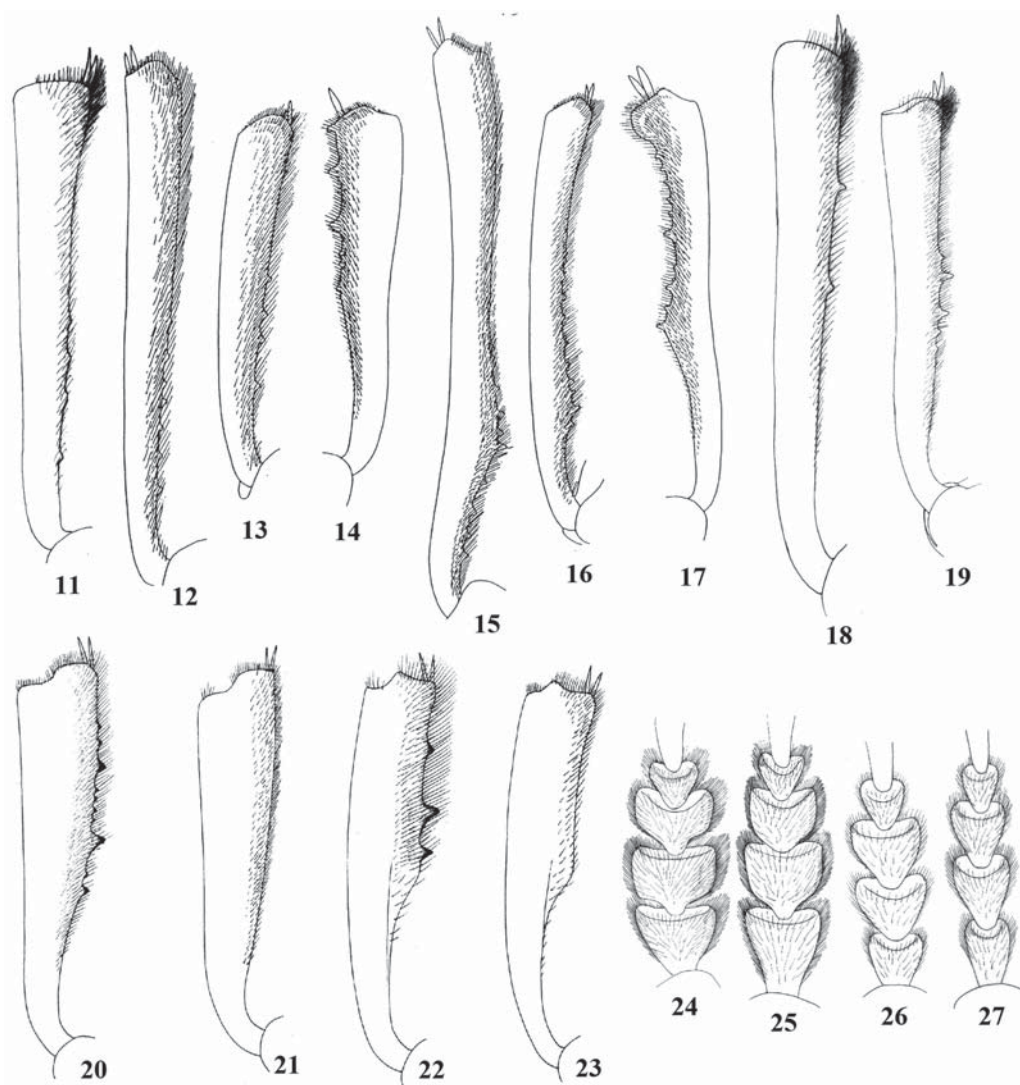
Figs. 9–10. *Cylindrinotus* species, pronotum. **9)** *C. nitidus*, male, lectotype; **10)** *C. gibbosus*, female, holotype.

Cylindrinotus lugubris Faldermann 1837: 74, tab. III, f. 10. Types are probably lost.

Cylindrinotus funestus Faldermann 1837: 76, t. 3, f. 9a, b. Holotype female at MNHP, labeled “*Funestus* Fald. Caucase type//Ex Museo Mniszech//Muséum Paris 1952 coll. R. Oberthür”.

Full bibliography and synonymy are given in Abdurakhmanov and Nabozhenko (2011).

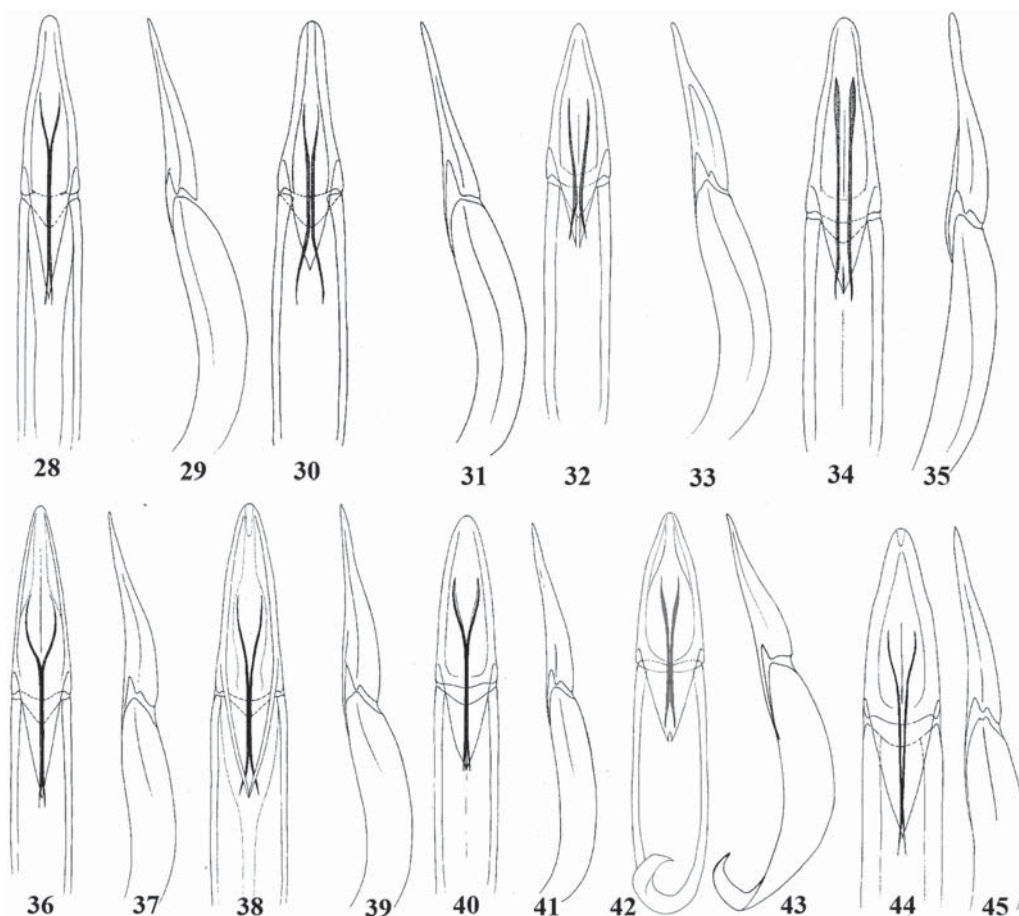
Material Examined. ARMENIA: 5♂♂, 2♀♀: Transcaucasus [Armenia?] (ZIN); 1♀: Caucas. (ZIN); 1♀: Caucasus. Armen. Geb., leg. H. Leder (ZIN); 1♂: Araxesthal (H. Leder); 1♂, 3♀♀ (ZIN): Darachichag [now Tsaghkadzor], leg. Malyushenko; 1♀ (ZIN): Nizhnyaya Akhta [now Hrazdan] leg. Malyushenko (ZIN); 1♂, 1♀: Sukhoy Fontan (Hrazdan District) leg. Malyushenko (ZIN); 1♀: Geran’ railway station (northern coast of Sevan Lake), leg. Malyushenko (ZIN); 6♀♀: Elenovka [now Sevan city], 5–25.v.1902, 3.vi.1902, leg. E.A. Elachich, A.A. Klemantovich (ZIN); 1♀: Chubukhly [now destroyed, north western coast of Seval Lake], 11.vi.1902, leg. E.A. Elachich, A.A. Klemantovich (ZIN); 1♂, 1♀: Dilijan, left bank of Avstafa River,



Figs. 11–27. *Cylindrinotus* species, legs. **11, 12)** *C. femoratus*, male, metatibia; **13, 14)** *C. femoratus*, male, meso- and protibiae, respectively; **15–17)** *C. acutangulus*, male, meta-, meso-, and protibiae, respectively; **18, 19)** *C. gibbosus*, male, meso- and protibiae, respectively; **20, 21)** *C. constrictus*, protibia, male and female, respectively; **22, 23)** *C. erivanus*, protibia, male and female, respectively; **24, 25)** *C. constrictus*, male, pro- and mesotarsi, respectively; **26, 27)** *C. charlesi*, male, pro- and mesotarsi, respectively.

22.vii.1936, leg. A.A. Rikhter (ZIN); 1♂: Jrvzh, 12.vi.1960, leg. G.M. Dlussky (ZIN); 1♀: Sovetashen, 11.v.1986, leg. M. Shestopalov (ZIN); 3♂♂, 1♀: Jermuk, 6.vi.1988, leg. V.Yu. Savitsky (ZIN); 2♂♂, 2♀♀: Syunik Province, Sisian Pass, 18.v.1988, 15.v.1995, leg. M.Yu. Kalashyan (ZIN); 1♂: Gyunashli, 14-15.vi.1988, leg. M.Yu. Kalashyan (ZIN); 1♂: Arayler Mt., 16.v.1990, leg. M.Yu. Kalashyan (ZIN); 1♂: Kotayk Province, 5–6 km N Arzakan, Aghveran gorge, soil traps, 20.v.1990,

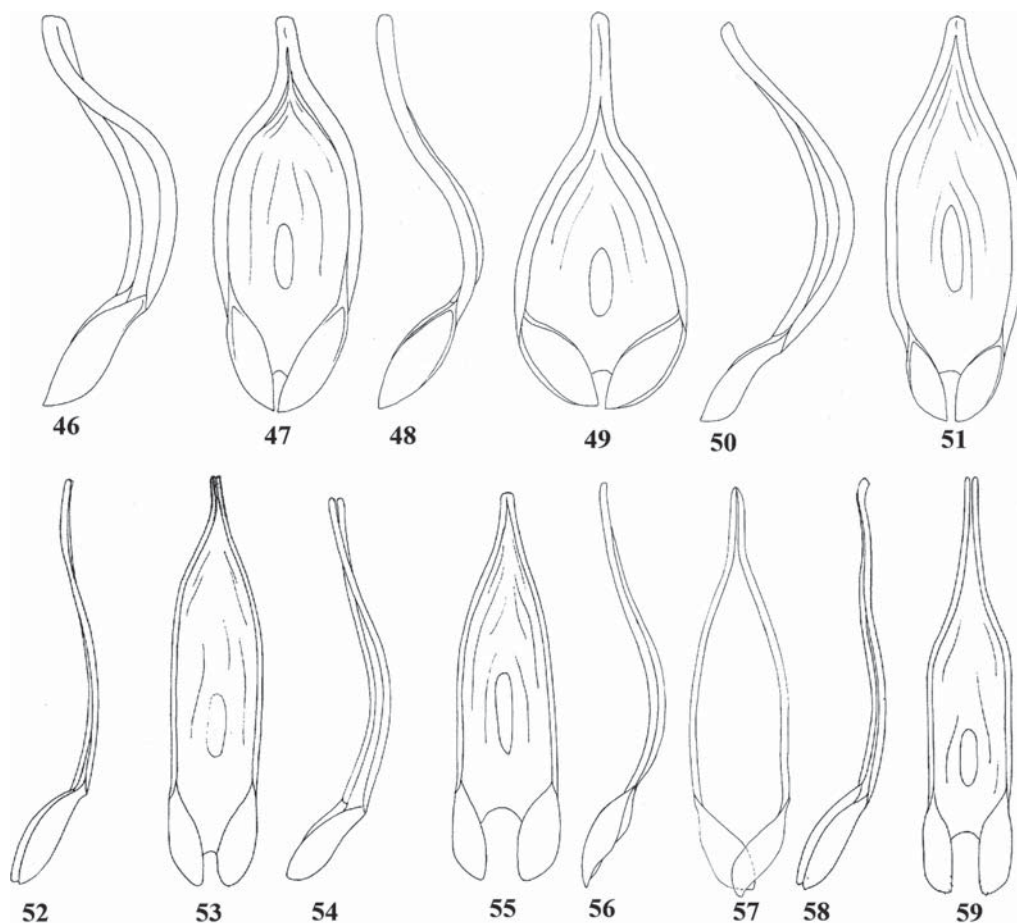
leg. M.Yu. Kalashyan (CK); 1♀: Khosrov State Reserve, 25.vi.1992, leg. M.Yu. Kalashyan (CK). 1♂: Dilijan, 18–21.vi.1993, leg. M.Yu. Kalashyan (ZIN); 2♂♂, 1♀: Syunik Province, Meghri Pass, 2550 m, 6.v.1993, 8.vi.1993, leg. M.Yu. Kalashyan (ZIN); 1♂: Syunik Province, Meghri Distr., Aldara, 25.v.1995, leg. M.Yu. Kalashyan (ZIN); 1♂: Goris District, near Sevlich Lake, 1.vi.1995, leg. M.Yu. Kalashyan (ZIN); 2♂♂: Syunik Province, Sisian Pass, Gorhayk, 2200 m, N 39°44', E 45°44',



Figs. 28–45. *Cylindrinotus* species, aedeagus. 28, 29) *C. femoratus*; 30, 31) *C. acutangulus*; 32, 33) *C. nitidus*; 34, 35) *C. batesi*; 36, 37) *C. gibbicollis*; 38, 39) *C. erivanus*; 40, 41) *C. constrictus*; 42, 43) *C. gibbosus*; 44, 45) *C. charlesi*. Even numbered figures = ventral view; odd numbered figures = lateral view.

15.v.1996, leg. M.Yu. Kalashyan (CK); 1♂: Yeghegnadzor District, Getap, 2.v.1998, leg. M.Yu. Kalashyan (ZIN); 1♂: Tsovagyukh, 1.vi.1997, leg. A.A. Rubenyan (ZIN); 2♂♂: Syunik Province, E of Lichk, 1740 m, N 39°03', E 46°12', 25.iv.1998, leg. M.Yu. Kalashyan (CK); 34♂♂, 25♀♀: Jermuk, 1–7.vi.1999, leg. M.V. Nabozhenko (ZIN); 7♂♂, 5♀♀: Gegharkunik Province, Shorja (eastern coast of Sevan Lake), 20–25.v.1999, leg. M.V. Nabozhenko (ZIN); 1♂, 1♀: Gegharkunik Province, 3 km NE Tsovagyukh, 2240 m, N 40°39', E 44°59', 17.iv.2001, leg. K.E. Agababyan (CK); 1♀: Khosrov State Reserve, Khachadzor area, 12–17.vi.2002, leg. Malkhasyan (CK); 1♀: Tavush Province, Aghartsin monastery, near Teghut, N 40.7878°, E 44.9162°, 12–25.vi.2005, leg. M.Yu. Kalashyan (CK); 1♀: Tavush Province, W env. Berd, N 40.871°, E 45.364°, 1250 m, 4.v.2006, leg.

M.Yu. Kalashyan (CK); 1♀: Tsaghkadzor, N 40°31'51", E 44°43'17", 1800 m, 19.v.2013, leg. M.Yu. Kalashyan (CK); 2♂♂, 1♀: Akhberk environs, N 40°32'56", E 45°17'09", 5.v.2015, leg. A. Rubenyan (CN); 2♀♀: Lermanist Lake, N 40°27'00", E 44°49'10", 5.v.2015, leg. A. Rubenyan (CN); 1♂, 2♀♀: Spandaryan reservoir, Tskuk, N 39°40'06", E 45°52'24", 10.v.2015, leg. A. Rubenyan (CN); 1♀: Noravak environs, N 39°32'15", E 46°07'56", 11.v.2015, leg. A. Rubenyan (CN). **AZERBAIJAN:** 2♂♂, 2♀♀: Lankaran District, Zuvand [now Lerik District], 11.vi.1909, leg. A.N. Kirichenko (ZIN); 1♂: Lankaran District, Sajarady, 11.vi.1909, leg. A.N. Kirichenko (ZIN); 1♀: Lenkoran, leg. E. Khadarin (ZIN); 2♀♀: Talysh, Lerik District, Gosmolyan, 20.05.1980, leg. M.L. Danilevsky (MPSU); 1♂: Nakhchivan Autonomous Republic, Bichanek,



Figs. 46–59. *Cylindrinotus* species, gastral spicula. 46, 47) *C. femoratus*; 48, 49) *C. acutangulus*; 50, 51) *C. batesi*; 52, 53) *C. erivanus*; 54, 55) *C. constrictus*; 56, 57) *C. gibbosus*; 58, 59) *C. charlesi*. Even numbered figures = ventral view; odd numbered figures = lateral view.

4.vi.1982, leg. M.L. Danilevsky (ZIN); 1♀: Nakhchivan Autonomous Republic, Shakhbuz District, Kyukyu Mt., 18.vi.1983, leg. G.E. Davidyan (ZIN); 3♂♂, 1♀: Yardymli District, Kjurekchi, 27–28.v.2008, leg. D.G. Kasatkin (CN); 2♂♂, 1♀: Yardymli District, Uzybashi Mt., 2000–2200 m, 27–28.v.2008, leg. D.G. Kasatkin (CN). **IRAN:** Tabriz, Kendevan and Mazandaran, Gochsar (CN) [see Nabozhenko 2009]; 2♂♂: Azarbaijan-e Sharqi Province, Sefide Khan, 25 km S Tabriz, 7.v.2002, leg. S. Kadlec (NMP).

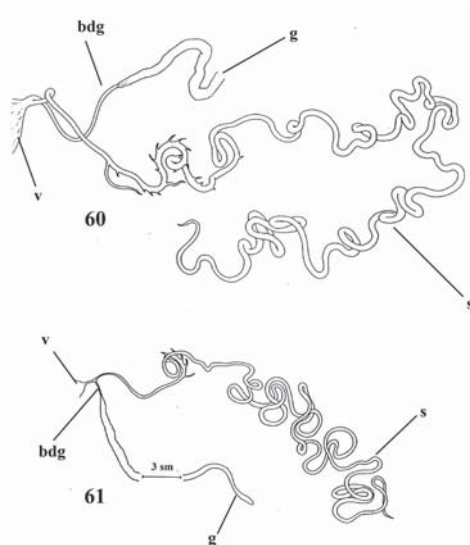
Distribution. Armenia, Azerbaijan (Talysh, Nakhchivan), northern Iran.

Bionomics. The species inhabits xerophytic mountain steppes, but mesophytic small valleys and canyons. *Cylindrinotus femoratus* inhabits sparse oak forests in the northern part of its range (Dilijan, Armenia).

Variability. Specimens from high mountains in southern Armenia and Nakhchivan Autonomous Republic, Azerbaijan (listed as *C. constrictus* by Nabozhenko 2000) differ by a polished pronotum with sparse, fine punctation and lateral pronotal margins not sinuate near the base. Specimens of the typical widespread form have a moderately shiny pronotum that has lateral margins sinuate near the base pronotum and moderately coarse, dense punctation.

***Cylindronotus acutangulus* (Seidlitz, 1896)**
(Figs. 15, 17, 30, 31, 48, 49)

Hedyphanes (*Stenomacidius*) *acutangulus* Seidlitz 1896: 791, 797. Lectotype male at NMW (designated by Nabozhenko 2006a), labeled “Achalzich/Collect. Türk//*acutangulus* det. Seidlitz//*Hedyphanes acutangulus*”.



Figs. 60–61. *Cylindrinotus* species, female genital tubes. **60)** *C. femoratus*; **61)** *C. gibbicollis*. bdg = basal duct of gland; g = gland; s = spermatheca; sm = santimeter (centimeter); V = vagina.

Helops (Cylindronotus) bellator Reitter 1902: 217–218. Lectotype (male) and paralectotype (female) at HNHM, labeled “Caucasus, Borshom, Sievers//*bellator* m.” and curator’s labels “Holotype *Cylindronotus bellator* Reitter, 1901” and “Paratype *Cylindronotus bellator* Reitter, 1901”. Lectotype designated here.

Bibliography, synonymies, and information about types are given in Abdurakhmanov and Nabozhenko (2011).

Material Examined. GEORGIA: 1♀: Caucasus, leg. G.I. Sivers (ZIN); 2♀: Borjom, leg. Vinogradov (GNM).

Distribution. This species is known only from two localities in southern Georgia: Akhaltsikhe and Borjom.

Bionomics. Dzhabazishvili (2000) noted that the species inhabits mountain forests.

***Cylindrinotus nitidus* (Seidlitz, 1896)**

(Figs. 9, 32, 33, 64, 65)

Helops (Cylindrinotus) nitidus Seidlitz 1896: 721. Reitter 1902: 218, 1922: 125. Lectotype (male) and paralectotype (female) at ZSM, labeled: “Syria//*nitidus*//*Cotypus Helops (Cylindrinotus) nitidus* Seidlitz, 1898” (curator’s last label). Lectotype designated here. Other paralectotypes (2♂♂ and 2♀♀) are deposited in NMW.

Material Examined. TURKEY: 1♂, 1♀: Kesalar (env. Erzurum), v.–14.vi.1917, leg. Poltoratsky (ZIN);

1♂, 1♀: Çabani [now Erzurum Province], iv.1917, leg. Poltoratsky (ZIN); 1♀: Ağrı Province, Eleşkirt, 12.iv.1990, under stones, leg. D. Szalóki (HNHM); 1♂: Ağrı Province, Sarıcan, under stones, 12.iv.1990, leg. D. Szalóki (HNHM); 2♂♂, 3♀♀: Ağrı Province, Tahir Mts., N 39°49', E 42°39', 2100, 1.v.1999, leg. Gy. Fabian, L. Nadai, Z. Rahmé, K. Székely (HNHM); 2♂♂, 1♀: Erzurum Province, 43 km N Şenkaya, 1754 m, N 40°25'78, E 42°20'92, 9.vi.2001, leg. M.G. Volkovitsh (ZIN); 1♀: Van Province, Nemrut Lake inv., NW Tatvan, 9.vi.2002, leg. P. Bialooki (CB); 3♂♂, 1♀: Van Province, near Erçek Gölü (southern coast), 2000 m, 23.04.2007, leg. M.V. Nabozhenko (CN); 7♂♂: Muş Province, Buğlan gecidi, N 38°56', E 41°07', 20–23.v.2009, leg. D.G. Kasatkin, I.V. Shokhin (CN); 1♀: Erzurum Province, Köprüköy District, Güzelhisar, N 39°48'02.7", E 42°04'12.6", 2160 m, 24.v.2010, leg. B. Keskin, M.V. and S.V. Nabozhenko (ZDEU).

Distribution. Syria (Seidlitz 1896), eastern Turkey.

Bionomics. This species inhabits upland xerophytic steppe (from 1,700 to 2,200 m) during April–June, when soil humidity is retained.

Note. Ferrer and Soldati (1999) recorded this species from Sertavul Pass (between Karaman and İçel Provinces, Turkey). These authors also placed *C. nitidus* in the subgenus *Odocnemis*. I am sure that it is an erroneous determination because I have collected at this pass only *Odocnemis anatolica* (Pic, 1899).

***Cylindrinotus batesi* Allard, 1876**

(Figs. 34, 35, 50, 51, 66, 67)

Cylindrinotus batesi Allard 1876: 15, 39. Allard 1877: 51, 216; Seidlitz 1896: 721 (note); Reitter 1922: 125 (note). Lectotype male at BMNH, labeled “Kurdistan//*Cylindrinotus batesi*//*Cylindrinotus batesi* type All./F. Bates Coll. 81–19.”. Lectotype is designated here.

Material Examined. TURKEY: 1♂, 2♀♀: Choruh (valley of Çoruh River), 1896, leg. Herz (ZIN); 1♀: Trapezund (now Trabzon), 17.v.1917, leg. W. Eichler (ZIN); 4♂♂: Artvin Province, Hatila River valley, Fıstıklı, 2.v.2007, leg. M.V. Nabozhenko (CN).

Distribution. The species is known only from Artvin and Trabzon Provinces of Turkey.

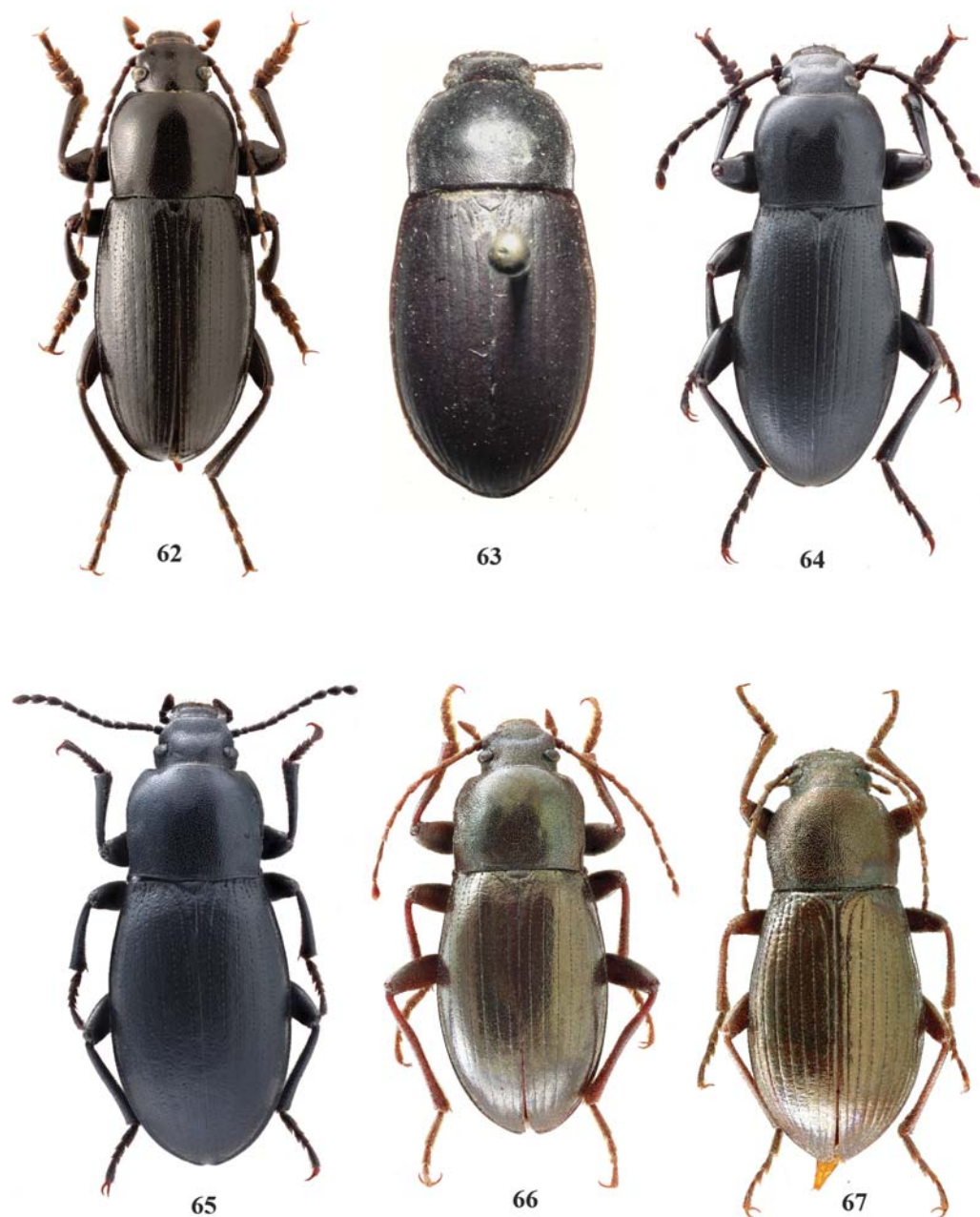
Bionomics. Specimens of *C. batesi* were found in Artvin Province at night (21:00 hrs) on the trunks of *Fagus orientalis* Lipsky (Fagaceae), where they fed on foliose lichens.

***Cylindrinotus gibbicollis* Faldermann, 1837**

(Figs. 1, 2, 36, 37, 61, 68, 69)

Cylindrinotus gibbicollis Faldermann 1837: 78.

Cylindrinotus umbrinus Faldermann 1837: 77.

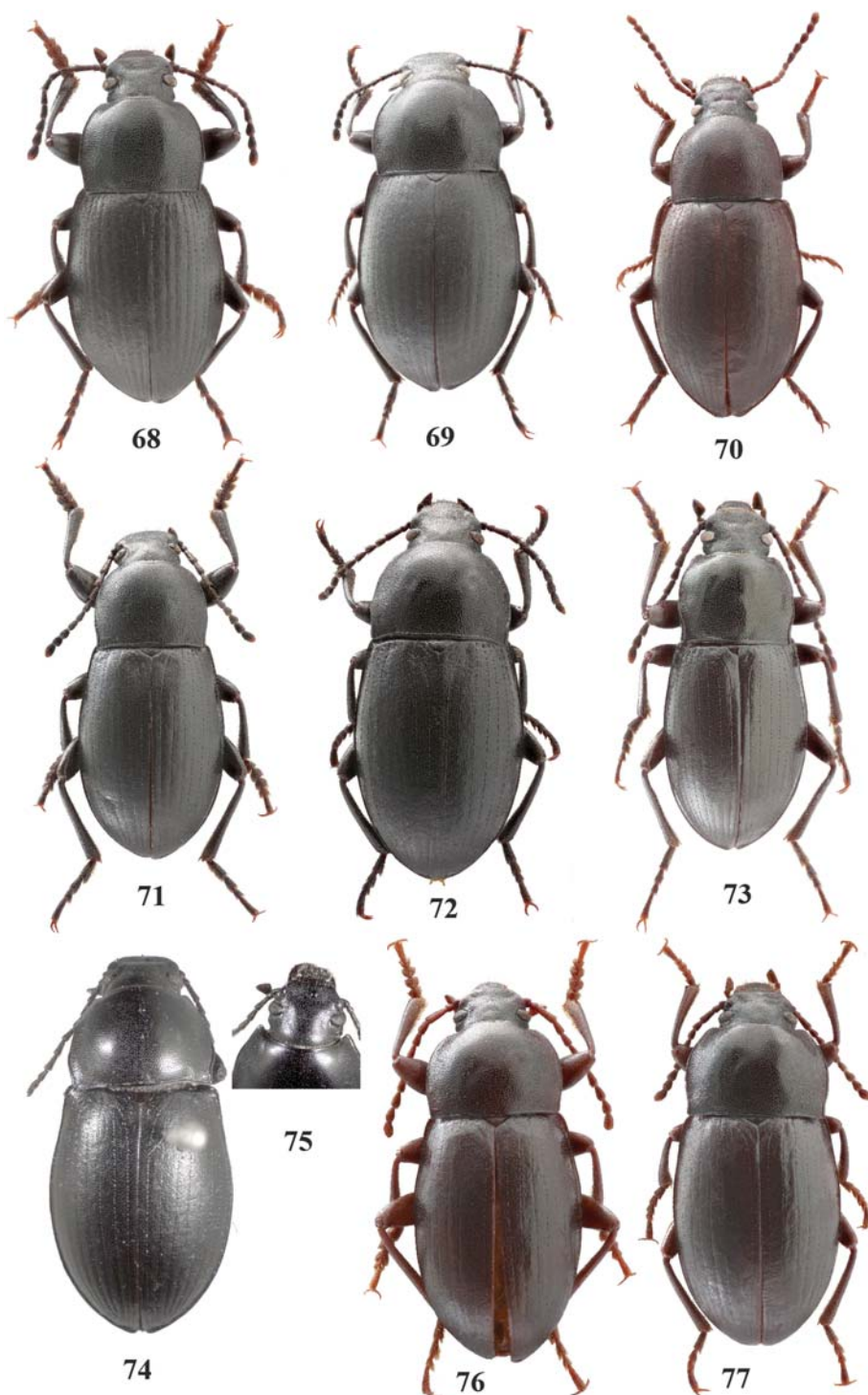


Figs. 62–67. *Cylindrinotus* species, habitus. **62)** *C. femoratus*, male, Armenia (Photograph by M. E. Smirnov from www.zin.ru/Animalia/Coleoptera); **63)** *C. femoratus*, female, holotype of *C. funestus*; **64)** *C. nitidus*, male; **65)** *C. nitidus*, female; **66)** *C. batesi*, male; **67)** *C. batesi*, female.

Cylindrinotus flavipes Allard 1877: 52, 219.
Helops corallipes Reitter 1902: 219.

Bibliography and synonymy are given in Abdurakhmanov and Nabozhenko (2011).

Type Material. Faldermann's types are probably lost. The types of *C. flavipes* are deposited in MNHP. The species was described based on specimens collected by Hans Leder from Tsalka (southern of Georgia, see Material Examined).



Figs. 68–77. *Cylindrinotus* species, habitus. **68)** *C. gibbicollis*, male; **69)** *C. gibbicollis*, female; **70)** *C. erivanus*, female; **71)** *C. constrictus*, male; **72)** *C. constrictus*, female; **73)** *C. gibbosus*, male; **74)** *C. gibbosus*, female, holotype; **75)** *C. gibbosus*, head and anterior part of pronotum; **76)** *C. charlesi*, male, Palandöken Dağları; **77)** *C. charlesi*, female.

I studied *Cylindrinotus* from Tsalka and found that it is only a form of *C. gibbicollis* with reddish legs. Reitter (1902) also described var. *corallipes* from the same locality.

Material Examined. ARMENIA: 2 ♀♀: "Caucasus 1877//*Helops lugubris* Fald., det. J. Frivaldszky" (HNHM); 2 ♀♀: Armenia, leg. E.E. Ballion (ZIN); Dullal Ogly [NW Armenia without clear locality], 13–31.v.1896, leg. A. Kafarov (ZIN); 1 ♀: pass near Alvar [now Shirak Province], 8.v.1896, leg. A. Kafarov, (ZIN); 1 ♂, 2 ♀♀: Armen. Geb., leg. H. Leder (ZIN); 1 ♂: Chubukhly [now destroyed, northwestern coast of Sevan Lake], 11.vi.1902, leg. E.A. Elachich, A.A. Klemantovich (ZIN); 1 ♀: Alagöz [now Aragats Mt.] 29.vii.1935, leg. M. Ter-Minasyan and A. Richter (ZIN); 1 ♂: Kipchakh (SW slope of Aragats), 28.vii.1936, leg. A.A. Richter (ZIN); 1 ♀: Yerevan, 6.v.1939, leg. A.A. Richter (ZIN); 2 ♀♀: Yanykh (Martuni env.), 12–16.vi.1939, leg. G. Avakyan (ZIN); 1 ♂, 1 ♀: Gukasyan, 23.vi.1954, leg. S.M. Iablokoff-Khnozorian (ZIN); 6 ♂♂, 6 ♀♀: same locality, 28–29.vii.1992, 5–8.v.1996, leg. M.Yu. Kalashyan (ZIN); 2 ♂♂, 1 ♀: same locality, 2.vii.1997, leg. A. Amiryanyan (ZIN); 2 ♀♀: Artik District (Shirak Province), Montash canyon, 15.viii.1956, leg. V.A. Richter (ZIN); 1 ♀: Jrvezh, 12.vi.1960, leg. G.M. Dlussky (ZIN); 2 ♂♂, 5 ♀♀: Kazanchi (env. Gukasyan), 12.v.1971, leg. V.I. Tobias (ZIN); 1 ♀: Sevan, vii.1978, 2300 m, leg. R. Rous (SNMS); 1 ♀: Gyunashli, 14–15.vi.1988, leg. M.Yu. Kalashyan (ZIN); 1 ♂, 1 ♀: Tsakhkaovit (eastern slopes of Aragats Mt.), vi–vii.1989, leg. M.Yu. Kalashyan (ZIN); 1 ♂: Martuni env., Madina, 2650 m, 17.vii.1991, leg. M.Yu. Kalashyan (CK); 1 ♀: Lichk (eastern coast of Sevan Lake), 17–19.vii.1991, leg. M.Yu. Kalashyan (ZIN); 1 ♀: Shirak Province, Amasia, 6–8.viii.1991, leg. M.Yu. Kalashyan (ZIN); 1 ♂: NE slope of Aragats Mt., env. Tsaghkaovit, 29.vi.1992, leg. M.Yu. Kalashyan (CK); 64 ♂♂, 37 ♀♀: 15 km S Martuni, 26–31.v.1999, leg. M.V. Nabozhenko (ZIN); 5 ♂♂, 1 ♀: Shirak Province, 5–6 km NNW Ashotsk, 27.vi.1999, leg. K.E. Aghababyan (CK); 6 ♂♂, 9 ♀♀: Lernaovit, N 40°04'04", E 45°16'31", 7.v.2015, leg. A. Rubenyan (CN). **GEORGIA:** 1 ♀: Kojori (S Tbilisi), 6.v.1881, leg. G. Sivers (ZIN); 2 ♀♀: Manglisi (S Tbilisi), 1883, leg. G. Sivers (ZIN); 1 ♀: Borshom, 13.v.1885, leg. coll. J. Daniel (ZSM); 1 ♂, 1 ♀: Javakheti, between Segamo and Tambovka, 29.vi.1909, leg. Berg (ZIN); 2 ♂♂, 1 ♀: Tambovka, 26.vi.1909, leg. Berg (ZIN); 1 ♂, 1 ♀: Adjara, Khaky, 26.vi.1978, leg. V.G. Dolin (ZIN); 2 ♀♀: Kvemo Kartli Region, Tsalka, 20–22.vi.2013, leg. I.V. Shokhin, D.G. Kasatkin (CN). **TURKEY:** 1 ♀: Chambobal, 5.vi.1885, leg. coll. J. Daniel (ZSM); 1 ♂, 2 ♀♀: Giamali (Ardahan env.), 19.v.1912, leg. Mlokosevich (ZIN). 1 ♂: Kars Province, SW

Sarikamış, 1800 m, N 40°23', E 42°42', 24.v.1975, leg. H. and U. Aspöck, H. and R. Rausch, P. Ressler (SNMS); 1 ♀: Erzurum Province, Erzurum, under stones, 13.iv.1990, leg. D. Szalóki (HNHM); 2 specimens: Ardahan Prov., Sakaltutan Geçidi, N 40°54'59.5", E 42°58'30.9", 2210 m, 21.04.2014, leg. M.V. & S.V. Nabozhenko, B. Keskin (ZDEU); 5 ♂♂, 3 ♀♀ (CN), 14 specimens (ZDEU): Ardahan Province, Çıldır Gölü, Gölebakan, N 41°01'54.0", E 43°11'36.1", 2260 m, 21.04.2014, leg. M.V. and S.V. Nabozhenko, B. Keskin.

Distribution. Armenia (excluding southern part of the country), southern Georgia, eastern Turkey.

Bionomics. The species inhabits wet alpine zones in high mountains from 2,000 to 2,700 m. One population is known near Tbilisi (about 700 m).

Cylindrinotus erivanus (Reitter, 1902)

(Figs. 3, 4, 22, 23, 38, 39, 52, 53, 70)

Helops (Cylindrinotus) erivanus Reitter 1902: 219.

Holotype (male) and three paratypes (one male, two females) at HNHM, labeled: "Caucasus, Armen. Geb. Leder, Reitter/Erivan. Coll. Reitter". Holotype has additional handwritten label: "*C. erivanus* m. 1900. Type".

Bibliography is given in Abdurakhmanov and Nabozhenko (2011).

Material Examined. ARMENIA: 1 ♂: Alagös [now Aragats Mt.], vii 1871 (ZSM); 1 ♂, 1 ♀: Byurakan (southern slopes of Aragats Mt.), 5.v.1972, leg. M.S. Gilyarov (ZIN); 1 ♂: Tsakhkadzor, 9.vii.1983, leg. A. Kravets (ZIN); 5 ♂♂, 3 ♀♀: Kotayk Province, Araiiler Mt., 16.v.1990, 28–30.v.1993, 8–20.v.1995, 20.v.1995, 18–19.v.1996, leg. M.Yu. Kalashyan (ZIN, CK); 2 ♀♀: Kotayk Province, S slope of Araiiler Mt., 10–11.05.1997, leg. Karagyan (CK); 2 ♀♀: Kotayk Province, Araiiler Mt. between N 40°23' E44°25' and N 40°24' and E 44°26', 19.v.1994, leg. M.Yu. Kalashyan (CK); 22 ♂♂, 27 ♀♀: Kotayk Province, Hrazdan District, 10 km N Arzakan, 14–19.v.1999, leg. M.V. Nabozhenko (ZIN); 1 ♂, 1 ♀: Kotayk Province, 2–4 km E Hankavan, 5.v.2001, leg. M.Yu. Kalashyan (CK).

Distribution. Central Armenia.

Bionomics. The species inhabits xerophytic montane steppe.

Cylindrinotus constrictus (Seidlitz, 1896)

(Figs. 5, 20, 21, 24, 25, 40, 41, 54, 55, 71, 72)

Helops (Cylindrinotus) Seidlitz 1896: 722, 752; Reitter 1902: 218 (*Helops (Cylindrinotus)*), 1922: 125 (*Cylindrinotus*). Holotype female at HNHM, labeled: "Alp. Sivas coll. Friv./Friv. 8132//*Helops pedinoides* Kind. coll. E. Frivaldszky// Monotypus

Helops (Cylindrinotus) constrictus 1898 Seidlitz" (curator's last label).

Helops (Cylindrinotus) funestoides Reitter in Bodemeyer 1900: 159; Reitter 1902: 219 (*Helops (Cylindrinotus)*), 1922: 126 (*Cylindrinotus*). **New synonymy.** Lectotype male at HHNM, labeled "Holotypus *Cylindrinotus funestoides* Reitter, 1900//Asia Minor, Bulgar-Maaden. v. Bodemeyer". Paratatypes (2 females) at HHNM labeled "Paratypus *Cylindrinotus funestoides* Reitter, 1900//Asia Minor, Bulgar-Maaden. v. Bodemeyer". Lectotype is designated here.

Material Examined. TURKEY: 1♀: Beiburt, leg. Staudinger (ZSM); 2♂♂, 2♀♀: Anatolia, Egribel pass, 2000–2400 m, 28.vii.1963, leg. W. Heinz (ZIN); 1♂, 1♀: Bayburt Province, 15 km S Bayburt, 7.vi.1999, leg. B.A. Korotyayev (ZIN); 5♂♂, 12♀♀: Erzincan Province, Derekorosu, Keshish Mts. (Keşiş Dağı), 7.vi.1989, leg. A. Podlussany (HHNM); 2♀♀: Sivas Province, Kısıldağ, 2190 m, 8.vi.1989, leg. A. Podlussany (HHNM); 1♀: Anatolia bor., Soganlı (Soganlı Geçidi), pass bei Bayburt, 2.viii.1978, leg. W. Heinz (SNMS); 1♀: Anatolia, Bayburt, Soganlı Geçidi, 2300 m, 20.v.1989, leg. Riedel (HHNM); 1♂, 1♀: Erzincan Province, 4 km SE Gemecik, N 39°54'845", E 38°28'761", 4–6.06.2010, leg. D.G. Kasatkin; 2♂♂, ♀2♀ (CN), 5 specimens (ZDEU): Amasya Province, Akdağ, Kocacık Taş, N 40°46'45.4" E 35°55'44.9", 2020 m, 18.04.2014, leg. M.V. and S.V. Nabozhenko, B. Keskin.

Bionomics. The species inhabits wet alpine zones in high mountains (2,000–2,500 m).

Notes. Seidlitz (1896) described this species based on one female from Armenia, but this female was found in Sivas, which was not a part of Armenia in the 19th century.

***Cylindronotus gibbosus* (Seidlitz, 1986)**

(Figs. 6, 10, 18, 19, 42, 43, 56, 57, 73, 74)

Helops (Cylindrinotus) gibbosus Seidlitz 1896: 721; Reitter 1922: 125 (*Cylindronotus*). Holotype female at MNHP, labeled "416//Caucasus//*Helops gibbosus/gibbosus* = *gibbicollis* All."

Material Examined. TURKEY: 1♀: Gümüşane Province, pass N Şiran (northern slope), 1600–2100 m, 28.iii.1973, leg. W. Heinz (SNMS); 1♀: Gümüşane Province, Kankanlı Zigana pass, 1800 m, N 40°40', E 39°15', 23.v. – 18.vi.1975, leg. H. and U. Aspöck, H. and R. Rausch, P. Ressler (HHNM); 2♂♂: Trabzon Province, Maçka District, near Sumela Manastırı, 18–20.iv.2009, leg. M.V. and S.V. Nabozhenko (CN).

Redescription. Male. Body black, shiny, slender. Body length 10.2 mm, width 4.2 mm. **Head:**

Widest across eyes. Eyes weakly convex. Head width 1.6 times width of interocular space. Genae weakly rounded at base and straight to frontoclypeus. Outer margin of head between gena and frontoclypeus without sinuation. Frontoclypeal suture very weakly depressed. Temples behind eyes not constricted, regularly rounded. Punctuation of head moderately dense, coarse (puncture diameter 2 times as long as distance between them); punctuation of frons finer. Antennae moderately long, with 3 apical antennomeres extending beyond base of pronotum.

Pronotum: Transverse, widest after middle, narrowed from base to anterior level, 1.5 times as wide as long, 1.7 times as wide as head. Lateral margins weakly rounded, sinuate in middle and near base. Anterior margin widely emarginated; base bisinuate. Anterior angles strongly protruding, acute apically; posterior angles straight. All margins beaded, lateral margins with thicker bead posteriorly. Disc moderately convex, lateral sides visibly flattened in basal half. Punctuation of disc moderately coarse and not dense in middle (distance between punctures 2 times as long as diameter of punctures), coarse and dense on sides (puncture diameter 2 times distance between punctures). Outer sides of prothoracic hypomera flattened in basal half, with fine, irregular wrinkles near outer margins and longitudinal, coarse wrinkles over rest surface, with distinct punctures between wrinkles. **Elytra:** Elongate, oval, 1.5 times as long as wide, 1.2 times as wide and 2.8 times as long as pronotum, 2 times as wide as head. Strial punctures not merged at middle but merged in furrows apically. Punctuation of interstriae fine and sparse, distinct. **Venter:** Prosternal process weakly convex, without cone-shaped tooth apically. Mesepimera and metepisterna with coarse, sparse punctuation, metaventricle with fine, sparse punctuation. Abdominal ventrites with finer punctuation and wrinkles laterally; ventrite 5 not beaded apically; ventrite 1 with small hair brush in middle, ventrite 2 with smaller hair brush. Protrochanters with 3 long setae, meso- and metatrochanters with 1 long and several short setae. **Legs:** Protibia with 5–7 teeth, mesotibiae with 3 small teeth. Protarsus weakly widened, mesotarsus not widened.

Female (Holotype). Body black, robust, head and pronotum shiny, elytra dull. Body length 11 mm, width 5 mm. Head width 1.4 times width of interocular space. Antennae short, with 2 apical antennomeres extending beyond base of pronotum. Pronotum 1.8 times as wide as head. Ratio of pronotal width at base, greatest width, and width at anterior margin 8.0: 8.3: 5.1, respectively. Elytra convex, widest at middle, 1.3 times as wide as pronotum. Strial punctures in fine dotted lines. Interstriae with very fine, sparse punctuation and microwrinkles. Epipleura weakly depressed. Abdominal ventrites without hair brush, with

moderately dense, fine punctation and fine, longitudinal wrinkles on sides.

Distribution. Northeastern Turkey.

Bionomics. Males from Sumela were found in a wet meadow under stone.

Notes. Seidlitz (1896) considered *C. gibbicollis sensu* Allard (1876, 1877) as his species *C. gibbosus*, but he did not include Allard's material in the type series. I do not support this opinion before studying Allard's non-type material.

Cylindrinotus tchorokhicus Nabozhenko, 2011

Cylindrinotus tchorokhicus Nabozhenko 2011: 336.

Figures and information about the types are given in Nabozhenko (2011).

Distribution. Southeastern Turkey.

Bionomics. This species is known only from alpine zones in Artvin Province.

Cylindrinotus charlesi Nabozhenko, new species

(Figs. 7, 26, 27, 44, 45, 58, 59, 76, 77)

Type Material. Holotype male at ZIN and paratypes 1 male and 7 females (CN, ZIN), 10 paratypes (ZDEU): "Erzurum Province, Palandöken Dağları, N 39°50'05", E 41°16'36", 2550 m, 23.05.2010, leg. M.V. and S.V. Nabozhenko, B. Keskin". Other paratypes: 1♂ with labels: "Paşaki, distr. Erzurum, 4.vii.1916, Mus. Caucas. 104-16, Vinokurov", golden circle, "*Helops (Cylindronotus pseudoconstrictus)*" [handwritten label of A.V. Bogachev] (ZM MSU). 1♂: Erzurum Province, Çat, 2400 m, 6.v.1998, leg. Bajdak (SNMS); 3♂♂, 5♀♀: Erzurum Province, S slope of Kop pass, 2300 m, aspenrove, under *Hesperis bicuspidata*, 15.VI.2003, leg. B.A. Korotyayev (ZIN); 1♂: Erzurum Province, 15 km N Aşkale, 2400 m., 7.vi.1999, leg. B.A. Korotyayev (ZIN); 3♂♂, 1♀: env. Sarikamysh (now Kars Province, Sarikamiş), 15.v.1914, leg. Poltoratsky (ZIN); 3♂♂ with label in Russian: "Ериванская губерния, Зорское ущелье, Малюшенко" [now probably eastern Turkey, "Zorskoe sanyon" is not a clear locality because "dzor" is "canyon" in Armenian] (ZIN); 1♀: Anatolia or., Kop-dağ pass, 2200–2500 m, 29.vii.1973, leg. W. Heinz (ZIN).

Description. Male. Body: Robust, dark brown, weakly shiny, pronotum shinier than elytra, legs and antennae light brown. Body length 8.5–10.0 mm. **Head:** Widest across eyes. Eyes widely separated, weakly convex. Head width 1.4 times width of interocular space. Anterior margin of frontoclypeus weakly bisinuate. Outer margin of head between gena and frontoclypeus with very weak situation. Genae rounded, dorsally with fine basal setation. Temples weakly rounded dorsally, not depressed

near eyes. Fronto-clypeal depression weak. Punctation of head moderately coarse and sparse (puncture diameter less than distance between punctures). Antennae short, with only 1 apical antennomere extending beyond base of pronotum. Length/width ratio of antennomeres 2–11: 1.00, 2.50, 2.00, 1.80, 1.80, 1.85, 1.80, 1.50, 1.50, 1.30. Antennomere 3 2.5 times as long as antennomere 2 and 1.3 times as long as antennomere 4. **Pronotum:** Weakly transverse (1.12 times as wide as long), widest at middle. Lateral margins weakly rounded, rarely weakly sinuate near base; anterior margin weakly widely emarginate; base almost straight. Anterior angles obtuse, narrowly rounded apically; posterior angles weakly obtuse or straight, distinct. All margins beaded; lateral margins with thicker bead near base; anterior margin with interrupted bead at middle. Disc regularly convex, with flattened sides, rarely only flattened near base. Punctation of disc moderately coarse, sparser at middle (puncture diameter less than distance between them) and denser on sides (puncture diameter subequal or more than distance between them). Outer margins of hypomera narrowly flattened, with longitudinal wrinkles. **Elytra:** Elongate, oval, convex. Strial punctures elongate, fine, not merged in entire furrows. Interstriae flat, with sparse, fine punctation. Epipleura with smooth, transverse wrinkles. Epipleural carina completely visible dorsally. **Venter:** Mesoventrite and metepisterna with coarse, dense punctation. Metaventricle with short, recumbent setation medially. Abdominal ventrites finely punctate, with longitudinal, dense, fine wrinkles. Ventrites 1 and 2 with dense hair brush medially, ventrite 3 with small brush without distinct borders. Ventrite 5 not beaded apically. **Legs:** Protibia straight, evenly broad to apex, without deep emargination at base. Inner side of protibia with 3–4 large and some small teeth. Mesotibia weakly bent, with 2–3 teeth on inner side. Metatibia straight, without teeth. Protarsus strongly widened, protarsomeres 1–3 transverse; mesotibia weakly widened with longitudinal mesotarsomeres 1–3. Pro- and mesotarsomeres with dense brush of golden setae.

Female. Body more robust. Antennae shorter. Hair brushes on abdominal ventrites absent. Tibiae without teeth. Tarsi not widened.

Etymology. This species is named in honor of the famous entomologist Charles A. Triplehorn, who has made important contributions to our knowledge of darkling beetles.

Diagnosis. *Cylindrinotus charlesi* is similar to *C. tchorokhicus*, which also has flattened (but widely flattened) lateral pronotal margins. It differs, however, by not having merged strial punctures, pronotum widest at middle (*C. tchorokhicus* is widest after middle) and form of male apical piece. It differs from *C. constrictus* by the regularly

rounded, non-constricted temples behind the eyes, brown body, and form of male apical piece.

Bionomics. The species inhabits alpine zone from 2,000 to 2,600 m, where it occurs in meadows under stones.

KEY TO THE SPECIES OF ADULT *CYLINDRINOTUS* FALDERMANN, 1837

1. Body bronze, with a metallic greenish shade *C. batesi*
- 1'. Body black or brown, without metallic shade 2
2. Anterior angles of pronotum protruding, acute. Prothoracic hypomera with longitudinal wrinkles and distinct punctation *C. gibbosus*
- 2'. Anterior angles of pronotum not protruding, right or obtuse, not acute apically. Prothoracic hypomera with wrinkles, without punctation 3
3. Inner side of male and female protibiae with deep emargination at base, parallel-sided in apical 2/3 4
- 3'. Tibiae regularly broadened to apex, without deep emargination in base 5
4. Temples behind eyes completely constricted (in dorsal view). Anterior part of temples depressed entire length (in lateral view). Anterior margin of pronotum distinctly beaded. Elytral interstriae with dense coriaceous microsculpture and poorly visible punctation, elytra dull *C. gibbicollis*
- 4'. Temples behind eyes not completely constricted, dorsally rounded. Anterior part of temples depressed only near lower half of eyes. Anterior margin of pronotum often interrupted at middle bead. Elytral interstriae with poorly visible coriaceous microsculpture and distinct punctation; elytra moderately shiny *C. erivanus*
5. Body large, males slender and completely more or less shiny. Females with matte or dull elytra. Male gastral spicula strongly S-shaped (in lateral view), with thickened rods. Temples not constricted 6
- 5'. Body not large, males and females robust. Males and females with equal shine. Male gastral spicula weakly bent (in lateral view) and with thin rods. Temples completely or not completely constricted 8
6. Pronotum widest at or before middle. Punctuation of pronotal disc weakly but clearly elongate on sides *C. nitidus*
- 6'. Pronotum nearly trapezoidal, widest after middle. Punctuation of pronotal disc not elongate on sides 7
7. Male protibia strongly bisinuate, meso- and metatibiae with thickening in basal third. Lateral margins of pronotum very weakly rounded, almost straight. Ratio of pronotal basal width to anterior width in females 1.3 *C. acutangulus*
- 7'. Male protibia straight or slightly bisinuate on inner side; meso- and metatibiae without thickening in basal third. Lateral margins of pronotum completely weakly rounded. Ratio of pronotal basal width to anterior width in females 1.4–1.5 *C. femoratus*
8. Temples completely constricted, head width after eyes less than at level of posterior margin (in dorsal view) *C. constrictus*
- 8'. Temples not completely constricted, with depression in lower half, dorsally regularly rounded, with subequal head width after eyes and on level of posterior margin (in dorsal view) 9
9. Disc of pronotum widely flattened laterally. Bead thickened entire lateral margins. Elytral striae punctures connected with fine furrows. Body black *C. tchorokhicus*
- 9'. Disc of pronotum narrowly flattened laterally or flattened only in basal third. Bead thickened only near base and narrow on other marginal perimeter. Elytral striae punctures not connected with furrows. Body brown *C. charlesi*, new species

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