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Which species of the genus *Scaurus* Fabricius (Coleoptera: Tenebrionidae) occurs in the Caucasus and the border areas of Anatolia?

Maxim Nabozhenko[a,b,*], Yakov Kovalenko[c] and Mark Kalashian[d]

[a]*Caspian Institute of Biological Resources of the Dagestan Scientific Centre of the Russian Academy of Sciences, Makhachkala, Russia;* [b]*Dagestan State University, Makhachkala, Russia;* [c]*Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences, Moscow, Russia;* [d]*Scientific Centre of Zoology and Hydroecology of the National Academy of Sciences of Armenia, Yerevan, Armenia*

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A redescription of the male of *Scaurus araxinus* Richter, 1945 is given and the female is described for the first time. The species occurs in Azerbaijan (Nakhichevan Republic), Armenia (Tigranashen and Yeghegnadzor) and Eastern Turkey (first record in Iğdır province). It had been regarded as conspecific with *S. syriacus* Reitter, 1914 and *S. puncticollis* Solier, 1838 but clearly differs from both these species and is close to *S. rugicollis* Reitter, 1914 from the Mediterranean region. The female genital tubes of *S. araxinus* are figured, the first such illustration for the tribe Scaurini. The genus *Scaurus* has a small secondary bursa copulatrix, separated glandular, moderately short, spermatheca and a relatively short accessory gland, similar to those found in some genera of the tribe Helopini.

Keywords: Transcaucasia; Turkey; morphology; distribution

Introduction

The genus *Scaurus* Fabricius, 1775 (Tenebrioninae: Scaurini) comprises 45 species and 5 subspecies distributed in Northern Africa (including Sudan), the European Western Mediterranean, the Middle East, and Transcaucasia (Löbl et al. 2008; Ferrer, Castilla, Hawez, Abdulla, & Al-Hemaidi, 2014; Abdurakhmanov, Nabozhenko, Abdurakhmanov, Ivanushenko, & Daudova, 2016). It belongs to the small tribe Scaurini (subfamily Tenebrioninae) with two Palaearctic (*Scaurus* and *Cephalostenus* Solier, 1838) and two Afrotropical (*Carchares* Pascoe, 1887 and *Herpiscius* Solier, 1838) genera (Schulze, 1983). The New World genera, previously included in the tribe Scaurini, were transferred to the tribes Cerenopini and Eulabini (Berry, 1973), which is also supported by larval characters (Schulze, 1983). A first full revision of the genus *Scaurus* was made by Reitter (1914). Labrique, who contributed greatly to the knowledge of the Scaurini, again revised the genus (Labrique, 1995a, 1995b, 1999, 2002, 2007), and Ferrer et al. (2004) provided an almost complete bibliography on this genus and discussed the Middle East species. In light of new material from Azerbeijan, Armenia, and Turkey, we reassess the taxonomic position of the little known and disputable *Scaurus araxinus* Richter, 1945.

*Corresponding author. Email: nalassus@mail.ru

The *Scaurus puncticollis* species group

The *Scaurus puncticollis* Solier, 1838 species group was first mentioned by Koch (1935), who interpreted *S. rugicollis* Reitter, 1914, *S. macricollis* Allard, 1882, *S. syriacus* Reitter, 1914 as subspecies of *S. puncticollis*. Peyerimhoff (1946) described an additional subspecies, *S. puncticollis getula* Peyerimhoff, 1946, but later he proposed to consider all these taxa as "aberrations" of *S. puncticollis* (Peyerimhoff, 1948). Lillig (1995) described a further species in the *puncticollis* species-group, *S. pevelingi* Lillig, 1995. Labrique (1999) transferred this taxon as a subspecies of *S. getula*: *S. getula pevelingi* and noted that *S. puncticollis sensu lato* and *S. getula pevelingi* are closely related. This opinion, published in Labrique's (1999) doctoral thesis, has not been taken into account by subsequent authors. The combination *S. puncticollis getula* was used in Löbl et al. (2008).

The *S. puncticollis* species group was partly revised for the Middle East by Ferrer et al. (2014), who studied the type material of several taxa and analysed additional taxonomic characters such as ovipositor and female ventral spicula. As a result almost all subspecies of *Scaurus puncticollis* were elevated to species level: *S. macricollis*, *S. rugicollis*, *S. syriacus* and *S. dlabolai* Kaszab, 1959. They also described two new species, *S. nielseni* Ferrer, Castilla, Hawez, Abdulla et Al-Hemaidi, 2014 from Turkey and *S. qataricus* Ferrer, 2014 from Qatar.

Within these seven species only one taxon was not discussed: *Scaurus araxinus* Richter, 1945. This species was described from Julfa (Nakhichevan, Azerbaijan) and formally (without any differential characters) compared with *S. macricollis* (Richter, 1945). Later this species was listed only by Iablokoff-Khnzorian (1961), Löbl et al. (2008) and Abdurakhmanov & Nabozhenko (2011). Ferrer et al. (2014) interpreted this species as *S. syriacus* Reitter, 1914 without any arguments and formal synonymisation. Mas-Peinado, Ruiz, García-París, Castilla, Valdeón, and Saifelnasr (2013) listed *S. puncticollis* for Armenia referring to Richter (1945).

We studied the holotype of *S. araxinus* and additional material from Southern Armenia and Eastern Anatolia and discovered that it is clearly distinct from all other Middle East species in several male and female characters, and is likely to be more closely related to the Mediterranean species *S. rugicollis* Reitter, 1914. This contribution continues our study of Caucasian Tenebrionidae after the publication of the key and catalogue of this territory and Anatolia (Abdurakhmanov & Nabozhenko 2011; Abdurakhmanov et al., 2016).

Abbreviations

This study is based on material deposited in the following collections:

IZAY Institute of Zoology, Scientific Centre of Zoology and Hydroecology of the National Academy of Sciences of Armenia, Yerevan
MKCY Collection of Mark Kalashian (Yerevan, Armenia)
ZIN Zoological Institute of Russian Academy of Sciences, St. Petersburg

***Scaurus araxinus* A. Richter, 1945** (Figures 1–3)

Type material. Holotype, ♂ (IZAY) with labels: vall. Araxis/ Djulfa vic. (p)/ 20 (h).V. …23 (p)// Mus. Armen./ Exped. Arax./ 1923 (p) // Scaurus araxinus sp. n. / type Richter (h, Richters's hand) // Scaurus/ araxinus/ Richt. (h, Iablokoff-Khnzorian's hand) [in original description referred to A.B. Schelkovnikov as collector]. – Other material. 1♂ (MKCY): [Armenia, Ararat Prov.] Urts [Mount ridge] Kyarki [now Tigranashen] / 1100 [m], Gorge/ A[rmenian] SSR. 28.5.58 [Khnzorian leg.]. – 1♀ (ZIN): Armenia, Vayots Dzor Province, near Yeghegnadzor, N39°47'40.91", E45°18'29.17", h ~ 1180 m, mountain steppe slope, 25.VI.2016, leg. Ya. N. Kovalenko. – 1 specimen (IZAY): [Turkey] Igdir, Dobrowljansky / *Scaurus barbarus* (without head and prothorax).

Figure 1. *Scaurus araxinus*, habitus: A, male (holotype) dorsally; B, male (holotype) ventrally; C, labels of the holotype; D, female, dorsally; E, female (ventrally). Arrow shows lower femoral tooth, directed distally.

Description of female. Body large (21 mm long, 8 mm wide), dull. *Head*: Widest at temple level, where head is 1.05 times wider than at eye level. Head width 1.55 times width of interocular space. Temples strongly convex and distinctly separated from other surface of head. Eyes weakly convex, strongly transverse and oblique dorsally. Anterior

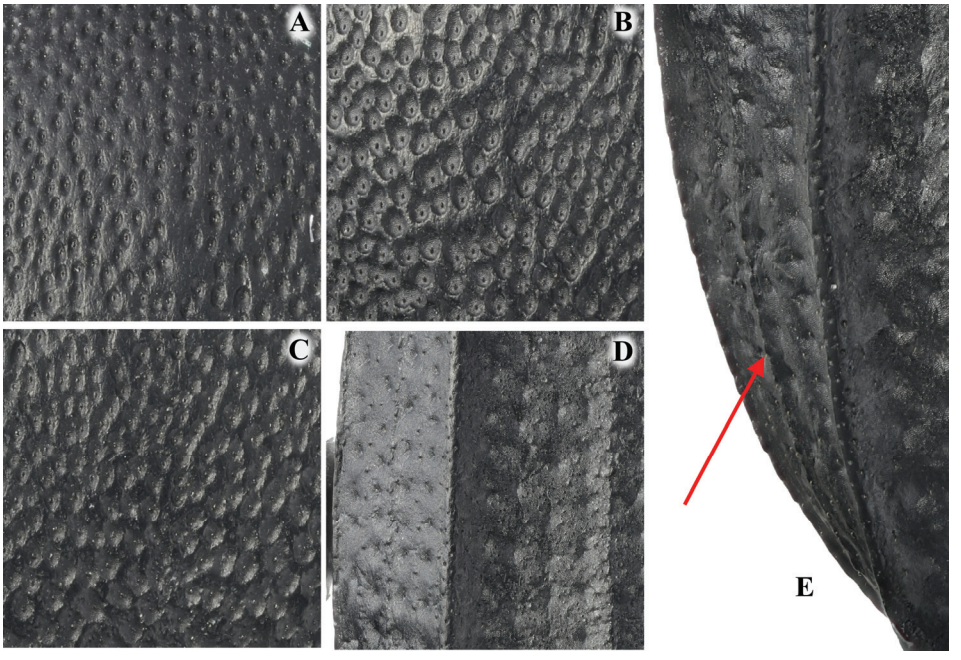

Figure 2. *Scaurus araxinus*, details of the structure: A, punctation of pronotum, anterior third; B, the same, lateral sides; C, the same, basal half; D, sclupture of elytra; E, lateral side of elytra near the apex. Arrow shows additional short rib between marginal and lateral ribs of elytra.

margin of head weakly bisinuate. Anterior third of head with smooth sparse punctation, punctures without granules. Frons with not deep wide dense elongate foveae at middle and dense finer foveae basally; all foveae with granules. Vertex distinctly separated from gular area, with coarse and dense round granuleted foveae. Gular area with dense fine transverse punctures, gula without punctation laterally and with very fine smooth punctures at middle. Mentum strongly transverse, trapezoidal, weakly depressed on sides. – *Pronotum*: Transverse (1.2 times as wide as long), widest at middle. Lateral margins of pronotum strongly rounded from anterior part to basal third and straight in basal third. Anterior margin weakly bisinuate, with projected middle. Base widely emarginate at middle. Anterior angles widely rounded almost not expressed. Posterior angles obtuse, rounded apically. Anterior margin and base distinctly beaded, lateral margins not beaded. Disc of pronotum with two weak oblique impressions at middle and smooth depressed area along basal bead. Punctation of pronotum irregular: with small and sparse oval punctures in anterior quarter (puncture diameter subequal to distance between them); middle with small dense elongate foveae (fovea diameter 3–4 times as long as distance between them); sides and basal quarter with very dense and coarse large connected fovea. Each fovea with radial microsculpture and one small granule at middle. Prosternum with granulation before procoxae. Prothoracic hypomera with coarse and large dense granules. Prosternal process widened between procoxae and at apex, beaded and with longitudinal depression at middle. – *Elytra*: Oval (1.3 times as long as wide) with small humeral angles in base, 1.27 times as wide and 1.9 times as long as pronotum, 2.2 times as wide as head. Elytra with sutural rib in apical third. Each elytron also with full marginal and lateral rib and not full medial rib reching elytral

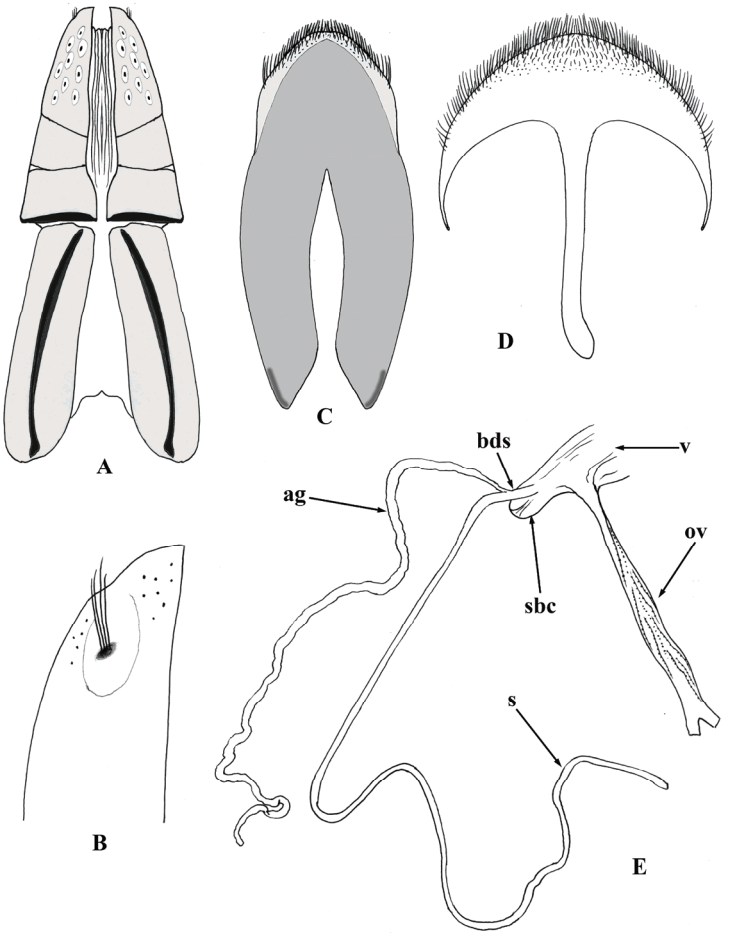

Figure 3. *Scaurus araxinus*, details of female genitalia and terminalia: A, ovipositor, ventrally; B, apical lobe of ovipositor, dorsally; C, proctiger; D, ventral spicula; E, genital tubes: v - vagina, ov - oviduct, bds - basal duct of spermatheca, sbc – secondary bursa copulatrix, s – spermatheca, ag – accessory gland of spermatheca.

basal third; apical part of each elytron with small and short rib between marginal and lateral ribs. Lateral ribs not reaching apex of elytra. Marginal and lateral ribs weakly serrate apically. Strial punctures moderately deep, smooth. Interstriae with sparse microgranules. – *Mesoventrite*: With very dense and fine granulation in anterior half and large foveae in intercoxal area. Mesepisterna with dense and fine punctation in apical half and large and dense foveae in basal half. Metaventrite strongly transverse (4.1 times as wide as long), with small impression and coarse punctation at middle and with coarse longitudinal wrinkles on sides; intercoxal process of metaventrite broadly beaded, narrowly than intercoxal process of mesoventrite. Metepisterna with coarse foveae. Metepimera small, convex. Abdominal ventrites 1–4 widely beaded, with coarse and dense punctation (puncture diameter 2–4 times longer that interpuncture distance); abdominal ventrite 5 not beaded, with finer and sparse punctation (puncture diameter 2 times as short as interpuncture distance). – *Legs:* Profemora with strong acute tooth on

dorsal inner side and weakly elevated (at apex) ventral inner side. Meso- and metafemora curved. Pro- and mesotibiae weakly bent, metatibiae straight. – *Genitalia:* Ovipositor fossorial, with four lobes of coxite, wide sclerotized and flattened apical lobes. Each apical lobe shortly sinuated near apex, without styli but with four long setae in each "stylus" foveae. Paraproct longitudinal, oblique, with wide baculi ventrally. Proctiger without baculi, but with more sclerotized lateral margins basally. Spermatheca unbranched, grandular, with short basal duct (i. e. duct between vagina and connection of accessory gland and spermatheca). Vagina with small secondary bursa copulatrix. Gland shorter than spermatheca.

Description of male. By contrast to Richter's (1945) description, the holotype does not have marginally beaded pronotum (not completely beaded), elytra widest at the middle (not after the middle).

Distribution: Southern Armenia, Azerbaijan (Nakhichevan), Turkey (Iğdır). First record for Turkey.

Discussion

The description of the male of *S. araxinus* by Richter (1945) does not match in all details with the holotype. The female is described here for the first time.

Ferrer et al. (2014) separated *Scaurus nielseni* and *S. rugicollis* from the other Middle Eastern members of the genus based on the structure of the pronotal punctation. Both species have open basally U-shaped pronotal foveae, each with a single central micro-granule. *Scaurus araxinus* also belongs to this species group and differs from both species in the structure of pronotal punctation (fovaea close, not U-shaped, round on sides, not strigose in *S. araxinus*) and sinuated margins of apical lobes of ovipositor. In addition, *S. araxinus* differs from all Middle Eastern species in the distally directed rectangular tooth on the lower inner side of the profemora.

The structure of female genitalia of *Scaurus* was partly discussed by Ferrer et al. (2014), who compared the ovipositors (lobes of coxite) of five species and figured the ventral spicula for two species. The *Scaurus* ovipositor is similar to those found in members of the genus *Blaps* Fabricius, 1775, which also have fossorial often flattened apical lobes with reduced styli (Medvedev, 2001; Chigray & Nabozhenko, 2016; Chigray, Abdurakhmanov, Nabozhenko, & Shapovalov, 2016). Species of *Scaurus*, in contrast to *Blaps*, have long setae in the stylus area (all species of *Blaps* have only one very short seta near the base of apical lobe).

The genital tubes of Scaurini have not been studied in detail to date. Tschinkel and Doyen (1980) wrote that "the spermatecae in several American Scaurini are extremely thin tubules" (*Apsena* LeConte, 1862 and *Argoporis* Horn, 1870). They also figured female genital tubes for one species of the genus *Apsena*. However these authors did not take into account the work of Berry (1973), where *Apsena* was transferred to the tribe Eulabini, and *Argoporis* to the tribe Cerenopini. The Scaurini (at least *S. araxinus*) has unusual genital tubes with a small secondary bursa copulatrix, separated spermatheca (with the basal duct) and a short accessory gland. A secondary bursa copulatrix is also known to occur within genera of the diaperine lineage of Tenebrionidae, but these genera have the basal spermatheca with an apically connected accessory gland. Most Tenebrioninae and some Stenochiinae have a single bursa-derived spermatheca and a separate accessory gland (Tschinkel & Doyen, 1980, fig. 17). The secondary bursa copulatrix, along with the separate spermatheca and accessory gland are also present in the genus *Xanthohelops* Nabozhenko, 2006 (subfamily Tenebrioninae, tribe Helopini)

(Nabozhenko, 2006); however, that genus does not have the basal spermathecal duct (i.e., both the spermatheca and the accessory gland flow into the vagina separately). In both cases, the bursa copulatrix is probably the compensatory mechanism with short and extremely thin spermatheca tubules and should be used with caution in considerations of the higher taxonomy of Tenebrionidae.

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No potential conflict of interest was reported by the authors.

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