

Taxonomic Notes on *Smicronyx* Schoenherr, 1843 (Coleoptera: Curculionidae) from Turkey¹

Mahmut Erbey³ and Halil Bolu²

Dicle University, Faculty of Agriculture, Department of Plant Protection, 21280 Diyarbakır, Turkey

J. Entomol. Sci. 56(2): 210–216 (April 2021)

Abstract Four species of the genus *Smicronyx* Schoenherr (Coleoptera: Curculionidae) were examined in this study with *Smicronyx albosquamosus* Wollaston, *S. coecus* Reich, and *S. syriacus* Faust reported for the first time in Turkey. Given that *S. jungermanniae* Wollaston, *S. reichii* (Gyllenhal), *S. sordidus* LeConte, and *S. fulvus* LeConte were previously reported from Turkey, there are now seven species of *Smicronyx* in the insect fauna of Turkey. Specimens of *S. albosquamosus*, *S. coecus*, *S. syriacus*, and *S. jungermanniae* were collected from almond trees, *Amygdalus communis* L., in Eastern Southern Anatolia Region of Turkey and subjected to taxonomic study using primarily genitalia and reproductive structures to provide descriptions of these species with comparisons with previous studies.

Key Words Curculionidae, *Smicronyx*, aedeagus, new records, Turkey

Smicronyx Schoenherr is a genus of weevils (Coleoptera: Curculionidae) that is distributed worldwide. In the Palearctic region, 48 species are currently recognized and grouped into three subgenera, namely, *Chalybodontus* Desbrochers des Loges (five species), *Pseudomicronyx* Dietz (one species), and *Smicronyx* (42 species). Palearctic species of *Smicronyx* are fairly small in size (approximately 2–4 mm in length). The taxonomy of this latter group remains unclear, and biological and distribution data are either missing or incomplete for many species (Haran et al. 2017).

In this group, larvae of most species develop inside plant tissues by forming galls. Representatives of the genus *Smicronyx* often infest parasitic plants commonly known as dodders (*Cuscuta* L.), thus, *Smicronyx* are commonly known as dodder weevils. The use of *Smicronyx* in the biological control of dodder has been studied in Europe and Asia. Larvae infesting the vascular bundles *Cuscuta* induce gall formation and eventually alter the appearance of the plant (Aistova and Bezborodov 2017). There exists potential for using *Smicronyx* weevils for the biological control of a number of *Cuscuta* (Zhekova et al. 2014; Macan 1986). Our objective in this study was to extend our knowledge of *Smicronyx* species occurring in Turkey.

¹Received 25 May 2020; accepted for publication 12 July 2020.

²Corresponding author (email: besni@dicle.edu.tr; website: <https://orcid.org/0000-0001-5488-0056>).

³Ahi Evran University, Faculty of Arts and Sciences, Department of Molecular Biology and Genetics, 40100 Kırşehir, Turkey (email: merbey023@gmail.com; website: <https://orcid.org/0000-0002-9790-756X>).

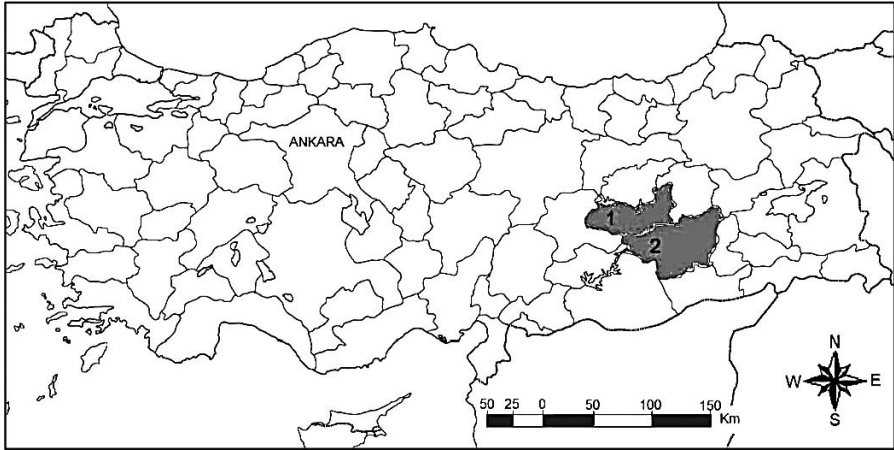


Fig. 1. Areas of Elazığ (1) and Diyarbakır (2) surveyed for *Smicronyx* in Turkey.

Materials and Methods

Nine specimens of *Smicronyx* were collected by shaking *Amygdalus communis* L. plants growing in Southeastern (Diyarbakır province) and Eastern Anatolian (Elazığ province) Regions of Turkey in 2004 (Fig. 1). These specimens are deposited in the Kırşehir Zoology Museum (Kırşehir, Turkey). The specimens were identified by the first author based on Lompe (2014), Haran et al. (2017), and Haran (2018). Genitalia were prepared by first softening the abdomen in 10% KOH for 24 h at 30°C. Thereafter, tissues were carefully removed in 70% alcohol, and the genitalia were placed in glycerin. Observation was made using a stereomicroscope (Olympus SZX12 Photomicroscope at 40×). The aedeagus structures of *S. coecus* and *S. syriacus*, and the spermatheca of *S. jungermanniae* were removed; the aedeagus structures were drawn. Terminology associated with the aedeagus drawings follows Wanat (2007).

Results

Identification of the collected specimens yielded four species of Curculionidae with taxonomic descriptions to follow.

Subfamily Curculioninae Latreille Tribe Smicronychini Seidlitz Genus *Smicronyx* Schoenherr

Smicronyx coecus Reich

Material examined. Elazığ (Gezin), 1,256 m, 08.X. 2004, 31.VIII.2004, 2♂♂ (Fig. 2A).



Fig. 2. (A) *Smicronyx coecus* Reich (♂), (B) *S. syriacus* Faust (♂), (C) *S. albosquamosus* Wollaston (♀), (D) *S. jungermanniae* Reich (♀).

Description. Body is small, black, 1.8 mm in length, and covered with white elliptical scales; head is covered with small oval white feathers; rostrum is cylindrical, pronounced curved; apical is half naked; basal is half covered with whitish hairs; clustered scales are in front of eyes and upright; pronotum transverse surface is covered with white elliptical scales; elytra is short, and its surface is covered with white elliptical scales; elytral shoulders are prominent; body ventral and legs are covered with white scales; legs are thin (femurs weak); tibia is short (front of tibia slightly enlarged), tarsus four-segment, pretarsus adjacent basally (Fig. 2A); aedeagus: the median lobe is long, the apical margins are curved inwards, the symmetrical sclerites are located outward, the apical aperture is prominent, the tegmen and manubrium are prominent, the manubrium is curved at the tip, and the aedeagal apodemes are thin and short (Fig. 3A, B).

Host plant. *Amygdalus communis*

Distribution. Belgium, Bulgaria, Russia, Denmark, Estonia, France, Great Britain, Germany, Greece, Hungary, Lithuania, Poland, Romania, Spain, Russia: South European Territory, Switzerland, Israel, and Russia: Western Siberia (Alonso-Zarazaga et al. 2017).

Distribution in Turkey. *Smicronyx coecus* is a first record for the fauna of Turkey.

Remarks. This species was identified according to Lompe (2014) who showed the general appearance of *S. coecus* species, male and female genital structure. The species that we examined was compared with the aedeagus in Lompe (2014) (Fig. 3C). In particular, apical organization was found to be the same (Fig. 3A, C).

***Smicronyx syriacus* Faust**

Material examined. Diyarbakır (Ergani), 1,043 m, 08.VIII.2004, 1♂; Elazığ (Gezin), 1,256 m, 21.IX.2004, 1♂ (Fig. 2B).

Description. Body is elongated, length is 2.1 mm, black, and densely covered with brown oval scales; head is covered with small oval brown hairs; rostrum is long curved; basal is covered with brown scales—the other part is naked, and scales are clustered in front of eyes; antennae is black color, located closer to the apical end,

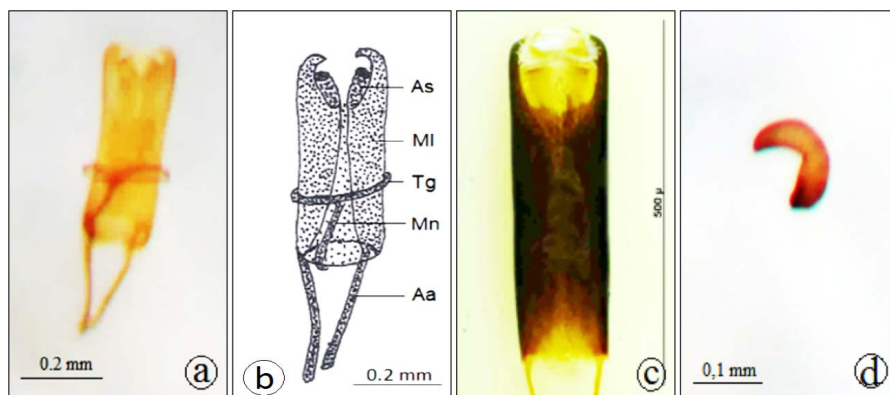


Fig. 3. (A) *Smicronyx coecus*, aedeagus (dorsal view). (B) Drawing of aedeagus with terminologies in *S. coecus* (dorsal view); *As*: Apical sclerite, *MI*: Median lobe, *Tg*: Tegmen, *Mn*: Manubrium, *Aa*: Adegal apodem. (C) Aedeagus of *S. coecus* (dorsal view) in Lompe (2014). (D) Spermatheca of *S. jungermanniae*.

and funiculus and bun are covered with whitish hair; pronotum is transverse, width almost equal to the length, and densely covered surface with brown oval scales; elytra is thin and long, densely covered with brown oval scales; elytral shoulders marked and covered with white scales; ventral body and legs covered with whitish scales, femur developed, and tibia are enlarged in the flat apical, tarsus four-segment, pretarsus adjacent basally (Fig. 2B); aedeagus: median lobe is short; the apical part is wide oval, and narrows slightly behind the apical; apical space is prominent; apical sclerite is symmetrical, located inward; chitination is more basally; tegmen and manubrium are prominent, and adeagal apodemes are very thin and short (Fig. 4A, B).

Host plant. *Amygdalus communis*

Distribution. Albania, Bulgaria, France, Italy, Greece, Hungary, Malta, Moldavia, Romania, Spain, Russia: South European Territory, Switzerland, Morocco (including Western Sahara), Tunisia, Cyprus, Iran, Iraq, Israel, Kazakhstan (east of Ural River), Mongolia, Syria, Turkmenistan, Uzbekistan (Alonso-Zarazaga et al. 2017).

Distribution in Turkey. *Smicronyx syriacus* is a first record for the fauna of Turkey.

Remarks. This species was identified according to Haran et al. (2017). In addition, the male genitalia of the species were again compared with Haran et al. (2017) and Haran (2018). Haran et al. (2017) stated that the general appearance of *S. syriacus* is similar to *S. jungermanniae*, but scale cover is usually more contrasted, consisting of a dense cover of dark brown scales, with white spots on shoulders and an apical transverse line. Haran et al. (2017) stated that these characters exist in the species we studied. The aedeagus of species that we examined (Fig. 4A, B) is compared with *S. syriacus* (Fig. 4C) and *S. jungermanniae* (Fig. 4D) in Haran et al. (2017). The apical part of the aedeagus is more similar to *S.*

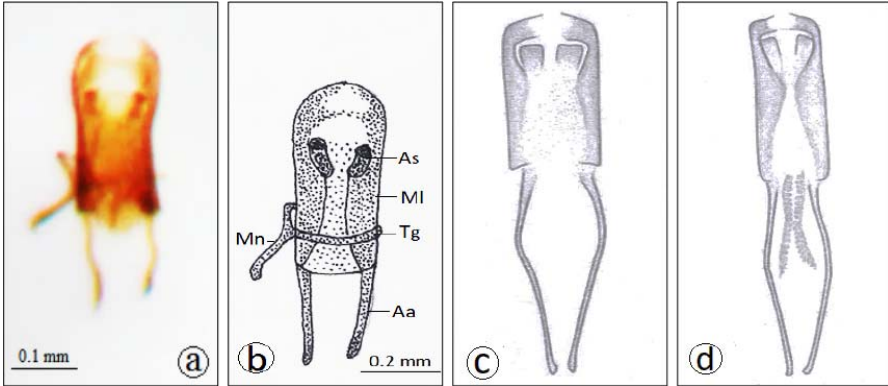


Fig. 4. (A) Aedeagus of *Smicronyx syriacus* (dorsal view). (B) Drawing of aedeagus with terminologies in *S. syriacus* (dorsal view); *As*: Apical sclerite, *MI*: Median lobe, *Tg*: Tegmen, *Mn*: Manubrium, *Aa*: Adegal apodem. (C) Drawing of aedeagus of *S. syriacus* in Haran et al. (2017) (dorsal view). (D) Drawing of aedeagus of *S. jungermanniae* in Haran et al. (2017) (dorsal view).

syriacus than to *S. jungermanniae*. However, the apical part of the aedeagus presented by Haran et al. (2017) was angular (Fig. 4C), while the species we examined was oval (Fig. 4D).

***Smicronyx albosquamosus* Wollaston**

Material examined. Elazığ (Gezin), 1,256 m, 18.III.2004, 1 ♀ (Fig. 2C).

Description. The body is small, thin, and length is 1.9 mm; the rostrum is thin and slightly curved—the apical half is naked and the basal half is covered with scales; the scales appear in front of the eyes; the antenna is covered with black white feathers and is located almost in the middle of the rostrum; the scape extends to the anterior level of the eyes, and the antennal bun is large; pronotum is short wide, densely covered with yellowish brown scales; elytra is long, densely covered with scales that are wide and oval, basally white scales formed “V” shape; the elytral shoulders are prominent; the ventral body and legs are covered with white scales; the legs are black, the tibia flat, the apical end is slightly widened, and tarsus four-segment, pretarsus adjacent basally (Fig. 2C).

Host plant. *Amygdalus communis*

Distribution. France, Greece, Italy, Malta, Spain, Algeria, Canary Islands, Libya, Morocco (including Western Sahara), Madeira Archipelago (including Selvagens), Tunisia, Cyprus, Israel (Alonso-Zarazaga et al. 2017).

Distribution in Turkey. *Smicronyx albosquamosus* is a first record for the fauna of Turkey.

Remarks. This species is described by Haran et al. (2017).

Smicronyx jungermanniae Wollaston

Material examined. Elazığ (Gezin), 1,256 m, 07.VIII.2004, 31.VIII.2004, 21.IX.2004, 3♀ ♀ (Fig. 2D).

Description. The body is small, length is 1.8 mm; the rostrum is slightly curved—the apical half is naked, and the basal half is covered with scales; the scales appear in front of the eyes and upright; the antenna is located closer to the apical end; the scape extends to the anterior level of the eyes; pronotum is transverse, densely covered with white and yellow scales; elytra is densely covered with elliptic scales that are white and yellowish; the elytral shoulders are prominent; the ventral body and legs are covered with white scales; the legs are black, the tibia flat, the apical end is slightly widened, and tarsus 4-segment, pretarsus adjacent basally (Fig. 2D).

Host plant. *Amygdalus communis*

Distribution. Belgium, Bulgaria, Croatia, Russia: Central European Territory, Denmark, France, Great Britain, Germany, Greece, Italy, Hungary, Luxembourg, Malta, Moldavia, Norway, Poland, Romania, Spain, Russia: South European Territory, Sweden, Algeria, Libya, Morocco, Tunisia, Israel, Kazakhstan, Pakistan, Turkey, and Russia: Western Siberia (Alonso-Zarazaga et al. 2017).

Remarks. This species was identified according to Haran et al. (2017) and is similar to *S. albosquamosus*, which is sympatric. It is sometimes hard to distinguish from the latter. Apart from the claws, which are always equal in *S. jungermanniae* (unequal in *S. albosquamosus*), this species is generally smaller than *S. albosquamosus*. The vestiture of the elytra does not form the white “V” typical of *S. albosquamosus* (Haran et al. 2017). The species that we examined has characteristics of *S. jungermanniae* and showed spermatheca in taxonomic agreement (Fig. 3D).

Discussion

Smicronyx jungermanniae, *S. reichii* (Gyllenhal), *S. sordidus* LeConte, and *S. fulvus* LeConte were previously reported from Turkey (Alonso-Zarazaga et al. 2017, Lodos 1981). Gürbüz et al. (2003) noted that the latter two species are pests of sunflower, *Helianthus* sp.; however, they are not included in the world catalog (Alonso-Zarazaga et al. 2017). Bolu and Legalov (2008) and Bolu and Oygen (2005) listed four taxa belonging to the genus *Smicronyx* as species. In the study reported herein, four species belonging to *Smicronyx* genus were evaluated. *Smicronyx coecus*, *S. syriacus*, and *S. albosquamosus* represent first reports of these species in Turkey. Thus, there are now seven species of *Smicronyx* species known from Turkey.

The aedeagus of *S. coecus* (Fig. 3A, B) and *S. syriacus* (Fig. 4A, B) are given here. These were compared with descriptions of Lompe (2014) and Haran et al. (2017). We did not remove the genitalia of the *S. albosquamosus* specimen because it was the only specimen of this species collected. It and *S. jungermanniae* have been identified according to the diagnostic key of Haran et al. (2017) and the description of Haran (2018). In addition, the female spermatheca of *S. jungermanniae* is given (Fig. 3D).

Our results and description should prove helpful in further studies of *Smicronyx* species, some of which have potential for use as agents of biological control of the weed pest *Cuscuta*. It should be noted that we obtained all of the species examined in this study from almond trees, *A. communis*, which are native to the Middle East and South Asia. Turkey is a country with high almond production, with commercial production primarily in the Aegean, Marmara, Mediterranean, Southeast and Eastern Anatolia regions. The almond is of great economic importance worldwide (USDA 2010), and our studies reported herein may prove useful in the management of the potential pest of almond production in Turkey and the surrounding region.

References Cited

- Aistova, E.V. and V.G. Bezborodov. 2017.** Weevils belonging to the genus *Smicronyx* Schönherr, 1843 (Coleoptera, Curculionidae) affecting dodders (*Cuscuta* Linnaeus, 1753) in the Russian Far East. *Russian J. Biol. Invas.* 8: 184–188.
- Alonso-Zarazaga, M., H. Barrios, R. Borovec, P. Bouchard, R. Caldara, E. Colonnelli, L. Gültekin, P. Hlavá, B. Korotyayev, C.H.C. Lyal, A. Machado, M. Meregalli, H. Pierotti, L. Ren, M. Sánchez-Ruiz, A. Sforzi, H. Silfverberg, J. Skuhrovec, M. Trýzna, A.J. Velázquez De Castro and N.N. Yunakov. 2017.** Comparative catalogue of Palaearctic Coleoptera Curculionidea. *Soc. Entomol. Aragones S.E.A, Spain* 8: 1–729.
- Bolu, H. and İ. Özgen. 2005.** Abundance and economic of the Curculionidea (Coleoptera) fauna of almond (*Amygdalus communis* L.): Orchards in importance of the species of Curculionidea superfamily on almond (*Amygdalus communis* L.) of Southeastern and Eastern Anatolia regions. *J. Entomol. Res. Soc.* 7: 51–58.
- Bolu, H. and A. Legalov. 2008.** On the Curculionidea (Coleoptera) fauna of almond (*Amygdalus communis* L.): Orchards in South-eastern and Eastern Anatolia in Turkey. *Baltic J. Coleopt.* 8: 75–88.
- Gürbüz, B., M.D. Kaya and A. Demirtola. 2003.** Sunflower cultivation. *Hasat Yayıncılık, Istanbul*, 104 p.
- Haran, J. 2018.** A review of the genus *Smicronyx* Schoenherr (Coleoptera, Curculionidae, Curculioninae) in tropical Africa. *Zootaxa* 4508: 267–287.
- Haran, J., A. Schütte and A.L.L. Friedman. 2017.** A review of *Smicronyx* Schoenherr (Coleoptera, Curculionidae) of Israel, with description of two new species. *Zootaxa* 4237: 17–40.
- Lodos, N. 1981.** Reverse effect of insects in fruit setting of almond trees (*Prunus amygdalus*) in Turkey. *CIHEAM-Options Mediterraneennes IAMZ* 81: 109–111.
- Lompe, A. 2014.** Coleoptera-Curculionidae, [Von Arved Lompe (n.G.A. Lohse)]. Käfer Europas *Smicronyx*, von Arved Lompe sind lizenziert unter den Bedingungen. 11 October 2019. (<http://coleo-net.de/coleo/texte/smicronyx.htm>).
- Maçan, G. 1986.** Güneydoğu Anadolu Bölgesinde bademlerde zarar yapan böcek türleri, önemlilerinin tanınmaları, yayılışları ve ekonomik önemleri üzerinde araştırmalar. *Tarım ve Orman Bakanlığı Araştırma Eserleri* 5: 19–22.
- USDA. 2010.** Tree nuts Annual Report, Turkey. *Glob. Agric. Infor. Network* 1–18.
- Wanat, M. 2007.** Alignment and homology of male terminalia in Curculionidea and other Coleoptera. *Invertebr. Systemat.* 21: 147–171.
- Zhekova, E., D. Petkova and I. Ivanova. 2014.** *Smicronyx smreczynskii* F. Solari, 1952 (Insecta: Curculionidae): Possibilities for biological control of two *Cuscuta* species (Cuscutaceae) in District of Ruse. *Acta Zool. Bulgarica* 66: 1–2.