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Trigonoscelus rakovici sp. nov. from Jordan (Coleoptera: Scarabaeidae: Aphodiinae: Didactyliina)

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Abstract. A new species of the genus *Trigonoscelus* Petrovitz, 1963, *Trigonoscelus rakovici* sp. nov., from Jordan is described and compared with the morphologically most similar species, *T. afghanus* (Petrovitz, 1963). An updated and improved identification key to the species of *Trigonoscelus* is provided.

INTRODUCTION

The subtribe *Didactyliina* was established by Pittino in 1984 to accommodate the genera *Didactylia* d'Orbigny, 1896 (the type genus of the subtribe) and *Pseudomothon* Pittino, 1984. At present, the subtribe comprises three four genera: *Aidophus* Balthasar, 1963, *Didactylia*, *Pseudomothon*, and *Trigonoscelus* Petrovitz, 1963, encompassing a total of 46 species known to date (Schoolmeesters 2025). The genus *Trigonoscelus* was originally described by Petrovitz in 1963 as a subgenus of *Aphodius* Hellwig, 1798, to include the species *T. afghanus* (Petrovitz 1963) and *T. coelebs* (Petrovitz 1963). Later, Petrovitz (1980) elevated this subgenus to the rank of genus and placed it near the genus *Didactylia*. Three additional species have been described to date: *T. elbursensis* Stebnicka & Galante, 1991, *T. narayaniensis* Ilčíková & Král, 2004, and *T. hypi* Král, 2017. The work of Ilčíková & Král (2004) includes an identification key to the species of the genus known at that time, as well as a checklist of the Palaearctic and Oriental species of the entire subtribe *Didactyliina*. The genus had previously been known from arid to desert regions, ranging from the UAE through Iran, Afghanistan, and Pakistan eastward to Nepal.

The biology of the *Trigonoscelus* species, including its habitat preferences, remains largely unknown. The beetles appear to favour semi-desert sandy habitats, where they may be attracted to artificial light sources. Specimens of *Trigonoscelus hypi*, for example, were collected after being attracted to a permanent artificial light installation located in gardens surrounded by remnants of a "Ghaf forest" (i.e., stands of mature *Prosopis cineraria* trees) and sparsely vegetated sand dunes in the United Arab Emirates (Král & Batelka 2017). The material of the species described herein was found i.e. beneath fresh dung, most likely of a donkey (see below for the details).

Here, we describe an additional species of this genus from central Jordan, representing the westernmost known occurrence of the genus to date.

MATERIAL AND METHODS

The specimens were observed using Olympus SZ61 and SZP 1120-T stereoscopic microscopes. The photographs published here were taken with a Meopta laboratory microscope, a CMOS 5 digital camera, and processed using the Helicon Focus software. Measurements of length and width were carried out with the aid of an ocular micrometer.

Specimens of the newly described species bear a red printed label reading: "Trigonoscelus rakovici sp. nov. | HOLOTYPUS ♂ [or] PARATYPUS ♂ | David Král & Ladislav Mencl det. 2025." Verbatim label data are cited for the type material; individual lines within each label are separated by a vertical bar ("|"), and different labels are separated by a double vertical bar ("||"). Information enclosed in quotation marks (" ") reflects the original spelling. Our remarks and additional comments are enclosed in square brackets ("[]").

Morphological terminology used in the description of the epipharyngeal structures follows Dellacasa et al. (2010).

The following codes identify the collections housing the examined material (curators are listed in parentheses).

LMTC Ladislav Mencl private collection, Týnec nad Labem, Czechia;
MMPC Martin Mařík private collection, Praha, Czechia;
NMPC National Museum, Praha, Czechia (Jiří Hájek);
PSCK Pavel Štěpánek private collection, Kladno, Czechia;
VTZC Václav Týr private collection, Žihle, Czechia.

TAXONOMY

Trigonoscelus rakovici sp. nov.

(Figs. 1-17)

Type locality. SW Jordan, 20 km W of Shaubak, 30°31'57.506"N 35°22'6.665"E.

Type material. Holotype, ♂ (NMPC), "JORDAN SW, desert | 20 km W of Shaubak | leg. M. Mařík, 14.4.2023 || MARTIN MAŘÍK | COLLECTION | PRACUE CZ || 3326 | Dok.L.Mencl 2025 [green label from Ladislav Mencl's documentation] [printed]". Paratypes, 32 ♂♂ (1 ♂ LMTC - 3178 | Dok.L.Mencl 2025), 23 ♂♂ in MMPC, 5 ♂♂ in NMPC - including 3324 and 3325 | Dok.L.Mencl 2025, 3 ♂♂ in VTZC), same data as holotype; 36 ♂♂ (10 ♂♂ NMPC, 25 ♂♂ PSCK, 1 ♂ VTZC), "Jord. Cen. [Jordania centralis] | Fejnan [= Faynan] env., 14.4.2023 | [Pavel] Štěpánek lg[t]. [printed]".

Description of holotype (♂). Total body length: 4.1 mm. Body elongate, almost parallel, convex. Dorsal surface remarkably alutaceous; yellowish, contours of head and pronotum, scutellum, elytral sutural interval of elytron, apical contours of femora and protibia, and external teeth of protibia darkened; setation pale (Fig. 1).

Head small, semicircular; clypeus almost flat discally, sides broadly, shallowly emarginte before genae, margin upturned, slightly emarginate anteriorly; genal suture distinct, genae

Figs. 1-3. Habitus of *Trigonoscelus rakovici* sp. nov., paratype, ♂ (No. 3325): 1- dorsal view, 2- dorsolateral view, 3- ventral view. Sclae bar:1 mm. Photos by Ladislav Mencl.

right-angled, exceeding distinctly eyes; frontal suture invisible; punctation consisted from coarse and deeply impressed punctures (Fig. 4).

Epipharynx broady transverse, anterior margin deeply and widely emarginate at middle, epitorma faint, corypha with one apical spicula, pedia shortly and densely setaceous, with stronger and rather elongate spines anterolaterally, chaetopariae slender, densely spaced, nesium strongly broadened (Fig. 10).

Pronotum convex, widest just before middle; anterior margin regularly broadly sinuate, marginal line absent; anterior corners rounded; side outline almost semicircular, lateral margin slightly crenulate basally, bearing with scarcely distributed long macrosetaesetae; basis straight medially, posterior corners obliterate, marginal border absent; surface alutaceous, coarsely, irregularly and sparsely punctate, disc almost impunctate with relatively short, shallow longitudinal furrow basally (Figs. 5-6).

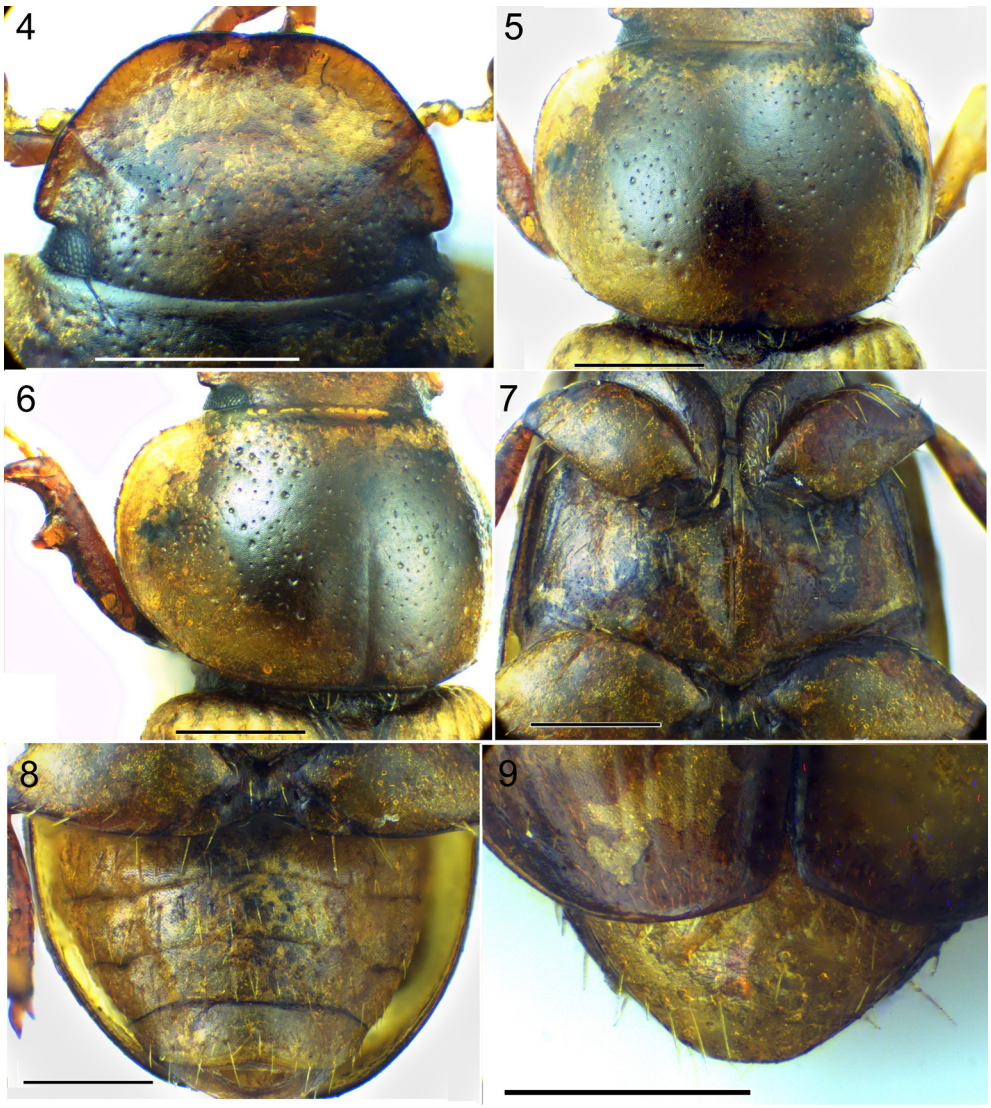
Scutellar plate triangulate, little longer as wide, rounded apically; impunctate (Figs. 1-2).

Elytra slender, distinctly alutaceous, humerus rounded, exposed, not denticulate; lateral margin with several short macrosetae in basal third; striae distinctly impressed discally, vanishing apicad, impunctate; intervals almost flat, impunctate, shortly, sparsely macrosetaceous laterally and apically Fig. 13); interval 2-7 approximately of same width; sutural interval angustate apicad.

Macropterous.

Pygidium alutaceous, coarsely, irregularely, very sparsely punctate, punctures bearing long setae (Fig. 9.

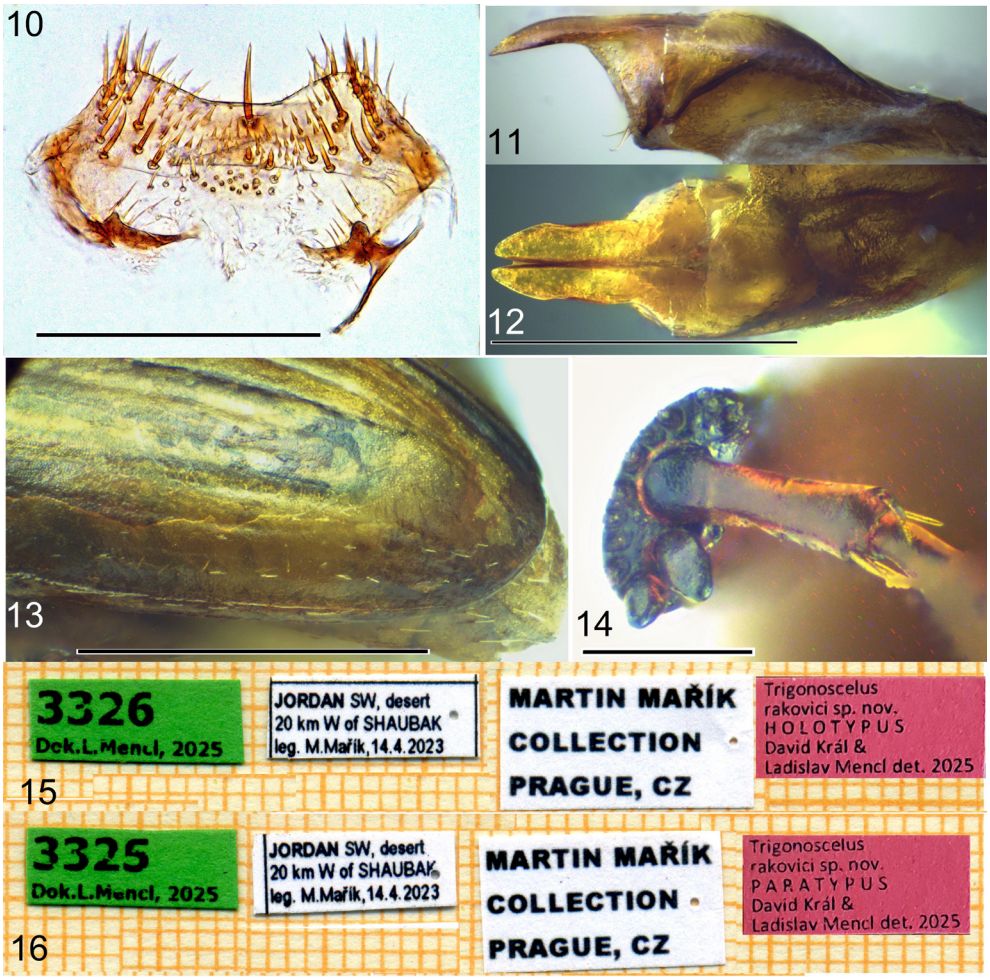
Meso-metaventral plate shining, flat, impunctate, with distinctly impressed medial furrow. Abdominal ventrites shining, almost impunctate, sparsely longly setaceous (Figs.



Figs. 4-9. *Trigonoscelus rakovici* sp. nov., holotype, ♂: 4- head, dorsal view; 5- pronotum, dorsal view; 6- pronotum, dorsolateral view; 7- meso-metaventral plate; 8- abdomen; 9- pygidium. Scale bar: 0.5 mm. Photos by Ladislav Mencl.

7-8).

All femora relatively wide, shiny, impuncte, scarcely macrosetaceous. Protibia with three remarkable sharp external teeth, terminal spur short, acute apically, approximately equal to length of basiprotarsomere. Meso- and metatibia flattened and slightly dilated distad, transversal carinae obsolete; metatarsi approximately as long as metatibia,



Figs. 10-16. *Trigonoscelus rakovici* sp. nov.: 10- epipharynx; 11- aedeagus, lateral view; 12- aedeagus, dorsal view; 13- apex of elytra, dorsal view; 14- apex of metatibia, ventral view; 15- label associated with holotype; 16- label associated with paratype. Scale bars: 10 and 14- 0.2 mm; 11 and 12- 0.5 mm; 13- 1 mm. Photos by Ladislav Mencl.

basimesotarsomere distinctly longer than superior terminal spur, inferior terminal spur shortened; basimetatarsomere little longer than superior terminal spur. Claws only slightly curved (Fig. 7).

Male genitalia. Parameres as in Figs. 11-12.

Sexual dimorphism. Female unknown.

Variability. Paratypes show slight individual variations in length of body and length and distribution of punctures and macrosetae. Total body length: 3.8-4.3 mm.

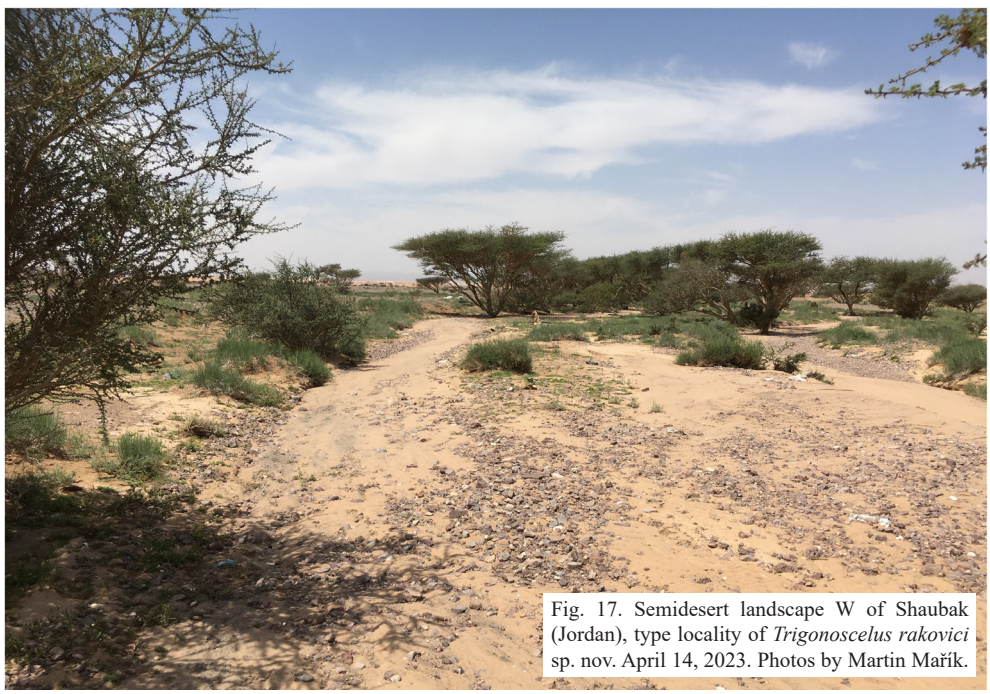


Fig. 17. Semidesert landscape W of Shaubak (Jordan), type locality of *Trigonoscelus rakovici* sp. nov. April 14, 2023. Photos by Martin Mařík.

Differential diagnosis. The new species is classified within the subtribe *Didactyliina* of the genus *Trigonoscelus*, primarily based on the following characteristics: the clypeal outline is semicircular, truncate or slightly emarginate anteriorly; the genal suture is visible; the lateral pronotal margins are regularly rounded and macrosetaceous; the scutellar plate is basally approximately as wide as elytral intervals 1-3 and apically rounded; and the transverse carinae of the meso- and metatibiae are almost obsolete (see also Dellacasa et al. 2001, Ilčíková & Král 2004, and Král & Batelka2017). It is distinguished from other described species mainly by the sculpture of the pronotum and elytra, as well as the shape of the parameres. For differential diagnosis, see the key below.

Circumstances of the finding. The material was collected in a broad, shallow wadi with sparse undergrowth and acacia trees (Fig. 17). A portion of the specimens was obtained in full sunlight, beneath fresh droppings of *Equus* sp. (most likely donkey), collected by Martin Mařík. The remaining specimens were attracted to an artificial light source at night and collected by Pavel Štěpánek.

Etymology. The new species is named in honor of our colleague and friend Miloslav Rakovič, a leading expert on the taxonomy of the Aphodiinae group, who recently passed away.

A KEY TO IDENTIFICATION OF THE *TRIGONOSCELUS* SPECIES*)

1 (2) Dorsal surface of pronotum remarkably coarsely rugopunctate, elytral intervals convex. Nepal. .... *T. narayaniensis* Ilčíková & Král, 2004
2 (1) Dorsal surface of pronotum punctate, elytral intervals moderately convex or flat.
3 (4) Anterior margin of clypeus almost semicircular, lateral clypeal margin broadly emarginate before genae in males; relativelly smaller species, total body length: 3.3-3.5 mm. UAE. ..... *T. hypi* Král, 2017
4 (3) Anterior margin of clypeus emarginate or truncate, lateral margin of clypeus straight or broadly emaginate before genae in males; relativelly larger species, total body length: 3.7-4.3 mm.
5 (6) Body shape slightly broader posteriad, head and pronotum blackish brown, distinctly darker than elytra, dorsal surface almost not microsculptured, shiny. Pakistan. ..... *T. coelebs* (Petrovitz, 1963)
6 (5) Body shape almost parallel, head and pronotum yellowish brown, only weakly darker than elytra, dorsal surface finely microsculptured, more or less alutaceous.
7 (8) Lateral margin of clypeus straigth before genae in males, head and pronotum moderately shiny, elytra alutaceous, pronotal punctation coarser and denser, elytral intervals moderately convex. Afghanistan, Iran..... ..... *T. afghanus* (Petrovitz, 1963)
8 (7) Lateral margin of clypeus shallowly, emarginate before genae in males (Figs. 1, 4), whole dorsal surface alutaceous, pronotal punctation remarkably sparser (Figs. 1, 5, 6), elytral intervals flat (Figs. 1-2, 13). Jordan. ..... *T. rakovici* sp. nov.

*) *Trigonoscelus elbursensis* is not included in the key above because the only known specimen has not been studied by the authors.

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