Studies and Reports
Taxonomical Series 20 (1): 223-228, 2024

A contribution to the knowledge of Leiodinae (Coleoptera: Leiodidae) from Pakistan

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Taxonomy, new species, Leiodidae, Sogdini, Leiodini, *Sogda, Leiodes,* Pakistan

Abstract. *Sogda* (*Trichohydnobius*) *orszuliki* sp. nov. and *Leiodes pakistanica* sp. nov. both from Pakistan are described and distinguished from similar species.

INTRODUCTION

The family Leiodidae commonly also called round fungus beetles, small carrion beetles, small scavenger beetles or mammal-nest beetles is widespread all over the world. It is represented by more than 398 genera with more than 4 221 species (Newton 2022). The present paper deals with finding of a new *Sogda* Lopatin 1961 and *Leiodes* Latreille, 1797 species.

Sogda belongs to those genera that comprise only few species. Altogether only eight species inhabiting in Europe, Asia and North America have been known up to now. The ninth *Sogda* species, found in Pakistan, is described in this paper. On the other hand, the genus *Leiodes* is rich in species – altogether 246 valid species are known at present (Švec private database).

The leiodid fauna of Pakistan is not well known. Only thirteen species of the subfamily Leiodinae have been recorded from the country up to now - two species of the genus *Leiodes* Latreille, 1797, ten *Agathidium* Panzer, 1796 and one species of *Stetholiodes* Fall, 1910. Two additional species occurring in Pakistan are added in this paper.

Additionally the biology of the members of the subfamily Leiodinae is generally insufficiently known. It is assumed they associate, inter alia, with subterranean fruiting bodies of fungi or also with the mycelium (Newton 1998).

MATERIAL AND METHODS

The paper is exclusively based on the material coming from Pakistan that has been collected by the Czech entomologist Kamil Orszulik recently. The material is deposited in the collection of the collector (KOPC) and also in the author's collection (ZSPC).

The male genitalia have been removed from the specimens dissected in a drop of water, rinsed and subsequently mounted in polyvinylpyrrolidin.

The measurements of total body length were taken from all specimens examined.

Specific measurements of the individual body parts were taken from the holotypes only. They were measured to the first decimal place of millimetre. The measurements of the genitalia were measured to the second decimal place of millimetre. The descriptions are based on the holotype. Variability is mentioned in the paragraph "Variation" and includes features exhibited by females and other type material. The spermatheca is predominantly feebly sclerotized in the genera *Sogda* and *Leiodes* lacking specific taxonomical characters. Also, the ovipositor does not seem to be of any important diagnostic importance. Therefore female genitalia are not described and figured in the present paper.

The classification of the mesoventral carina in *Leiodes* follows that in Švec (2008).

Abbreviations used in the paper:

ZSPC private collection of Zdeněk Švec, Prague;
KOPC private collection of Kamil Orszulik, Frýdek-Místek

AI-AXI - antennomeres I-XI
TI-TV - tarsomeres I-V

Collecting data of the type series cited in quotation marks are taken from the locality labels accompanying examined specimens. The individual lines from the original locality labels are separated by a slash. The author's remarks are placed in the square brackets [...]. The holotype and the paratypes are indicated by a red label bearing the status of the specimen, name of the species, the name of the author of the species and the relevant year and attached to the same pin as the corresponding specimen.

The examined specimens were softened in 8% acetic acid and subsequently dissected or directly mounted on paper cards. The dissected male genitalia were taken over clove oil, 40% ethyl alcohol and water to polyvinylpyrrolidin on a transparent slide added to the same pin as the dissected specimen.

DESCRIPTIONS

Sogda (*Trichohydnobius*) *orszuliki* sp. nov.

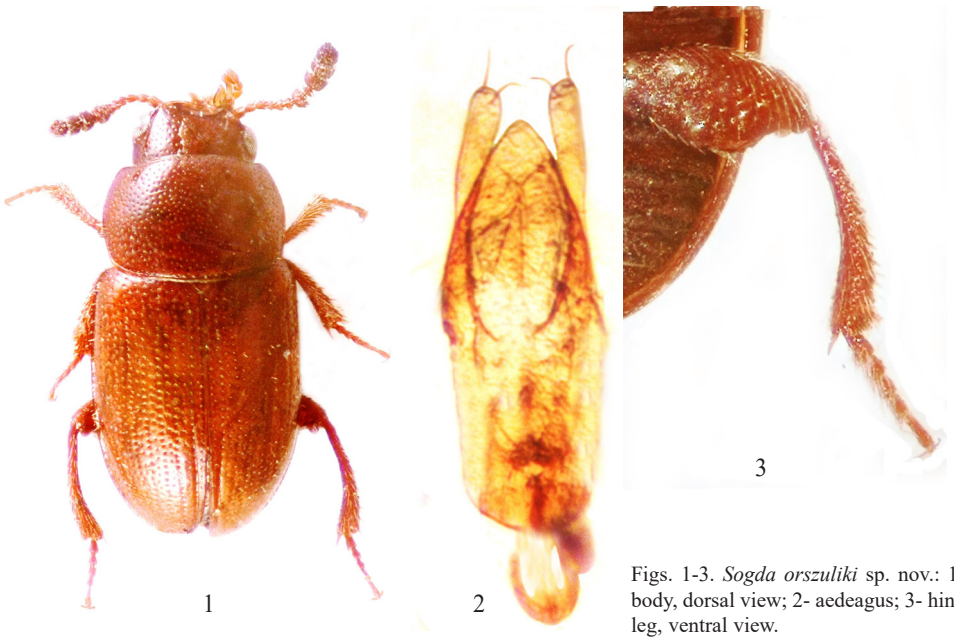
(Figs. 1-3)

Type material. Holotype (♂): "PAKISTAN 18.8.2019/ Fairy Mead[ows] 2700-4000/35[°]19´08´´[N], 74[°]35´40´´[E]/ lgt. Orszulik", (ZSPC). Paratypes: (2 ♂♂), same data, (ZSPC, KOPC).

Description. Body obtrusively protracted, parallel (Fig. 1). Length of body 2.6 mm, head 0.3 mm, pronotum 0.8 mm, elytra 1.5 mm, antenna 0.8 mm, aedeagus 0.41 mm; maximum width of head 0.7 mm, pronotum 1.1 mm at middle of length, elytra 1.2 mm between humeri and posterior third of elytral length.

Dorsum lightly chestnut with head and pronotum a little darker. Legs and antennomeres AI-AVI dark brown. Venter light chestnut. No dorsal micro-sculpture beside punctation present on dorsum. Entire dorsum lacking setae except several short erect setae on elytra laterally and apically. Epipleura sparsely, but distinctly setose.

Head. Distinctly coarsely densely punctured, punctures separated by about 1-2 times their own diameter. Two punctures larger than others on vertex. Eyes hemisphaerical,



Figs. 1-3. *Sogda orszuliki* sp. nov.: 1- body, dorsal view; 2- aedeagus; 3- hind leg, ventral view.

prominent from head outline. Tempora behind eyes parallel. Clypeal line distinct, clypeus feebly emarginate anteriorly.

Ratios of length of antennomeres II-XI (2nd antennomere equal to 1.0): 1.0-1.0-0.7-0.7-0.7-1.2-0.6-1.1-1.1-2.0. Ratios of width of antennomeres II-XI (2nd antennomere equal to 1.0): 1.0-0.9-0.9-1.0-1.0-2.1-2.0-2.5-2.5-2.3. Ratios width: length of antennomeres II-XI: 0.9-0.8-1.2-1.3-1.3-1.5-3.2-2.0-2.0-1.0.

Pronotum. Punctured similarly as on head, punctures denser, separated by about 0.5-1.0 times their own diameter. Hind angles distinctly developed, blunt, rounded in dorsal view; blunt and rounded laterally. Base straight.

Scutellum. Very small, triangular, lacking punctures.

Elytra. Obtrusively cylindrical, sides parallel from base up to apical third, with punctured striae, punctures similar to those on pronotum, separated by about 0.5 times their own diameter or less. Punctures of the elytral intervals sparser but of the same size and strength as the regularly arranged strial punctures. Punctures in intervals separated by about one time their diameter. Sutural stria developed. Elytra with rare erect lightly coloured setae, epipleurae with sparse setae shorter than those on dorsum of elytra. Epipleural setae detectable in oblique view on lateral part of body.

Metathoracic wings fully developed.

Legs. All legs slender, tibiae covered by dense setae dorsally, dorsal tarsal grooves very short on pro- tibiae, approximately as long as first tarsomere. All tibiae setose also laterally; setae approximately as long as lateral tibial spines. Hind tibia distinctly simply bent, gradually widened on their distal two thirds. Mid-femora without specific characters.

Hind femora widest approximately at middle, a little jagged on their posterior outline; hind margin strongly concave on apical third (Fig. 3).

Genitalia. Male genitalia in Fig. 2.

Variation. Length of body varies between 2.5-2.6 mm in the type series. Dorsum of both paratypes is uniclorous, lightly chestnut coloured with darker antennal club.

Differential diagnosis. *Sogda* (*Trichohydnobius*) *orszuliki* sp. nov. is similar to *S.* (*T.*) *secunda* (Guillebeau, 1897) as the body of the both species is cylindrical with parallel-sided elytra. They differ by the shape of the lateral outline of the pronotum - regularly rounded in *S. orszuliki* while angulated at the point of the maximum width in *S. secunda*. The punctures of the elytral intervals are sparser but of the same size and strength as the regularly arranged strial punctures in *S. orszuliki*, while the same are finer and weaker in *S. secunda*. The difference can be detected also in the shape of the hind femora lacking a large, apically-oriented tooth in the new species while that is present in *S. secunda*. The shape of the aedeagus is similar in both species and other species in the genus, nevertheless the lateral sides of the tegmen are convex and paramera are stouter in *S. orszuliki* while the sides of the tegmen are concave and paramera slender in *S. secunda*.

Etymology. The new species is dedicated to my esteemed colleague, the outstanding entomologist Kamil Orszulik.

***Leiodes pakistanica* sp. nov**.
(Figs. 4-6)

Type material. Holotype (♂): "PAKISTAN 10.8.2019/ Minapin, Hapakun/ 36[°]13´16´´[N], 74[°]32´50´´[E]/ lgt. Orszulik 2700 m", (ZSPC). Paratypes: (4 ♀♀), same data, (ZSPC, KOPC).

Description. Length of body 3.7 mm, head 0.5 mm, pronotum 0.9 mm, elytra 2.3 mm, aedeagus 0.74 mm, maximum width of head 0.9 mm, pronotum 1.6 mm, elytra 1.7 mm.

Body very oblong oval, mostly parallel-sided (Fig, 4), dorsum light chestnut coloured, antennomeres I-VI and legs light chestnut. Antennal club dark. Ventral surface chestnut coloured. Dorsum without transverse strigosites.

Head. Dorsal surface with distinct coarse dense puncturation; punctures separated predominantly by 0.5-1 time their own diameters. Vertex with large punctures – three of them arranged transversely one shifted more anteriorly. Last antennomere as long as wide; distinctly narrower than AXI. AVIII short, well visible between its neighbours. Ratio of length of antennomeres AII-AXI (AII=1.0): 1.0-1.3-0.8-0.6-0.7-1.3-0.5-1.3-1.3-1.8. Ratio of width of antennomeres AII-AXI (AII=1.0): 1.0-1.0-1.1-1.3-1.4-1.9-1.8-2.5-3.0-2.6. Ratio of width:length of AII-AXI: 0.7-0.5-1.0-1.4-1.4-0.9-2.3-1.3-1.5-1.0.

Pronotum. Widest at base. Sides very flatly, roundly tapered toward anterior angles in dorsal view; flatly rounded in lateral view. Posterior angles feebly acute, very shortly rounded in dorsal view; obtuse, shortly rounded in lateral view. Base distinctly emarginate before hind angles. Punctation distinct, punctures similar to those on head, separated

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5

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Figs. 4-6. *Leiodes pakistanica* sp. nov.: 4- body, dorsal view; 5- aedeagus; 6- hind left leg, ventral view.

predominantly by about 2 times their own diameter. With several large punctures behind anterior margin and with short but obtrusive line of very densely arranged large punctures predominantly connected each other developed on each side just before base. Several large sparse pre-basal punctures aligned transversally before middle part of base. Surface covered by irregular feeble micro-reticulation.

Elytra. With nine punctured striae. Striae well developed, strial punctures well expressed, separated predominantly by about 1-2 times their own diameter longitudinally on elytral disc, becoming denser laterally, smaller apically. Interval punctures fine and small, separated by about 2-4times their diameters; some even smaller punctures interposed. Sparse large punctures in odd intervals as large as strial punctures present on basal half of elytra becoming smaller apically. Stria 9 parallel, consisting of several punctures merging lateral channel. Sutural stria deepened all along its length, reaching approximately anterior fourth of elytral length continuing as row of punctures. Lateral channel without larger punctures or foveae. Elytra laterally near margins and before apex with few erect setae. Lateral elytral channels narrow. Epipleura without setae.

Legs. Anterior tibiae slender, approximately 2.5 as wide at apex as at their base. Inner terminal thorn of anterior tibia straight with simple tip, longer than lateral one. Tarsomeres TI-TIV of anterior and mid-legs feebly widened with unobtrusive tennent setae. Meso-tibiae of usual size and shape, straight. Hind margin of metafemur with small but distinct tooth approximately at middle of femoral length, at point of maximum width of femur. Distinct emargination developed on both sides of central tooth (Fig. 6). Femoral apex with unobtrusive lobe on dorsal and ventral sides. Hind tibiae distinctly but slightly double curved. TI-TIII of posterior tarsi conically widened apically.

Mesoventrite. Longitudinal carina of type A.
Membranous wings developed.
Genitalia. Aedeagus as in Fig. 5. Paramera bisetose apically.

Variation. Length of body varies between 3.3-3.9 mm. Female tarsomeres slender, hind tibiae simply very feebly curved or straight, hind femora without specific characters. Head and pronotum a little darker than elytra in two of the paratypes. The number of large punctures present on the vertex (occasionally also on front) varies between 3-5 in the paratypes. The lateral emargination of the pronotal base is very slight in females. The ninth elytral row indistinct, consisting of several punctures only, if parallel with lateral channel, then closely approximated to lateral margin, separated at most 1 time of their diameter from lateral margin.

Differential diagnosis. *Leiodes pakistanica* sp. nov. is similar to *L. dilutipes* J. Sahlberg, 1903 in the shape of body, last antennomere narrower than the previous one, the type of mesoventral carina, shape of hind tibia and the pronotum with lateral sides roundly tapered anteriorly. Also the body size of both species is similar. *L. pakistanica* sp nov. differs by lightly chestnut coloured body, lateral emargination of pronotal base and by the central tooth on hind margin of male femur, while the body is as a rule dark, pronotal base is straight and femur lack any central tooth in *L. dilutipes.* The aedeagus is broadly rounded apically in *L. pakistanica* in contrast to the shortly rounded apex of the aedeagus in *L. dilutipes*,

Etymology. The species name of the new species is derived from the country of origin - Pakistan.

ACKNOWLEDGEMENT. I want to express my thanks to my colleague Kamil Orszulik (Frýdek-Místek, Czech Republic) for allowing me to study the interesting leiodid material from Pakistan.

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Received: 21.11.2023
Accepted: 10.12.2023
Printed: 31.3.2024