

***LAEMOSTENUS (IRANOSPHODRUS) RUDICHAЕ*,
NEW SUBGENUS AND NEW SPECIES OF SPHODRINE BEETLE
FROM IRAN (COLEOPTERA: CARABIDAE: SPHODRINI)**

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Abstract - *Laemostenus (Iranosphodrus* subgen. nov.) *rudichae* sp. nov. from environs of the village Rāyen (Iran, province Kermān) is described, illustrated and compared with the related subgenera and species of the genus *Laemostenus* Bonelli, 1810 (in the widest sense). *Iranosphodrus* new subgenus, apparently close to *Pristonychus* Dejean, 1828, is mainly characterised within the genus *Laemostenus* by the peculiar combination of several features, in particular the absence of both anterior supraorbital setae of the head and the basolateral setae of the pronotum, the toothed mesosternum in front of the mesocoxae, the presence of a prominent tooth on the anterior margin of the ventral side of the profemora, and the markedly curved mesotibiae in males. *L. (I.) rudichae* new species, besides the character state distinctive at subgeneric rank, is further characterized by the elongate, parallel sided, depigmented body, reduced eyes, and the structure of the aedeagus. The systematic position of the new taxon is discussed.

KEY WORDS: Coleoptera, Carabidae, Sphodrini, *Laemostenus*, new subgenus, new species, Iran

Izveček - *LAEMOSTENUS (IRANOSPHODRUS) RUDICHAЕ*, NOV PODROD IN NOVA VRSTA HROŠČA PLEMENA SPHODRINI IZ IRANA (COLEOPTERA: CARABIDAE: SPHODRINI)

Opisan in prikazan je *Laemostenus (Iranosphodrus* subgen. nov.) *rudichae* sp. nov. iz okolice kraja Rāyen (Iran, provinca Kermān). Primerjan je s sorodnimi podrodovi in vrstami rodu *Laemostenus* Bonelli, 1810 (v najširšem smislu). Novi

podrod *Iranosphodrus* je očitno blizu podrodu *Pristonychus* Dejean, 1828, in je v okviru rodu *Laemostenus* prepoznaven po svojskem spoju več značilnosti, posebno po odsotnosti obeh prednjih supraorbitalnih ščetin na glavi in bazolateralnih ščetin na pronotumu, zobatem mezosternumu pred srednjimi kolki, prisotnosti izrazitega zoba na prednjem robu trebušne strani prednjih stegen in opazno ukrivljenih srednjih golenih pri samcih. Poleg znakov, določajočih podrodovni položaj, so za novo vrsto značilni še podolgovato, depigmentirano telo z vzporednimi stranicami, zmanjšane oči in zgradba edeagusa. Razpravljamo o sistematskem položaju novega taksona.

KLJUČNE BESEDE: Coleoptera, Carabidae, Sphodrina, *Laemostenus*, nov podrod, nova vrsta, Iran

Introduction

The genus *Laemostenus* Bonelli, 1810 (in the widest sense) includes nearly 200 described species, currently divided into 13 subgenera: *Actenipus* Jeannel, 1937, *Antisphodroides* Casale, 1988, *Antisphodrus* Schaufuss, 1865, *Arabosphodrus* Sciaky, 1996, *Atlantosphodrus* Antoine, 1954, *Ceuthosthenes* Antoine, 1957, *Eucryptotrichus* Jeannel, 1914, *Laemostenus* Bonelli, 1810 (sensu stricto), *Microsphodrus* Casale, 1988, *Pristonychus* Dejean, 1828, *Rhysosphodrus* Bedel, 1899, *Sphodroides* Schaufuss, 1865, and *Stenosphodrus* Casale, 1988. The latter, including presently three species, was proposed as junior synonym of *Antisphodrus* by Casale & Sciaky (1998) (see also Lorenz 2005). However, a better examination of the morphological features of *Stenosphodrus* species, and their isolation in Central Asia, seem to exclude this synonymy, and any relationships with a lineage of Euro-Mediterranean taxa; therefore, the taxon was again raised to the status of a valid subgenus by Casale (2003). The genus *Laemostenus* is distributed in the Western Palearctic (Europe, North Africa, Western and Central Asia, and Himalaya), with one cosmopolitan species (Casale 1988, 2003).

The genus includes brachypterous or micropterous, small to large-sized (8 – 28 mm) species, usually well pigmented, blackish with blue or violet reflection on elytra, rarely depigmented, piceous-brown to reddish-brown, with reduced eyes in subterranean species. It is well represented in the Near and Middle East (see, among others, Casale 1997; Casale & Vigna Taglianti 1999; Casale et al. 2003; Lohaj 2004, Lohaj & Mlejnek 2007).

Twelve species of the genus *Laemostenus* (five of the subgen. *Antisphodrus*, four of the subgen. *Pristonychus*, two of the subgen. *Laemostenus* (s.str.) and one of the subgen. *Sphodroides*), distributed in the northwest part of the country (most of them are known from the Zagros and Elburz mountain ranges), have been reported from Iran so far (Casale 1988, 2003, Casale & Quéinnec 2001, Lohaj & Mlejnek 2007). The material sampled near the village Rāyen (province Kermān, Southeastern Iran) by Petra Rudich and Jimi Kny, and entrusted to us for study by our friend David Wrase (Berlin, Germany), revealed the presence of five specimens of Sphodrina of a not yet described species with unique morphological features, which needs the insti-

tution of a new subgenus of the genus *Laemostenus* (in the widest sense). The description of the new subgenus and species are the object of this contribution.

Material and methods

Morphological features of the beetles were examined using stereomicroscopes Olympus SZ 60 and WILD M5. Macrophotos were taken using a stereomicroscope LEICA S8 APO with a digital camera NIKON COOLPIX® E 4500. Male genitalia were dissected, cleaned and mounted in Euparal® on transparent labels under the respective specimens. Drawings of aedeagi were made using a Leica DM 2500 transmitted-light microscope with attached drawing tube.

Abbreviations used in the text are as follows:

L: overall body length (measured from the apex of mandibles to the apex of elytra)

TL: total body length (measured from the anterior margin of clypeus to the apex of elytra)

PW: maximum width of pronotum

PL: pronotum length (measured along the middle line)

EW: maximum width of elytra

EL: elytral length (measured along sutura from the elytral base to the apex)

Forward slash indicates separate labels.

Acronyms of the collections:

cDW: collection of David Wrase, Berlin, Germany (male holotype)

cAC: collection of Achille Casale, Torino, Italy

cRL: collection of Roman Lohaj, Košice, Slovakia

The taxonomical treatment of the genus *Laemostenus* is in agreement with Casale (1988), with discussion in the conclusive remarks.

Taxonomy

Genus *Laemostenus* Bonelli, 1810

Iranosphodrus subgen. nov.

Type species: *Laemostenus rudichae*, sp. nov., by monotypy

Diagnosis: A subgenus including so far one medium sized, depigmented, brachypterous *Laemostenus* species, similar in general aspect to some species of the Subgen. *Pristonychus*, especially to the cave dwelling *L. (P.) rigrevanensis* (Coiffait, 1961) of Afghanistan, but characterized by the peculiar combination of the follow-

ing features: head narrow, distinctly narrower than pronotum; eyes small, markedly reduced; posterior pair of supraorbital setae present, anterior pair absent; antennae relatively short, reaching backwards the anterior fifth of the elytral length; antennomere 3 without accessory setae. Pronotum with a pair of antero-lateral setae at the anterior third; basolateral setae absent. Mesosternum denticulate, with small and pointed teeth in front of mesocoxae. Legs elongate, slender; anterior margin of pro-femora with a distinct tooth situated in the apical third in both sexes, without additional teeth or setae. Protibiae on the anterior side with scarce, short pubescence. Mesotibiae in males markedly curved, in females almost straight; meso- and metatibiae with apical brush of setae; tarsi with short, sparse pubescence on the dorsal side; tarsal claws with traces of denticulation at base; male protarsi distinctly dilated.

Etymology: referred to the country of origin, Iran, combined with the suffix – *Sphodrus*, a typical genus of the tribe *Sphodrini*.

***Laemostenus (Iranosphodrus) rudichae* sp. nov.**

(Figs. 1 - 5)

Type material.

Holotype, male labelled: “IRAN (Kermān), Highland of Iran, Rāyen env., ca 2500 m, 29°35 N/57°26 E, 18.V.2006 P.Rudich & J.Kny (white label, printed) / HOLOTYPUS *Laemostenus Iranosphodrus* subgen. nov. *rudichae* sp. nov. R. Lohaj & A. Casale det. 2011 (red label, printed)”, deposited in cDW. Paratypes, two males and two females, same as Holotype (cAC, cDW, cRL). All paratypes are labelled with red printed labels „PARATYPUS *Laemostenus Iranosphodrus* subgen. nov. *rudichae* sp. nov. R. Lohaj & A. Casale det. 2011 “.

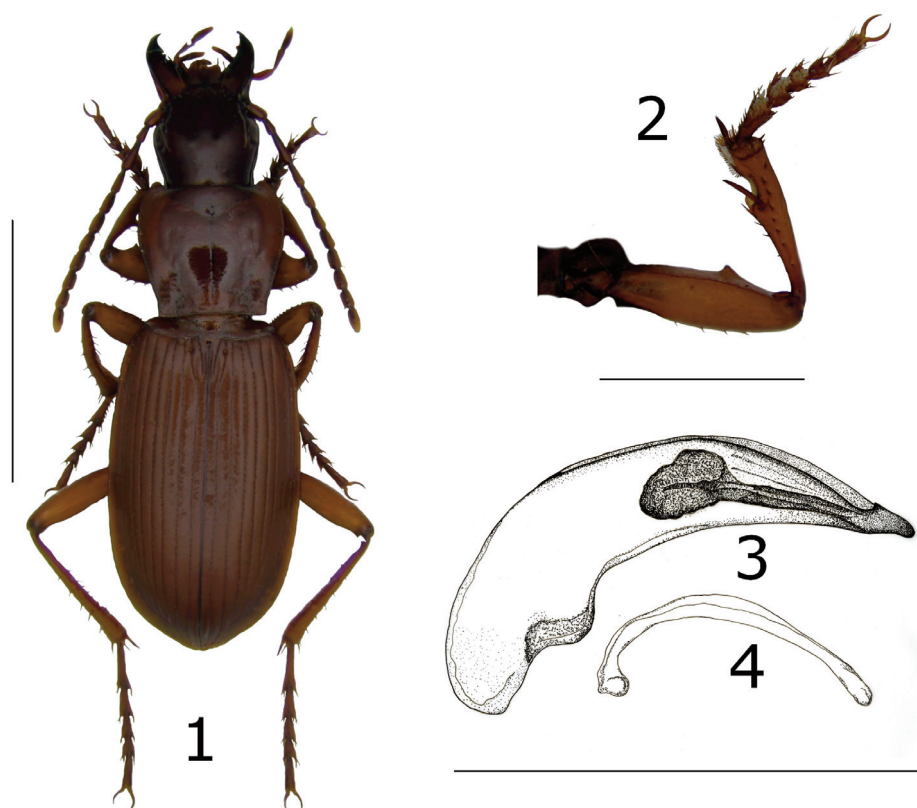
Description.

L: 13.3 – 15.2 mm, TL: 12.4 – 14.1 mm (Holotype 13.7 mm).

Colour dark brownish with paler antennae and tarsi, reddish-brown in immature specimens (all males). Head and pronotum smooth, shiny; elytra glabrous, dull, with distinct microsculpture evident as isodiametric meshes (Fig. 1).

Head elongate but robust, distinctly narrower than pronotum, almost as long as wide; posterior pair of supraorbital setae only present, anterior pair of supraorbital setae absent. Frontal furrows shallow, smooth, reaching the level of the anterior edge of eyes. Eyes reduced, flat, shorter than genae. Clypeus with two (one on each side) long setae; labrum with six setae, the outer pair distinctly longer. Mandibles long, narrow. Antennae relatively short and slender, reaching the anterior fifth of elytral length, flattened from antennomere 3. Antennomere 3 without accessory setae, antennomeres 4-11 with dense, decumbent pubescence.

Pronotum slightly wider than long, ratio PL / PW = 0.85 – 0.92 (HT 0.91); disc with very fine transversal ridges; basal foveae shallow, smooth; base slightly oblique towards the posterior angles. Anterior angles prominent, rounded at apex. Lateral margins distinctly sinuate in front of the posterior angles, which are obtuse. Lateral



Figs. 1–4: *Laemostenus (Iranosphodrus) rudichae* sp. nov., holotype male. 1 – habitus, dorsal aspect; 2 – left anterior leg, ventral aspect; 3 – median lobe of aedeagus, left lateral aspect; 4 – right paramere, left lateral aspect. Scale: 5 mm for fig. 1, 2 mm for figs. 2 – 4.

furrows narrow. Antero-lateral setae at the anterior third present; basolateral setae absent.

Elytra elongate, nearly parallel-sided, ratio $EL / EW = 1.54 - 1.70$ (HT 1.70), with their maximum width in the middle; disc flattened. Base distinctly wider than the pronotal base. Basal bead deeply concave, humeri distinct, humeral denticulation distinct, slightly prominent. Striae very fine, punctuate; intervals flat. Scutellar stria and scutellar setiferous punctures present. Umbilicate series of 16 - 19 setiferous punctures; 2 setae at apex of stria 7.

Mesosternum denticulate in front of mesocoxae. Abdominal sternites smooth, dull, with fine, dense microsculpture; abdominal sterna IV - VII each with two setiferous punctures on the distal margin, without accessory setae.



Fig. 5: Country near the fortress of Răyen.

Legs elongate, slender. Profemora with a distinct tooth on the anterior margin of the dorsal side in both sexes, without accessory setae or teeth (Fig. 2). Protibiae with short and scarce pubescence of 5 – 8 setae at apex of the anterior side. Mesotibiae in males markedly curved, in females almost straight. Meso- and metatibiae with a dense brush of yellow–reddish setae in their apical half. Metatrochanters not elongate, reniform. Tarsi with fine, sparse, decumbent pubescence; tarsal claws with some small teeth along the basal half of the internal margin; male protarsi with tarsomeres 1-3 distinctly dilated.

Male genitalia: aedeagus (Figs. 3 and 4) 2.13 mm long in HT, with median lobe short, arcuate, inflated at its basal third; apex short, subtruncate, slightly prominent dorsally. Right paramere rounded apically, left paramere with short apical membranous lobe.

Distribution and Bionomy.

Known so far only from the type locality. Individuals of the type series were collected near the Răyen fortress, situated south-west of Răyen city, at the altitude of about 2500 m, under stones (Fig. 5). Area of the type locality was covered with low, sparse vegetation and shrubs, soil was at the time of collecting (18th May) very dry.

Etymology.

Patronymic, dedicated to Petra Rudich (Berlin, Germany), enthusiastic traveler and nature lover, one of the discoverers of this new species.

Discussion and conclusions

Laemostenus, in the widest sense of Casale (1988), is a pletoric taxon that includes many species showing a wide range of different morphological features. Not casually, the “subgenera” proposed by Casale (1988) have been treated at gener-

ic rank in several contributions at local scale (see, for instance, Jeannel 1942). Nevertheless, at global scale, the character states of species belonging to these subgenera (or genera) are markedly difficult to evaluate, and have never been the object of a serious phylogenetic analysis, based on morphological and/or molecular data. However, it is a fact that in a recent molecular phylogeny of Sphodrini, proposed by Ruiz et al. (2009), the genus *Laemostenus* appears as a monophyletic - or paraphyletic unit, excluding *Licinopsis* Bedel, 1899 of the Canary islands.

Therefore, the attribution of new species to subgenera accepted in the current literature, or proposed as new, is based on the combination of morphological features known so far, not always easy to evaluate as synapomorphic characters. The question is also complicated by the occurrence, in this genus, of several subterranean species, which show well known homoplastic features („troglomorphy“: depigmentation, reduced eyes, loss of denticulation in tarsal claws), frequently hiding phylogenetic relationships between taxa.

Iranosphodrus subgen. nov. is so far very isolated from other subgenera of *Laemostenus*.

With its morphological characters – profemora with distinct ventral tooth, meso- and metatibiae with brush of setae, and mesotibiae curved in males - the type species resembles some species of the subgenus *Pristonychus*, in particular the troglomorphic *L. (P.) rigrevanensis* (Coiffait, 1961) from Afghanistan, or the montane species *L. (P.) martensianus* Casale, 1988, from Nepal.

Nevertheless, from all *Pristonychus* species it is distinct by the presence of mesosternal teeth in front of mesocoxae (the mesosternum is unarmed in all *Pristonychus* species). Very peculiar is also the absence of both, the anterior supra-orbital and the latero-basal pronotal setae. The absence of latero-basal pronotal setae is known so far in *Laemostenus (Laemostenus) modestoides* Casale, 1988, from Himalaya (North Dhaulagiri). In another species, the sand dwelling *L. (Sphdroides) favieri* (Fairmaire, 1868) from northern Morocco, in some individuals the posterior pair of supraorbital setae is absent (the anterior one in the new species here described), and in individuals of some populations the latero-basal seta of pronotum is also absent (see Casale 1988). Both cited species, however, are obviously not related to *L. (I.) rudichae*, and they demonstrate that loss of some fixed setae, or presence of accessory setae (as in some *Antisphodrus* species), is an autoapomorphic feature which appears independently in some Sphodrini lineages.

In conclusion, *L. (I.) rudichae* seems to be a relic, isolated taxon in a poorly investigated area, very rich of endemic taxa. Further investigations in the field should allow in future the discovery of close relatives of the taxon here described.

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