

## A new species of the genus *Laemostenus* from Zagros Mountains, Iran (Coleoptera: Carabidae: Sphodrini)

Jan Muilwijk<sup>1\*</sup>, Roman Lohaj<sup>2</sup> & Marjan Seiedy<sup>3</sup>

1. Department of Entomology, Naturalis Biodiversity Centre, Leiden, Netherlands 2. Záhradná 61A, SK-900 91 Limbach, Slovakia & 3. School of Biology and Center of Excellence in Phylogeny of Living Organism, College of Science, University of Tehran, Tehran, Iran.

\*Corresponding author, E-mail: Jan.Muilwijk@gmail.com

### Abstract

*Laemostenus (Antisphodrus) murastyii* sp. nov. from Kamaran pass near Fereydunshahr, Zagros Mountains, Iran, is described, illustrated and compared with related species. Moreover, an identification key and a check-list of *Laemostenus glasunowi* species-group is provided.

**Key words:** *Antisphodrus*, epigeal environment, new species, identification key, check-list

معرفی یک گونه جدید از جنس *Laemostenus*

(Coleoptera: Carabidae: Sphodrini) از رشته کوه‌های زاگرس، ایران

یان مویلوویک<sup>۱\*</sup>، رومن لوه‌ای<sup>۲</sup> و مرجان سیدی<sup>۳</sup>

۱- مرکز مطالعات تنوع زیستی طبیعی، لایدن، هلند ۲- زاهرادنا آ ۶۱، اس کی-۹۰۰ لیمباخ، اسلواکی و ۳- دانشکده زیست شناسی و مرکز قطب تبارزایی موجودات زنده، پردیس علوم، دانشگاه تهران، تهران، ایران.

\*مسئول مکاتبات، پست الکترونیکی: Jan.Muilwijk@gmail.com

### چکیده

گونه *Laemostenus (Antisphodrus) murastyii* sp. nov. از گذرگاه کمران نزدیک فریدون شهر، واقع در رشته کوه‌های زاگرس ایران توصیف، ترسیم و با گونه‌های مرتبط مقایسه شد. همینطور کلید شناسایی و چک‌لیستی از گونه‌های *Laemostenus* از گروه گونه‌ای *glasunowi* ارائه شد.

واژه‌های کلیدی: *Antisphodrus*، سطح خاک، گونه جدید، کلید شناسایی، چک لیست

دریافت: ۱۳۹۶/۱۱/۱۹، پذیرش: ۱۳۹۷/۱۲/۲۵.

### Introduction

Eleven species of the genus *Laemostenus*, including nine species of the subgenus *Antisphodrus*, one species of the subgenus *Laemostenus s. str.*, and one species of the subgenus *Sphdroides*, have hitherto been reported from Zagros (Casale, 2017; Tahami *et al.*, 2017). The Iranian *Antisphodrus* species are currently divided into three species-groups. *L. (A.) iranicus* (Dvořák, 1982), *L. (A.) mirzayani* (Morvan, 1973), *L. (A.) deconincki* Casale & Quéinnec, 2001 and *L. (A.) shirazensis*, Muilwijk, Tahami & Lohaj, 2017 belong to the *glasunowi* species-group (Casale, 1988); *L. (A.) aequalis* Muilwijk & Malek Hosseini, 2016 and *L. (A.) zakariyiensis* Muilwijk, Tahami & Lohaj, 2017 belong to the *aequalis* species-group, and *L. (A.) farsicus* Muilwijk, Tahami & Lohaj, 2017, *L. (A.) speleophilus* Muilwijk,

Tahami & Lohaj, 2017 and *L. (A.) zagrosensis* Muilwijk, Tahami & Lohaj, 2017 belong to the *zagrosensis* species-group. Current classification of *Antisphodrus* into species-groups should be understood as provisional to facilitate the identification of particular species and must not reflect their real relationships (Tahami *et al.*, 2017).

All of the known species of the subgenus *Antisphodrus* from Zagros Mountains were found in caves with exception of two species: *Laemostenus (A.) iranicus* with type locality Mount Dena, 2000–3000 m and *L. (A.) mirzayani* with type locality Zard–Kuh, Kurang, 3800 m., which were found in epigeal habitat, under stones. Both epigeal species are known only from the type material.

Among the carabids, collected in 2017 by D. Murastyi and E. Rutjan in the mountains near Fereydunshahr (Isfahan province) and identified by the first author, a number of *Laemostenus* specimens were present. All specimens were identified as *L. (A.) mirzayani* except three specimens, clearly different and belonging to an undescribed species.

### Material and methods

Measurements were taken using a Leica MZ 12.5 stereomicroscope with an ocular micrometre. Macrophotographs were made by a CANON 750D camera and CANON MP-E 65 mm macrolens or a NIKON 10x objective. Genitalia were dissected, cleaned in 10% KOH and fixed in Euparal. The species-group taxonomy of the subgenus *Antisphodrus* follows Casale (1988). A forward slash indicates separate label.

Measurements:

BL: body length (anterior margin of clypeus to the apex of elytra).

HL: head length (measured from the anterior margin of clypeus to the base).

PL: pronotum length (measured along the middle line).

EL: elytra length (measured along suture from the base to the apex of elytra).

HW: head width (maximum width of head).

PW: pronotum width (maximum width of pronotum).

EW: elytra width (maximum width of elytra).

Acronyms of the collections:

HMIM: Hayk Mirzayans Insect Museum, Tehran, Iran.

NMP: National Museum, Department of Entomology, Prague, Czech Republic

CMU: collection of Jan Muilwijk, Bilthoven, Netherlands

CRL: collection of Roman Lohaj, Limbach, Slovakia

### Results

#### *Laemostenus (Antisphodrus) murastyi* Muilwijk & Lohaj, sp. n. (Figs. 1–2)

**Type material.** Holotype female, labelled: “W. Iran, Isfahan prov., Fereydunshahr, Kamaran pass, 3650 m, 2–3.VII.2017, leg. Murastyi D.” / *Laemostenus murastyi* sp. nov. Muilwijk & Lohaj / Holotype [red label]. Paratypes, one female, labelled: “Iran, Zagros Mountains, Esfahan Fereydunshahr, Meidanak Kamaran road, Kamaran pass Ferdum Mountains 3150–3400 m, 2–3.VII.2017, leg. Rutjan E.” and one female from the same place and date as holotype / *Laemostenus murastyi* Muilwijk & Lohaj sp. nov. / Paratype [red label]. Holotype is deposited in HMIM, paratypes in CMU and CRL.

**Diagnosis:** Small, depigmented, brachypterous, brownish, legs and antennomeres reddish-brown, body flattened, with distinct microsculpture (Fig. 1).

**Description:** BL 11.6–12.1 mm. Head very robust, almost as long as wide (HL/HW: 1.1), almost as wide as pronotum, with two pairs of supraorbital setae, posterior pair situated far from eyes. Tempora strongly inflated, frontal furrows very fine; eyes flat, strongly reduced (0.5 mm); neck short. Clypeus with two long setae, labrum with six setae on apical site and three hairs at each lateral site, one paratype with only four apical setae. Antennae slender, reaching anterior fourth of elytral length; antennomere 3 without accessory setae except few apically fixed ones; antennomeres 4–11 pubescent.

Pronotum subquadrate, slightly wider than long (PL/PW: 0.9), maximum width in apical fourth, lateral margin slightly sinuate before hind angles. Posterior angles almost rectangular, anterior angles protruding, basal impressions shallow, with few punctures; lateral margins with two pairs of setae present in lateral furrow, the baso-lateral setae situated in posterior angles, the antero-lateral setae situated at anterior fifth of pronotal length.

Elytra ovate-elongate (EL/EW:1.7), with maximum width in posterior third, disc slightly depressed medially; elytral base as wide as pronotal base. Humeri distinct, with tooth. Striae distinct, with shallow punctures, intervals flat. Scutellar striae present; scutellar setiferous punctures situated in stria 1. Umbilicate series consists of 15–17 setiferous punctures, that are placed in two or three groups on right side, on left side more irregularly situated; two setae at apex of stria 7.

Mesosternum unarmed, without teeth before mesocoxae. Abdominal sternites brownish, dull, with distinct microsculpture, each sternite with two setae.

Legs elongated, slender. Protibiae with some fine hairs at apex of internal sides. Mesotibiae and metatibiae with dense pubescence extending to apical fourth. Tarsi dorsally with decumbent pubescence; claws smooth.

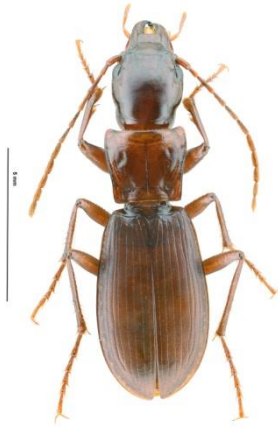
Aedeagus: male unknown.

Ovipositor: as on Fig.2.

**Differential diagnosis:** *Laemostenus (A.) murastyii* sp. nov. differs from *L. (A.) mirzayani* and *L. (A.) iranicus* by the very robust head and absence of a teeth before mesocoxae, as well as by the shape of pronotum. For differences from the other Iranian species of the *glasunowi* species-group see identification key below.

**Distribution and habitat:** the new species is known only from the epigeal zone of the type locality so far. Type specimens were collected under stones, mostly near roots of *Astragalus* sp. along snow fields, together with *L. (A.) mirzayani* (Fig. 5).

**Etymology:** Patronymic, cordially dedicated to our friend, Dmytro Murastyi (Kiev, Ukraine), a specialist in Lycaenidae (Lepidoptera), who discovered this new species.



**Fig. 1.** *Laemostenus (Antisphodrus) murastyii* habitus (holotype)



**Fig. 2.** *Laemostenus (Antisphodrus) murastyii* ovipositor in ventral view (paratype). Scale: 0.5 mm



**Fig. 3.** *Laemostenus (Antisphodrus) mirzayani* habitus



**Fig. 4.** *Laemostenus (Antisphodrus) iranicus* habitus (holotype)



**Fig. 5.** Habitat of *Laemostenus (Antisphodrus) mirzayani* and *L. (A.) murastyii* (Photo E. Rutjan)

## Discussion

The *L. (A.) glasunowi* species-group was established by Casale (1988) for three Iranian species: *L. (A.) glasunowi* (Semenov, 1895), *L. (A.) mirzayani* and *L. (A.) iranicus* (Dvořák, 1982). Later on, another three turkish: *L. (A.) bulirschi* Dvořák, 1995, *L. (A.) baehri* Casale, 1997 and *L. (A.) hroni* Dvořák, 1998, and two Iranian: *L. (A.) deconincki* Casale & Quéinnec, 2001 and *L. (A.) shirazensis* Muilwijk, Tahami & Lohaj, 2017 species were added to this group (Dvořák, 1995; Casale, 1997; Dvořák, 1998; Casale & Quéinnec, 2001; Tahami et al., 2017).

The *L. (A.) glasunowi* species-group is characterized by the presence of two pairs of supraorbital setae (with the exception of *L. (A.) shirazensis*), lateral bead of pronotum with one pair of antero-lateral setae and one pair of baso-lateral setae in posterior angles, antennomere 3 without accessory hairs, mesosternum mostly denticulate before mesocoxae (with the exception of *L. (A.) deconincki*, *L. (A.) baehri*, and *L. (A.) hroni*). Protibiae without accessory hairs at anterior sides, tarsi with short and dense, decumbent pubescence. Aedeagus small and arcuate, basal bulb well developed (Casale, 1988). Based on morphological features described above, *L. (A.) murastyii* sp. nov. belongs to *glasunowi* species-group.

So far, two epigeal, high-altitude species: *Laemostenus (A.) iranicus* from Kuh-e Dena and *L. (A.) mirzayani* from Zard-Kuh, Kurang are known from Zagros Mountains. Both species are very rare and only known from the type locality. Because of this, the find of *L. (A.) mirzayani* in the mountains near Fereyduhshahr is surprising. The discovery of *L. (A.) murastyii* sp. nov. together with *L. (A.) mirzayani* is interesting because no syntopic occurrence of two *Antisphodrus* species from Zagros Mountains has been reported so far.

Species richness of *Antisphodrus* from Zagros resembles the diversity of this subgenus in subterranean habitats of Taurus Mountains, Turkey, from which twelve species of the *bodemeyeri* species-group were reported so far (Lohaj & Mlejnek, 2007). Due to the large area of Zagros Mountains with numerous caves and high-altitude habitats, we expect that new *Laemostenus* species will be discovered.

All so far known Iranian species attributed to *glasunowi* species-group can be identified using following key:

### Key to the identification of the Iranian species of *Laemostenus (Antisphodrus) glasunowi* species-group

1. Head with only posterior pair of supraorbital setae; 17.2–17.5 mm. Zagros.....  
.....*shirazensis* Muilwijk, Tahami & Lohaj, 2017
- Head with both pairs of supraorbital setae.....2
2. Mesosternum with teeth before middle coxae.....3
- Mesosternum unarmed, without teeth before mesocoxae.....5
3. Eyes large, not reduced, long almost as tempora. Pronotum subquadrate, slightly sinuated toward hind angles; 13–14.5 mm. Zagros.....*mirzayani* (Morvan, 1973)
- Eyes smaller, reduced, long about as half of tempora, pronotum subcordiform.....4
4. Base of elytra broad, distinctly wider than base of pronotum, elytral striae with very fine punctation; 11.5 mm. Zagros.....*iranicus* (Dvořák, 1982)
- Base of elytra almost as wide as base of pronotum. Elytra more slender and flattened, elytral striae with distinct punctation; 12–15.5 mm. Elburz.....*glasunowi* Semenov, 1895

5. Head very large, robust, almost as wide as pronotum. Smaller species; 11.6–11.8 mm. Zagros .....  
 .....*murastyii* sp.nov.  
 - Head smaller. Larger species; 15–18 mm. Zagros.....*deconincki* Casale & Quéinnec, 2001

#### Annotated catalogue of *Laemostenus (Antisphodrus) glasunowi* species-group

1. *baehri* Casale, 1997: 280: Turkey, Eastern Taurus - Bolkar dağlari (=Bulghar dagh, Cilician Toros of the ancient authors).
2. *bulirschi* Dvořák, 1995: 417: Turkey, Aladağlari, Demirkazik env. (type locality). Remark: all records of this species from Iran are erroneous and based on a wrong citation of Lohaj, & Mlejnek (2007).
3. *deconincki* Casale & Quéinnec, 2001: 178: Iran, Zagros, Kuh-e-Garrin, Navahand, Gamasiab cave (type locality).
4. *glasunowi* Semenov, 1895: 193: Iran, Elburz, Demavend, cave „Karr“ near Ask "Ab Ask" village (type locality); mountain ranges mountain ranges Kuh-e Kahar and Takht-e Suleiman (Casale, 1988); Kalardasht-Rudbarak (Dvořák, 1982 (Dvořák, 1982), N Iran, Mazandaran, 10 km S Hasan Keif, 2300 m, 3625N 5102E (Lohaj & Mlejnek, 2007).
5. *hroni* Dvořák, 1998: 169: Turkey, Taurus – Bolkar dağlari, Pozanti env. (type locality).
6. *iranicus* (Dvořák, 1982): 279 (*Antisphodrus*): Iran, Zagros, Kuh-e Dena, 2000-3000 m (type locality).
7. *mirzayani* (Morvan, 1973): 184 (*Antisphodrus*): Iran, Zagros, Zard-Kuh, Kurang, 3800 m (type locality); Isfahan prov., SW Fereydunshahr, Kamaran pass, 3500-3650 m (present work).
8. *murastyii* Muilwijk & Lohaj, sp. nov.: W. Iran, Isfahan prov., SW Fereydunshahr, Kamaran pass, 3500-3650m (type locality).
9. *shirazensis* Muilwijk, Tahami & Lohaj, 2017: 121: Iran, Fars, Pasargad, Palangan cave (type locality).

#### Acknowledgments

We wish to thank Sayeh Serri (HMIM) and Jiří Hájek (Prague, Czech Republic) for providing of the type material of *L. (A.) mirzayani* and holotype of *L. (A.) iranicus*.

#### References

- Casale, A. (1988) *Revisione degli Sphodrina (Coleoptera, Carabidae, Sphodrini)*. Museo regionale di Scienze naturali, Torino, Monografie 5, 1024 pp.
- Casale, A. (2017) *Sphodrina*. In: Löbl I. & Löbl D. (Eds.), *Catalogue of Palearctic Coleoptera, Vol. 1. Archostemata – Myxophaga – Adephaga. Revised and Updated Edition*. Brill, Leiden, Boston, pp. 773–790.
- Casale, A. & Quéinnec, E. (2001) Un nouveau sphodride cavernicole des hautes montagnes du Zagros, Iran (Coleoptera, Carabidae, Sphodrina). *Revue Française d'Entomologie (N.S.)* 23, 177–180.
- Casale, A. & Wrase, D. (2012) New or little known *Laemostenus* species from the Near and Middle East (Coleoptera, Carabidae: Sphodrini). *Linzer biologische Beiträge* 44 (2), 1111–1127.
- Dvořák, M. (1982) Neue *Antisphodrus*-Arten aus Mittelasien and Iran (Coleoptera, Carabidae, Sphodrini). *Acta Entomologica Bohemoslovaca* 79, 274–280.

- Dvořák, M.** (1995) Einige neue stenotherme *Laemostenus*-arten. *Entomofauna* 16 (22), 413–420.
- Dvořák, M.** (1998) Eine neue *Laemostenus*-Art aus Turkey (Coleoptera, Carabidae: Sphodrini). *Klapalekiana* 34 (3–4), 169–171.
- Lohaj, R. & Mlejnek, R.** (2007) Two new species of *Laemostenus* (*Antisphodrus*) (Coleoptera: Carabidae) from Turkey and Syria. *Acta Societatis Zoologicae Bohemicae* 71, 7–14.
- Malek Hosseini, M.J., Muilwijk, J., Sadeghi, S. & Bakhshi, Y.** (2016) The Carabid fauna of caves in the southern Zagros Mountains and description of *Laemostenus* (*Antisphodrus*) *aequalis* nov.sp. and *Duvalius kileri* nov.sp. from Kohgiluyeh and Boyer–Ahmad Province, Iran (Coleoptera: Carabidae). *Entomofauna* 37, 185–204.
- Tahami, M.S., Muilwijk, J., Lohaj, R., & Sadeghi, S.** (2017) Study of *Laemostenus* species across Zagros and Central zone of Iran, with the description of seven new cavernicolous species and notes on subgenus *Iranosphodrus*. *Zootaxa* 4344 (1) 115–136.
-