Two new species of the genus *Laemostenus (Pristonychus)* Bonelli from Bulgaria and notes on *L. (P.) euxinicus* Nitzu (Coleoptera, Carabidae)

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Abstract

Two new species of Laemostenus (Pristonychus) *Bonelli from Bulgaria and notes on* L. (P.) euxinicus *Nitzu (Coleoptera, Carabidae).*— Two new species of subgenus *Pristonychus* Dejean, 1828, of the genus *Laemostenus* Bonelli, 1810, are described and illustrated: *L. stoevi* n. sp. from northern Bulgaria and *L. derventicus* n. sp. from southeastern Bulgaria. Both new species are distinguished from the closely related *L. euxinicus* Nitzu, 1998, *L. tichyi* (Kult, 1946) and *L. punctatus* (Dejean, 1828). This work contributes to both the faunistics and taxonomy of *L. euxinicus* from Romania. The assumed adaptive trend and origin of the most modified characters of the two new species are discussed, and the systematic place, taxonomic status and formation of more divergent species of the "*terricola*" group are presented.

Key words: Coleoptera, Carabidae, *Laemostenus, L. stoevi* n. sp., *L. derventicus* n. sp., Bulgaria.

Resumen

Dos nuevas especies del género Laemostenus (Pristonychus) *Bonelli de Bulgaria y notas sobre* L. (P.) euxinicus *Nitzu (Coleoptera, Carabidae).*— Se describen e ilustran dos nuevas especies del subgénero *Pristonychus* Dejean, 1828, del género *Laemostenus* Bonelli, 1810: *L. stoevi* sp. n. del norte de Bulgaria y *L. derventicus* sp. n. del sudeste de Bulgaria. Las dos nuevas especies se diferencian de las estrechamente relacionadas con ellas *L. euxinicus* Nitzu, 1998, *L. tichyi* (Kult, 1946) y *L. punctatus* (Dejean, 1828). Este trabajo es una contribución a la faunística y a la taxonomía de *L. euxinicus* de Bulgaria. Se discuten y asumen las tendencias adaptativas y el origen de la mayoría de caracteres modificados de las dos nuevas especies y se presentan la ubicación sistemática, el estatus taxonómico y la formación de especies más divergentes del grupo "*terricola*".

Palabras clave: Coleoptera, Carabidae, *Laemostenus, L. stoevi* sp. n., *L. derventicus* sp. n., Bulgaria.

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Introduction

During a recent study of the specimens from the genus *Laemostenus* deposited in the collections of the National Museum of Natural History–Sofia (NMNHS), specimens belonging to two new species from two different regions of Bulgaria (fig. 1) were found. Their diagnostic characters and descriptions are given below. Further on, based on two male specimens from two new localities, a contribution to the taxonomy of *L. euxinicus* is given. Finally, the systematic position of the new taxa is discussed, as the presence of some apotypic external characters suggests an adaptive trend to live in subterranean habitats.

Material and methods

In the description of *L. stoevi* n. sp. comparative material of *L. punctatus* (Dejean, 1828) from the cave "Devetashka peshtera" was used, collected simultaneously with two females of the first taxon, as well as two males of *L. euxinicus* Nitzu, 1998 (see below). *L. derventicus* n. sp. was compared with the above–mentioned specimens of *L. stoevi* n. sp. and *L. euxinicus*, with some individuals of *L. punctatus*, collected from different regions in Bulgaria, and with few specimens of *L. cimmerius* (Fisher–Waldheim, 1823), found around the type locality of this new species.

The sclerites and setae of the ovipositor are named after BALL & SHPELEY (1983). The data for the geological age of the various types of limestone are in accordance with POPOV (1970).

Results

Laemostenus (Pristonychus) stoevi n. sp. (figs. 1–2, 6, 10, 14, 18, 20, 22)

Type material

Holotype: 1♂, Bulgaria, Nikopol District, v. Muselievo, cave "Nanin kamik", 12 X 1986, leg. P. Beron, U. T. M. grid co–ordinates LJ23 (preserved in coll. NMNH).

Paratypes: 1♂, 2♀ (original labels in Cyrillic) Bulgaria, Lovech District, cave "Vodnata peshtera", 16 IV 1926, leg. N. Radev, U. T. M. grid co–ordinates LH 39 (a male and a female in coll. A. Casale, other female in coll. NMNHS); 2♂, 1♀, Bulgaria, Nikopol District, v. Muselievo, cave "Nanin kamik", 12 VIII 1994, leg. P. Stoev & T. Ivanova, coll. NMNHS; 2♀, Bulgaria, Lovech District, cave Devetashka 13 VIII 1994, leg. P. Stoev, U. T. M. grid co–ordinates LH 28, coll. NMNHS.

Diagnostic features

L. stoevi n. sp. differs from *L. euxinicus*, *L. derventicus* n. sp., and *L. punctatus* by shape of the male genitalia (figs. 2, 6, 10, 14). The median lobe in lateral view is that which curves most downwards (fig. 2), the right paramere has the roundest mid part and the most bent apex (fig. 10), and the left paramere is different (fig. 14) in comparison with males of the other three taxa. The new species differs from *L. derventicus* n. sp., *L. punctatus* and *L. tychyi* (genital characters unknown) in the protibia which has accessory pubescence on the anteriormargin distally (fig. 22). Further on, *L. stoevi* n. sp. can be distinguished from *L.*

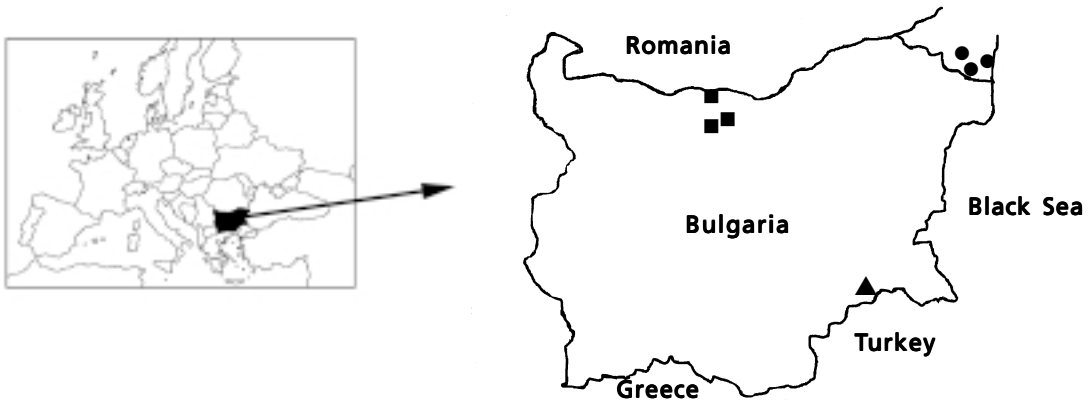
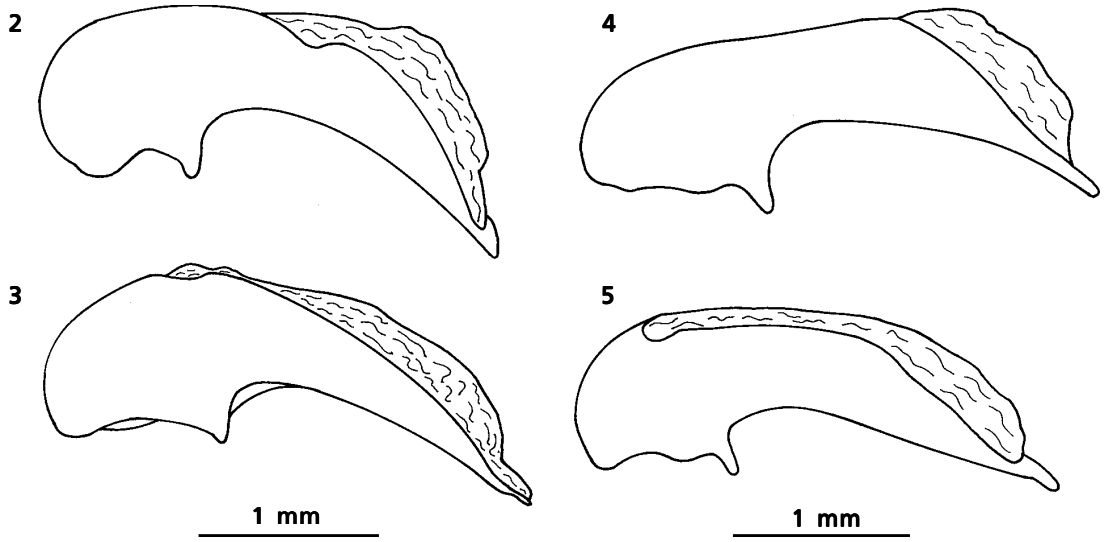


Fig. 1. Map of Bulgaria and southern Romanian Dobrudja showing the distribution of: *Laemostenus (Pristonychus) stoevi* n. sp. (■); *Laemostenus (Pristonychus) euxinicus* Nitzu (●); *Laemostenus (Pristonychus) derventicus* n. sp. (▲).

Fig. 1. Mapa de Bulgaria y el sur de Rumanía (región de Dobrudja) que muestra la distribución de: Laemostenus (Pristonychus) stoevi *sp. n. (■);* Laemostenus (Pristonychus) euxinicus *Nitzu (●);* Laemostenus (Pristonychus) derventicus *sp. n. (▲).*



Figs. 2–5. Shape of lateral aspect of the median lobe of: 2. *Laemostenus (Pristonychus) stoevi* n. sp. holotype, cave "Nanin kamik", v. Muselievo, Nikopol District, Bulgaria; 3. *Laemostenus (Pristonychus) punctatus,* cave "Devetashka peshtera", v. Devetaki, Lovech District, Bulgaria; 4. *Laemostenus (Pristonychus) euxinicus* Nitzu, military bunker in Hagieni Forest, v. Albeshti, Mangalia District, Romanian Dobrudja; 5. *Laemostenus (Pristonychus) derventicus* n. sp., holotype, a small precipice near v. Krajnovo, Elhovo District, Bulgaria.

Figs. 2–5. Configuración del aspecto lateral del lóbulo medio de: 2. Laemostenus (Pristonychus) stoevi *sp. n. holotipo, cueva "Nanin kamik", Muselievo, distrito de Nikopol, Bulgaria; 3.* Laemostenus (Pristonychus) punctatus, *cueva "Devetashka peshtera", Devetaki, distrito de Lovech, Bulgaria; 4.* Laemostenus (Pristonychus) euxinicus *Nitzu, búnker militar en el bosque de Hagieni, Albeshti, distrito de Mangalia, Dobrudja rumana; 5.* Laemostenus (Pristonychus) derventicus *sp. n., holotipo, en un pequeño precipicio cerca de Krajnovo, distrito de Elhovo, Bulgaria.*

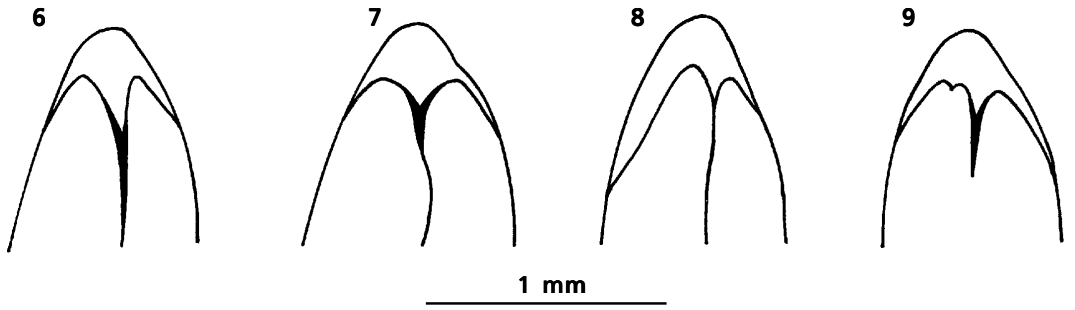
derventicus n. sp. by the different ratio width of elytra / width of pronotum, and from *L. punctatus* in colour of the tegument, lack of denticles on the claws inside, and both shape of sternum eight in female (figs. 18–19) and stylus of the ovipositor (figs. 20–21).

Etymology

The new species is named after one of its collectors, the young specialist of Balkan Chilopoda and enthusiastic cave explorer (Pavel Stoev).

Description

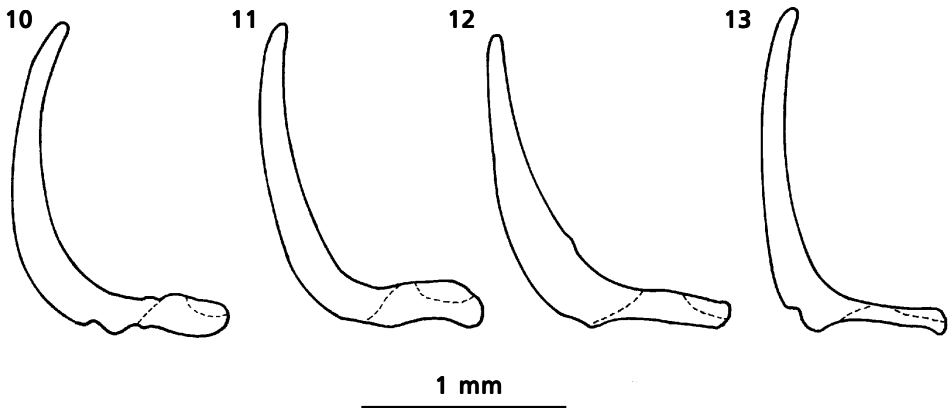
Colour varied from piceous–ferrugineus to nearly black, without metallic lustre. Length 12.8–19 mm (holotype 19 mm); width 4.7–6.8 mm (holotype 6.8 mm). Microsculpture on elytra isodiametric, absent on head and pronotum. Head smooth, antennae exceeding first quarter of elytra; eyes slightly prominent, shorter than temporae; frontal furrows very shallow; mentum with a bifide tooth. Pronotum cordate, 1.13–1.24 times wider than long (mean 1.17, of holotype 1.24) and 1.34–1.43 times wider than head with eyes (mean 1.39, of holotype 1.43), broadest in first third, with some punctures along lateral margins and at base; disc towards base with more or less conspicuous transversal microstirae; median furrow long and straight; anterior margin concave, anterior angles prominent, sub–acuminate; bead of lateral margins before anterior angles disappears; sides strongly sinuated towards, with somewhat projecting posterior angles; posterior margin almost straight and slightly curved towards posterior angles; bead of posterior margin interrupted in middle; base with a single fovea from each side. Legs are long and slender; posterior ventral margins of profemora with three or four setae, smooth (absent obvious tubercles); protibia with accessory pubescence on distal end of anterior margin; first three male protarsi with adhesive bristles ventrally; mesotibia slightly curved distally in males, and almost straight in females; mesotibiae and metatibiae inside distally with brush of hairs; first article of tarsus densely pubescent on all sides; onychium with four or five pairs of setae on ventral surface; claws smooth



Figs. 6–9. Shape of the dorsal aspect of the apex of the median lobe of: 6. *Laemostenus (Pristonychus) stoevi* n. sp., holotype; 7. *Laemostenus (Pristonychus) punctatus*; 8. *Laemostenus (Pristonychus) euxinicus* Nitzu; 9. *Laemostenus (Pristonychus) derventicus* n. sp., holotype. (For more information on locations of these species, see the legend of figs. 2–5.)

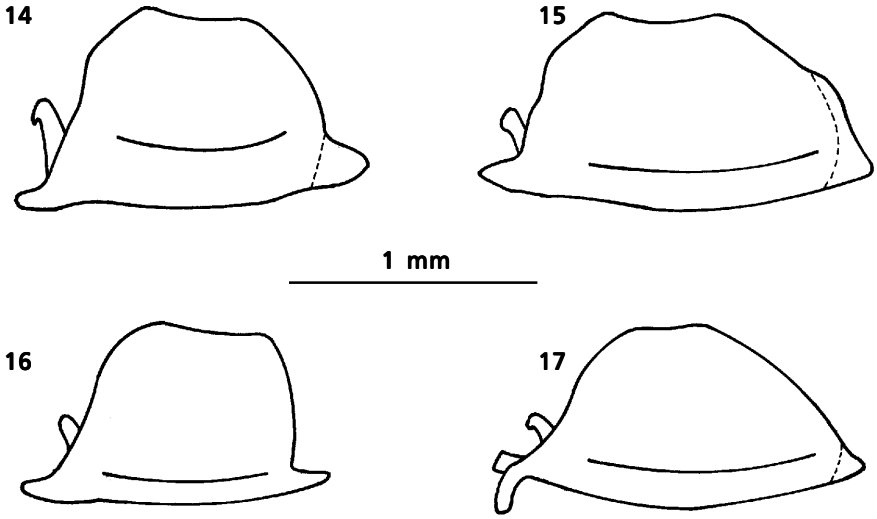
Figs. 6–9. Visión dorsal del ápice del lóbulo medio de: 6. Laemostenus (Pristonychus) stoevi *sp. n. holotipo; 7.* Laemostenus (Pristonychus) punctatus*; 8.* Laemostenus (Pristonychus) euxinicus *Nitzu; 9.* Laemostenus (Pristonychus) derventicus *sp. n., holotipo. (Para más información sobre las localizaciones de estas especies, ver el pie de las figs. 2–5.)*

inside. Elytra dilated towards posterior half, 1.43–1.59 times longer than broad mean 1.515, of holotype 1.51) and 1.41–1.53 times wider than pronotum (mean 1.49, of holotype 1.41); two elytron coalesced from scutellum to beginning of posterior half; angle of shoulder protruding, but absent clear denticle; both scutellar stria and scutellar setiferous pore present, other striae delicately punctate, intervals flat; umbilicate marginal series of 21–23 pores; end of seventh stria with three apical pores. Apterous. Ventrum smooth; apophysis of prosternum indistinctly bordered; exterior margin of metaepisterna longer than anterior; last visible sternum with single mar-



Figs. 10–13. Shape of the right paramere of: 10. *Laemostenus (Pristonychus) stoevi* n. sp., holotype; 11. *Laemostenus (Pristonychus) punctatus*; 12. *Laemostenus (Pristonychus) euxinicus* Nitzu; 13. *Laemostenus (Pristonychus) derventicus* n. sp., holotype. (For more information on locations of these species, see the legend of figs. 2–5.)

Figs. 10–13. Forma del parámero derecho de: 10. Laemostenus (Pristonychus) stoevi *sp. n. holotipo; 11.* Laemostenus (Pristonychus) punctatus*; 12.* Laemostenus (Pristonychus) euxinicus *Nitzu; 13.* Laemostenus (Pristonychus) derventicus *sp. n., holotipo. (Para más información sobre las localizaciones de estas especies, ver el pie de las figs. 2–5.)*



Figs. 14–17. Shape of the left paramere of: 14. *Laemostenus (Pristonychus) stoevi* n. sp., holotype; 15. *Laemostenus (Pristonychus) punctatus*; 16. *Laemostenus (Pristonychus) euxinicus* Nitzu; 17. *Laemostenus (Pristonychus) derventicus* n. sp., holotype. (For more information on locations of these species, see the legend of figs. 2–5.)

Figs. 14–17. Forma del parámero izquierdo de: 14. Laemostenus (Pristonychus) stoevi *sp. n. holotipo; 15.* Laemostenus (Pristonychus) punctatus*; 16.* Laemostenus (Pristonychus) euxinicus *Nitzu; 17.* Laemostenus (Pristonychus) derventicus *sp. n., holotipo. (Para más información sobre las localizaciones de estas especies, ver el pie de las figs. 2–5.)*

ginal pore in each side. Sternum eight of female sex with slightly slanting and hardly wavy distal border (fig. 18) whereas in female of *L. punctatus* same has well–expressed slanting and wavier distal border (fig. 19). Male genitalia are illustrated on figs. 2, 6, 10, 14. Apical stylomere of left stylus (fig. 20) having blade with dorsal side evidently concave, widened before rounded apex, one dorsal ensiform seta medially, two different in size dorsolateral ensiform setae (apical stylomere of left stylus, fig. 21, of female of *L. punctatus* from "Devetashka peshtera" has a blade with dorsal side slightly concave before pointed apex, one dorsal ensiform seta medially, and two dorsolateral ensiform setae different regarding size).

Distribution

The "Nanin kamik" cave is 200 m long and it is buried in Sarmatic limestone. It lies on the right side of the Osam River at 100 m altitude and the nearest village is Muselievo (Nikopol District).

The other two caves, "Vodnata peshtera" and "Devetashkata peshtera", also lie on the right side of the Osam River at elevation of 250–300 m in Early Cretaceous limestone. The first cave (25 m height, 60 m width, 450 m length) is situated between the villages of Chavdartsi and Alexandrovo (Lovech District). The second (57 m height, 102 m width and mote than 2000 m length) is located in the vicinity of Devetaki Village (Lovech District).

The direct line between the two caves is 10 km, whereas the distance between them and the cave "Nanin kamik" is 42–44 km approximately. Perhaps the specimens from the two closer caves should be regarded as population of a single species, but not geographical race.

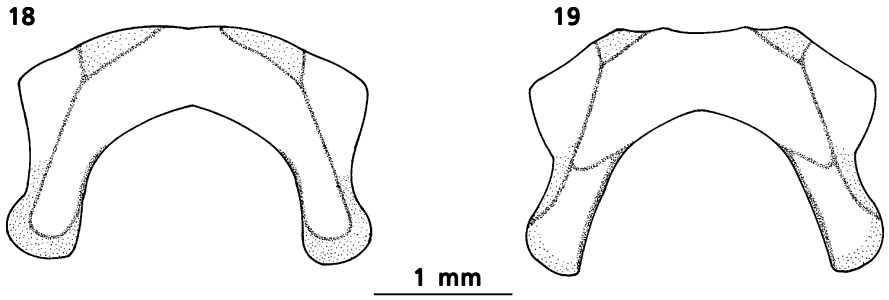
Geographical affinities

In the limits of the "*terricola*" species group, this strict troglophile beetle is sympatric and syntopic of *L. punctatus,* and is allopatric (e. g. isolated genetically from) of *L. euxinicus, L. derventicus* n. sp. and *L. tychyi*.

Notes

Part of the type series of *L. stoevi* n. sp. has been previously studied and published. The male specimen captured in the cave "Nanin kamik", 12 X 1986, leg. P. Beron bears label: "*L. (Pristonychus) cimmerius weiratheri* Müll. det. A. Casale 1988" and it was recorded by BERON (1994).

One ♂, 2♀, individuals collected from the cave "Vodnata peshtera" (original labels in Cyrillic) were identified as "*L. (P.) terricola punctatus* (Dej.) det. A. Casale 1994".



Figs. 18–19. Ventral line drawings of sternum eight of: 18. *Laemostenus (Pristonychus) stoevi* n. sp., female paratype; 19. *Laemostenus (Pristonychus) punctatus,* female. Both specimens from cave "Devetashka peshtera", v. Devetaki, Lovech District, Bulgaria.

Figs. 18–19. Dibujos de la línea ventral del esternón ocho de: 18. Laemostenus (Pristonychus) stoevi *sp. n., paratipo, hembra; 19.* Laemostenus (Pristonychus) punctatus, *hembra. Ambos especímenes procedentes de cueva "Devetashka peshtera", Devetaki, distrito de Lovech, Bulgaria.*

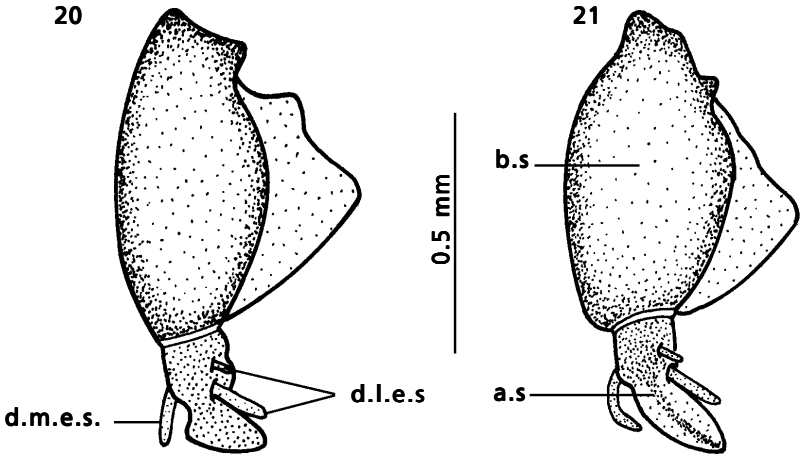
The ♂ specimen from the same locality also has a second label: "*Laemostenus terricola*? det. V. Guéorguiev".

Two ♀ specimens, collected from the cave "Devetashka", 13 VIII 1994, leg. P. Stoev, bear labels: "*L. (P.) terricola punctatus* (Dej.) det. B. Guéorguiev 1994" and they were cited by BERON (1994).

Laemostenus (Pristonychus) derventicus n. sp. (figs. 1, 5, 9, 13, 17)

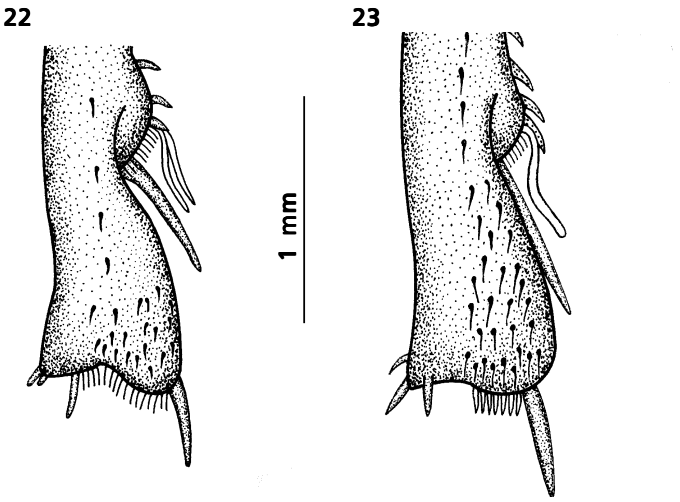
Type material

Holotype: 1♂, small nameless pothole, 350–400 m, v. Krajnovo (Elhovo District), U. T. M. grid co–ordinates MG 85, 22 IV 1991, leg. P. Stoev, coll. NMNHS.



Figs. 20–21. Ventral aspect of the left stylus (stylomeres 1–2) of the ovipositor of: 20. *Laemostenus (Pristonychus) stoevi* n. sp., female, paratype; 21. *Laemostenus (Pristonychus) punctatus*, female. Both specimesn from cave "Devetashka peshtera", v. Devetaki, Lovech District, Bulgaria: b.s. Basal stylomere; a.s. Apical stylomere; d.l.e.s. Dorsolateral ensiform setae; d.m.e.s. Dorsomedial ensiform seta.

Figs. 20–21. Aspecto ventral del estilo izquierdo (estilómero 1–2) del ovopositor de: 20. Laemostenus (Pristonychus) stoevi *sp. n., paratipo hembra; 21.* Laemostenus (Pristonychus) punctatus*, hembra. Ambos especímenes procedentes de cueva "Devetashka peshtera", Devetaki, distrito de Lovech, Bulgaria: b.s. Estilómero basal; a.s. Estilómero apical; d.l.e.s. Sedas ensiformes dorsolaterales; d.m.e.s. Seta ensiforme dorsomedial.*



Figs. 22–23. Presence of accessory pubescence on the distal end on the anterior margin of the right protibia of: 22. *Laemostenus (Pristonychus) stoevi* n. sp., male paratype, cave "Nanin kamik", v. Muselievo, Nikopol District, Bulgaria; 23. *Laemostenus (Pristonychus) euxinicus* Nitzu, male specimen, cave "Limanu", v. Limanu, Mangalia District, Romanian Dobrudja.

Figs. 22–23. Presencia de la pubescencia accesoria en el extremo distal del margen anterior de la protibia derecha: 22. Laemostenus (Pristonychus) stoevi *sp. n., paratipo macho, cueva "Nanin kamik", Muselievo, distrito de Nikopol, Bulgaria; 23.* Laemostenus (Pristonychus) euxinicus *Nitzu , macho, cueva "Limanu", Limanu, distrito de Mangalia, Dobrudja rumana.*

Diagnostic features

This species is quite similar to *L. stoevi* n. sp., *L. euxinicus*, and *L. punctatus*, but differs from all cited species by the shape of median lobe and two parameres (figs. 5, 9, 13, 17). The median lobe in the lateral aspect is somewhat like that of *L. punctatus* but its apex is not so bent downwards (fig. 5). Compared with males of the three other species, the right paramere of *L. derventicus* n. sp. seems the most slender with the basal part almost at a right angle to the apical one (fig. 13), whereas the left paramere has the left front margin evidently bent downwards (fig. 17). In particular, the new species can be distinguished from *L. stoevi* n. sp. in protibia without accessory pubescence on the distal end of the anterior margin and different ratio of width of elytra / width of pronotum. *L. derventicus* n. sp. is distinct from *L. euxinicus* in protibia without accessory pubescence on the distal end of the anterior margin, colour of the tegument is lighter, and fewer pores of umbilicate series. *L. derventicus* n. sp. differs from *L. punctatus* in depigmentation of tegument, smaller number of marginal pores of umbilicate series, and reduction of the denticulation on claws inside.

Etymology

This species is named after the region (the Derventski Vazvisheniya Hills) where the holotype was found.

Description

Colour piceous–ferrugineus, without metallic lustre; head somewhat darker, palpi lighter. Total length 14.5 mm; width 5.8 mm. Microsculpture on elytra isodiametric, absent on head and pronotum. Head smooth, antennae exceeding first quarter of elytra; eyes slightly prominent, as long as temporae; frontal furrows very shallow; mentum with a bifide tooth. Pronotum cordate, 1.11 times wider than long and 1.41 times wider than head (with eyes), broadest in first third, with a few fine punctures along lateral margins; disc smooth; median furrow well expressed; anterior margin concave, its angles prominent, with rounded apex; lateral margins strongly sinuated towards somewhat projecting posterior angles, bead of lateral margins before both anterior and posterior angles disappears; posterior margin almost straight and slightly curved towards angles; bead of posterior border interrupted in middle; basal surface with single shallow fovea from each side. Legs long and slender; posterior ventral margins of profemora with four setae, alternating with three small, but tubercles not so evident; protibia without accessory pubescence on distal end of anterior margin; first three male protarsi with adhesive bristles ventrally; mesotibia almost straight; mesotibia and metatibia inside distally with brush of hairs; first article of tarsus densely pubescent on all sides; onychium with

five pairs of setae on ventral surface; claws smooth inside. Elytra dilated towards posterior half (1.48 times longer than broad and 1.62 broader than pronotum); angle of shoulder protruding, but no clear denticle; scutellar stria and setiferous puncture present, other striae scarcely punctate, intervals flat; umbilicate marginal series of left elytron of 21 pores, right one (of 20 pores); end of seventh stria with three apical pores (two large and one further), hardly visible and rather smaller. Apterous. Ventrum smooth; apophysis of prosternum indistinctly bordered; exterior margin of metaepisterna longer than anterior; last visible sternum with a single marginal pore on each side. Male genitalia shown in figs. 11–14.

Type locality
The single specimen of this beetle was found in a small precipice at eight–nine m depth, which is situated in Middle Triassic limestone. This precipice is located among the Derventski vazvisheniya Hills, on three–four km west of v. Krajnovo and next to the Bulgarian–Turkish border.

Geographical affinities
This troglophile species is allopatric of the other species of the "*terricola*" group here examined (*L. stoevi* n. sp., *L. euxinicus, L. punctatus* and *L. tychyi*), e. g. the population to which these specimens belong is isolated reproductively from the most related taxa. *L. derventicus* n. sp. is sympatric of *L. cimmerius* (a beetle belonging to other phyletic trend of the "*terricola*" group). The latter species is common in microcavernicolous limestone habitats of the Derventski vazvisheniya Hills and adjacent to these regions (unpublished information). Three other ground–beetles taxa were collected together with *L. derventicus* n. sp.: *Platyderus* cf. *rufus* (Duftschmid), *Amara saphirea* Dej., and *Amara lucida* (Duft.).

Laemostenus (Pristonychus) euxinicus Nitzu, 1998 (figs. 1, 4, 8, 12, 16, 23)

Material examined
1♂, Romanian Dobrudja, v. Limanu (Mangalia District), cave "Limanu", U. T. M. grid co–ordinates PG 25, under stone on clay & guano, 3 VIII 2000, leg. B. Petrov & T. Ivanova, coll. A. Casale; 1♂, Romanian Dobrudja, v. Albeshti (Mangalia District), military bunker in Hagieni Forest, U. T. M. grid co–ordinates PG 15, under stone, 1 VIII 2000, leg. B. Petrov & T. Ivanova, coll. NMNHS. Both places are new established for this taxon, after its description (fig. 1).

Taxonomic comments
After examining the males and studying the original description, the author considers that *L. euxinicus* is clearly a distinct species. The variations in the shape of the sclerites of male genitalia in both specimens (figs. 4, 8, 12, 16) are within the limits of digressions normally observed in samples of separate populations of the same species**.** However, some of the characters, mentioned by NITZU (1998), merit noting with the diagnosis of *L. euxinicus*. These are: flatter temporae, the evident frontal foveae near to the clypeal suture, angulated carina of the front profemori, more acute front angles, much thinner lateral margins of pronotum, and basal margin of the elytra oblique towards scutellum. Such features are either lacking with the two individuals examined by the present author, or their state is very unstable. The presence of some of the above–mentioned characters can even be observed in single specimens of *L. punctatus* inhabiting North Bulgaria. These features are not therefore accurate for differentiation. More reliable diagnostic characters in *L. euxinicus* are probably the shape of male genitalia, the smooth claws, the number of pores of the umbilicate marginal series of elytron, the darker colour of the tegument, practically reduced bead of the base of pronotum, and almost the straight mesotibiae (in the order of enumeration). A fairly important (and stable) external diagnostic character available with this taxon, but omitted by NITZU (1998), is the presence of accessory pubescence on the distal end of the anterior margin of the protibia (fig. 23). The state of this feature in *L. euxinicus*, in comparison with *L. stoevi* n. sp., appears more advanced. Finally, there are no distinct humeral teeth of elytra in either male studied.

Geographical affinities
L. euxinicus is sympatric of *L. punctatus* only (cfr. Nitzu, 1998, sub *L. terricola* p.), and is allopatric of the other three studied here members of the species group "*terricola*".

Discussion

L. stoevi n. sp. and *L. derventicus* n. sp., included in the "*terricola*" species group of subgenus *Pristonychus*, with *L. euxinicus*, *L. tichyi* and *L. punctatus,* should be considered as separate species of the "superspecies" *L. terricola* (Herbst, 1783), after CASALE (1988). At present, Casale (personal communication), an authority on the Sphodrini carabids, continues considering that "the question about the species of the "*terricola*" group is not easy (species, semispecies, subspecies?)". This problem apparently requires further research.

In comparison with *L. terricola* and *L. punctatus*, both new species are particularly interesting for the presence of some modified characters (depigmentation of the tegument, reduction of the

number of pores of the umbilical series, lack of obvious tubercles between the setae on the posterior ventral margins of the profemora, presence of accessory pubescence on the distal end of the anterior margin of the protibia, mesotibia slightly curved or almost straight distally, and reduction of the denticulation of the internal side of claws). These presumably apotypic special features would be regarded as further adaptation to a subterranean manner of living. On account of convergence, most of the modifications mentioned above, including the lengthening of antennae and legs, seem adaptive rather than phyletic characters, which cannot differentiate the subgenera of *Laemostenus* (Casale, 1988). For example, similar adaptive characters appear also in *Actenipus* Jeannel, 1937. In two species from the last subgenus, e.g. *Laemostenus (Actenipus) acutangulus* (Schaufuss, 1862) from south Italy (CASALE, 1988) and *Laemostenus (Actenipus) dubaulti* Lassale, 1989 from the *Peloponessos* (LASSALE, 1989), there is accessory pubescence on the distal end of the anterior margin of the protibia. The reasons for such adaptation are probably to a great extent similar to those discussed by NITZU (1998). The lack of specimens captured from epigeous, lapidicolous or stratobios microhabitats shows that the most appropriate microclimatic conditions for the survival of two new species lies in the net of cracks of limestone. In the underground microhabitat, the variation of either or both of the most important abiotic factors (humidity and temperature) for the existence of these mesophillous beetles is considerably less than on ground, under stones or in the superficial soil stratum**.**

I suggest that *L. stoevi* n. sp., *L. derventicus* n. sp., *L. euxinicus* and *L. tichyi* are formed as the result of preadaptation brought about in several local Pleistocene populations of an eutopic (not so specialized, and arboreal) South–European species. It seems also that all four taxa present independent divergent lines from this ancestor, which was comprised during the Pleistocene both recent morphospecies (or semispecies?) [*L. terricola* (in the north–west) and *L. punctatus* (in the south–east)]. In the shape of the male genitalia (figs. 2–17) and the lower number of setae on the posterior margin of the profemora, all the four abovementioned species, are more similar to *L. terricola* than to *L. cimmerius*. The apices of the median lobes dorsally (figs. 6–9) in three of them (the male genitalia of *L. tichyi* are as yet unknown) are wholly rounded (like *L. terricola*) but not subacuminate (like *L. cimmerius*). The number of setae on the posterior margin of the profemori of the four species is three or four (figures closer to *L. terricola* rather than to *L. cimmerius)*.

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