ON A NEW CAVE–DWELLING BEETLE (TRECHINAE, CARABIDAE) FROM SERBIA

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Abstract — In the present study, a new cavernicolous beetle has been described from Serbia: Pheggomisetes ninae n. sp. (Trechinae, Carabidae). All important taxonomic features have been diagnostified and illustrated. Pheggomisetes ninae n. sp. is the first known species from the genus inhabiting Serbia and Montenegro, and it is easily distinguished from all other species and subspecies of Pheggomisetes Knirsch.

The new species belongs to an old separate phyletic lineage of Mesogeid origin. This species is both relict and endemic to Serbia and the Balkan Peninsula.

UDC 595.762(497.11)

INTRODUCTION

The genus Pheggomisetes Knirsch includes three species and 12 subspecies of cavernicolous archaic ground beetles which have been highly modified during their long evolution (Berou, 1994; Löbl & Smetana, 2003). This “aphaenopsian” genus has an isolated place in systematics and forms a distinct phyletic series (Casale, Vigna Taglianti & Juberthie, 1998). All species of Pheggomisetes are stenoendemics and restricted to certain caves in the Stara Planina Mountains in Bulgaria. Presently known species of the mentioned genus are: Pheggomisetes buresi (Knirsch), Pheggomisetes globiceps Buresch, and Pheggomisetes radevi Knirsch (Casale & Laneyrie, 1982; Löbl & Smetana, 2003). Additionally, Pretner (1970) found a few specimens of Pheggomisetes in the Odžina Rupa Cave (SE Serbia) and identified them as the subspecies Pheggomisetes globiceps ilandjievii Gueorguiev, whose type localities are the Balabanova Dupka Cave and Malka Balabanova Dupka Cave in the village of Komšica, Bulgaria, just over the Serbian–Bulgarian border (Gueorguiev, 1964).

In a small sample of trechines from southeastern Serbia borrowed from the Natural History Museum in Vienna and labelled as “globiceps ilandjievii”, we identified and established a new species: Pheggomisetes ninae n. sp. Description of the new species is based on the study of one male and two females. The type—specimens (holotype male and two paratype females) are deposited in the collection of the Natural History Museum in Vienna, Austria.

SYSTEMATIC PART

CARABIDAE LATREILLE

PHEGGOMISETES KNIRCH

PHEGGOMISETES NINAE, NEW SPECIES

Etymology. — After Miss Nina Ćurčić, geographer, sister of the senior author of the present paper.

Type–locality. — Odžina Rupa Cave, village of Odorovci, Mt. Vidlič, nr. Dimitrovgrad, southeast Serbia, 4 August 1967 (holotype male and two paratype females), collected by E. Pretner.

Diagnosis. — This new species is clearly different from all existing congeners. From Pheggomisetes buresi (Knirsch), P. radevi Buresch, and P. globiceps Knirsch, the new species is easily distinguished by the different body size (7.20–9.00 mm in P. buresi vs. 6.42–6.81 mm in P. ninae n. sp.); form of the head (elliptic vs. oval. vs. spherical/inversely oviform/oval vs. Inversely oviform) form of the frontal furrows (reaching the mid–head level, markedly and strongly curved vs. almost reaching the mid–head level, very deep, and markedly curved vs arcuated/curved/almost parallel up to their middle part, arcuated/curved after their middle part vs. overreaching the mid–head level, deepened anteriorly, and sigmoidly curved); length of the antennae [long, exceeding the body length vs. not exceeding/reaching/exceeding the body length vs. not exceeding/reaching/exceeding the body length vs. reaching (in females)/exceeding (in male) the body length]; the neck/head width ratio (neck about twice
as narrow as head vs neck very narrow, from 2.30–3.10 times as narrow as head vs. neck narrow, from 2.10–3.00 times as narrow as head vs. neck narrow, 2.53–2.56 times as narrow as head); form of the pronotum [widest medially, long as wide or slightly wider than longer, anterior and posterior pronotal margins concave, hind pronotal angles acute and prominent vs. widest anteriorly, slightly wider than longer/long as wide, anterior and posterior pronotal margins concave, hind pronotal angles acute and prominent vs. widest anteriorly/medially, slightly wider than longer/long as wide/slightly longer than wider, anterior and posterior pronotal margins concave/anterior pronotal margin concave and posterior pronotal margin straight, hind pronotal angles acute/obtuse vs. widest just before its middle part, slightly wider than longer, concave anteriorly and straight (in male)/concave (in females) posteriorly, hind angles acute]; shape of the elytra (1.50–2.00 times as wide as long, wide basally and convex distally, shoulders angulose, humeral angles well-developed and rounded vs. narrower basally than in *P. buresti*, humeral angles prominent, elytra rounded apically vs. relatively elongated, its base narrower/ as wide as/wider than pronotal base, humeral angles obtuse, rounded, and elevated, angulose apically vs. relatively long, convex, its base narrower than pronotum, humeral angles obtuse, rounded, and elevated, elytral apex rounded, length/width = 1.75); chaetotaxy (frons with 5–8 frontal setae, pronotum with normal chaetotaxy, 6–11 discal setae on third interstria on each elytron vs. frons with 5–7 frontal setae, pronotum with normal chaetotaxy, 5–8 discal setae on third interstria on each elytron vs. frons with 5–7 frontal setae, pronotum with normal chaetotaxy, 5–7 discal setae on third interstria on each elytron vs. frons with 5–7 frontal setae, pronotum with normal chaetotaxy, 5–7 discal setae on third interstria on each elytron vs. frons with 6–7 frontal setae, pronotum with normal chaetotaxy, 6–7 discal setae on third interstria on each elytron); shape of the aedeagus (somewhat arcuate, basal bulbus elongated and bent at an obtuse angle, apex of penis gradually attenuated, ventral border with a strong sinuosity and rounded apex vs. similar to those in *P. buresti*, weakly curved, basal bulbus moderately elongated, apex rounded vs. curved, basal bulbus not so elongated and rounded, aedeagus narrowing distally, in most cases its tip slightly raised upward, apex rounded vs. regularly curved, somewhat convex in dorsal median part, gradually narrowing apically, basal bulbus moderately elongated and rounded, its apex rounded) and its inner sac (inner sac with a thick thorny surface vs. armature of inner sac same as in *P. buresti* vs. unknown vs. consisting of a triangular part and a small inner rectangular gutter–shaped chitinous part armed with numerous long and short thorns); and the number of parameral setae (2–4; two apical setae vs. 2–4; 1–3 apical setae vs. 3–4; 2–4 apical setae vs. five; three apical setae) (Knirsch, 1923, 1924, 1924a; Buresch, 1925; Jeannel, 1928; Mandl, 1942; Karaman, 1958; Guéorguiev, 1964, 1965, 1977; Genest, 1978; present study) (Figs. 1–3).

Description. — Length: 6.42–6.81 mm. Head elongated, inversely oviform, almost 1.50 times as wide as long, slightly wider than pronotum. Head widest somewhat before its middle part; its posterior part much narrower than anterior part (Fig. 1). Lateral sides of the head regularly convex, narrowing toward neck. Eyes absent. Frontal furrows overreaching mid–head level, deeply impressed anteriorly, and sigmoidly curved. Neck narrow, 2.53–2.56 times as wide as head. Antennae long, reaching (in females) or exceeding (in male) the body length.

Pronotum widest just before its middle part, slightly wider than longer (Fig. 1). Anterior pronotal margin concave and posterior pronotal margin straight (in male) or concave (in females). Lateral pronotal margins rounded anteriorly and slightly concave posteriorly. Fore pronotal angles obtuse and rounded; hind pronotal angles acute, almost right–angled.

Fig. 1. *Pheggonisettes rinae* n. sp., from Odžina Rupa Cave, village Odorovci. — Holotype male, habitus. Scale line = 1.00 mm.
Elytra relatively long, convex, widest at their mid-part, their base narrower than pronotum (Fig. 1). Humeral angles obtuse, rounded, and elevated. Elytral apex rounded. Elytral disc convex in lateral view.

Legs and claws long and thin (Fig. 1).

Chaetotaxy. — Frons with 6–7 pairs of setae. Pronotum with normal chaetotaxy (two pairs of setae). Six or seven discal setae on third interstria on each elytron (Fig. 1).

Aedeagus regularly curved, somewhat convex dorsally in median part, gradually narrowing apically. Aedeagal apex rounded. Paramerae with five setae (of which three are apically positioned) (Fig. 2). Inner sac consisting of a triangular part and a small inner rectangular gutter–shaped chitinous part armed with numerous long and short thorns (Fig. 3).

Female genitalia are presented in Fig. 5. Gonocoxites IX of moderate length, dilated, apically rounded, basally completely joined with massive gonosubcoxites IX. In a close taxon, *Pheggomisetes globiceps ilandjievii* from the Goljama Balabanova Dupka Cave, village of Komštica, gonocoxites IX are more elongated, somewhat curved, and basally completely joined with gonosubcoxites IX, which are more thickened than in *Pheggomisetes ninae* n. sp. (Fig. 6).

Male abdominal sternite IX (urite) well-developed, subtriangular (Fig. 4).

**RELATIONSHIPS OF THE NEW SPECIES**

Both the body plan and the degree of specialization point to certain similarities between *Pheggomisetes ninae* n. sp. and some subspecies of *Pheggomisetes globiceps* from Bulgaria, *Pheggomisetes globiceps georgievi* Karaman, and *Pheggomisetes globiceps ilandjievii* Güerorgiev (inversely oviform head, body chaetotaxy, length of antennae, neck/head width ratio, certain similarities in aedeagi of *P. ninae* n. sp. and *P. globiceps georgievi*). A more careful examination, however, exhibits a number of clear distinctions in character states between these three taxa. Thus, *Pheggomisetes ninae* n. sp. clearly differs from *Pheggomisetes globiceps georgievi* and *Pheggomisetes globiceps ilandjievii* in body size (6.42–6.81 mm vs. 6.40–7.70 mm vs. 6.60–7.40 mm); form of the head (lateral sides of the head are markedly convex, head wider than pronotum vs. lateral sides of the head are weakly convex, head slightly narrower than pronotum vs. lateral sides of the head are moderatelly convex, head slightly wider than pronotum); form of the pronotum (widest just before its middle part, slightly wider than longer, anterior pronotal margin concave and posterior pronotal margin straight or concave, hind angles acute vs. widest medially, lateral margins not sigmoid basally, slightly wider than longer, anterior pronotal margin concave and posterior

**Figs. 2–5. *Pheggomisetes ninae* n. sp., from Odžina Rupa Cave, village Odorovei. [2. Holotype male, aedeagus — lateral view; 3. Holotype male, copulatory piece — dorsal view; 4. Holotype male, abdominal sternite IX (urite); 5. Paratype female, genitalia. Scale lines = 0.50 mm].**

**Fig. 6. *Pheggomisetes globiceps ilandjievii* Güerorgiev, from Balabanova Dupka Cave, village Komštica. — Topotype female, genitalia. Scale line = 0.50 mm.**
pronotal margin straight or slightly concave, hind angles obtuse vs. widest anteriorly, slightly longer than wider or as long as wide, anterior and posterior pronotal margins concave, hind angles acute; form of the elytra (elytral base markedly wider than pronotal base, humeral angles obtuse, rounded, and elevated vs. elytral base slightly wider than pronotal base, humeral angles strongly rounded upward and slightly elevated vs. elytral base much narrower than pronotal base, humeral angles somewhat-rounded, obtuse, and always elevated); appearance of the frontal furrows (overreaching the mid-head level, deepened anteriorly, and sigmoidly curved vs. somewhat arcurated toward their middle part vs. markedly curved backward); form of the aedeagus (regularly curved, somewhat convex in dorsal median part, gradually narrowing apically, its apex rounded vs. slightly curved and moderately convex dorsally, gradually narrowing distally, with rounded apex vs. thin, elongated, its basal bulb impressed ventrally, its apex slightly raised upward); the number of parameral setae (five; three apical setae vs. four; two apical and two subapical setae vs. 3–4; 2–3 apical setae); and appearance of the female genitalia (gonocoxites IX of moderate length, dilated, apically rounded, basally completely jointed with massive gonosubcoxites IX vs. unknown vs. gonocoxites IX more elongated, somewhat curved, basally completely jointed with gonosubcoxites IX, otherwise more thickened than in P. ninae n. sp.) (Karaman, 1958; Guéorguiev, 1964, 1965; present study) (Figs. 1, 2, 5, 6).

We maintain that the genus Pheggomisetes is in need of a new revision that will definitively show the real status of all its congeners. Most of the present subspecies of the mentioned genus each deserve a higher (species) rank in future classification, but we still lack data on some mostly morphological and anatomical characters (position of the setiferous punctures, length of certain antennomeres, complete shape of elytra, shape of the urite, length and form of paramerae, form of the inner sac with copulatory piece, and form of the female genitalia) to prove our assertion (Decou & Botosaneanu, 1964; Jubertthie & Decu, 1968). After detailed study based on a larger sample of the analyzed trechines, it will be possible to present the real status of all taxons belonging to the genus Pheggomisetes.

It is evident that the members of Pheggomisetes are of Mesogeid origin (Guéorguiev, 1977). As for P. ninae n. sp., it is endemic and relict to cave habitats in southeast Serbia.

Acknowledgements. — We are indebted to Dr. Borislav V. Guéorguiev (Natural History Museum, Sofia, Bulgaria), who gave us a sample consisting of few specimens of Pheggomisetes from Bulgaria considered herein.

REFERENCES


О НОВОМ ПЕЂИНСКОМ ТВРДОКРИЛЦУ (TRECHINAE, CARABIDAE) ИЗ СРБИЈЕ

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У овој студији је описан нови каверниколни тврдокрилац из деђина Србије: Pheggomisetes ninae n. sp. (Trechinae, Carabidae). Сва важна обележја овог таксона су презентована и исцрпно илустрована. Pheggomisetes ninae n. sp. је прва позната врста из рода која насељава Србију и Црну Гору и дијагностички се разликује од свих осталих таксона из рода Pheggomisetes Knirsch. Новоописана врста припада старој филетичкој линији мезогендионог порекла и представља реликт и ендемит Србије, односно Балканској полуострва.