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***Pterostichus neilgaimani* sp. nov., a new species of ground beetles (Coleoptera: Carabidae) from relict sacred grove in Eastern Georgia**

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A new species of ground beetles (Coleoptera: Carabidae) belonging to the subgenus *Aphaonus* Reitter, 1887 (genus *Pterostichus* Bonelli, 1810) is described, based on two specimens collected from the sacred grove of Khevsha (Eastern Georgia).

The subgenus *Aphaonus* Reitter, 1887 of *Pterostichus* Bonelli, 1810 includes 10 described species, all of them known only from western Caucasus (mostly from Abkhazia (Georgia) (Anichtchenko *et al.*, 2017; Kryzhanovskij *et al.* 1995; Lorenz 2005; Zamotajlov *et al.*, 2015). Specimens have been usually discovered under deeply inserted stones (Zamotajlov & Nikitsky, 2010) or after using pitfall traps (Zamotajlov *et al.*, 2015).

Worship of trees was important part of many pre-Christian civilizations, which kept some forest in a primeval form (Frazer, 1922). In recent years there is a growing recognition of importance of sacred natural sites for nature conservation (Frascaroli & Verschuuren, 2016; Wild *et al.*, 2008). Entomological fauna of sacred groves from Georgia is largely unknown; protection measures prohibit tree felling, hunting or even removing fallen trees, thus preserving undisturbed habitat for centuries (Qistauri, 2012).

In 2017 we discovered a unknown *Aphaonus* in the Sacred Grove of Khevsha (Eastern Georgia). Considering the large distance from the area where other *Aphaonus* have been reported, the rarity of these beetles, and the low probability to capture new individuals in the nearest future, we decided to describe *P. (Aphaonus) neilgaimani* sp. nov. based only on two specimens.

Material and methods

In total twenty pitfall traps (half-liter plastic cups, with 2% formalin as conservant) were installed at study area during 24.09.2016–5.11.2016 and 24.03.2017–15.07.2017. Ten traps were installed in the Khevsha Sacred grove and 10 in adjacent degraded forest. Pitfall traps were covered with stones to prevent flooding and to avoid small invertebrate by-catch.

Total body length of specimens was measured from the tip of labrum to the elytral apex, and also the maximum width of head, pronotum and elytra; length of elytra was measured from the apical part of scutellum to the apex of the sutural angle; body width and maximum width of elytra are equal.

Measurements were performed in Photoshop on digital images. Images were taken using a Canon PowerShot SX50 HS and Vivitar macro lenses set. Specimens were examined using Motic DMW-143-N2GG digital stereo microscope.

Type locality map was prepared using DIVA-GIS 7.5 (Hijmans *et al.*, 2012).

Results

***Pterostichus neilgaimani* Chaladze & Kalatozishvili sp. nov. (Figs 1–9)**

Etymology. Species is named after author Neil Gaiman, for bringing back what has been forgotten.

Type material. Holotype: male, collected in pitfall traps in the Sacred Grove of Khevsha (Eastern Georgia); trapping period: 17.06.2017–1.07.2017. Specimen is deposited at the Ilia State University's Zoological collection. Paratype: male, same date and locality as holotype, preserved at first author's personal collection.

Diagnosis. Head with 7–9 supraorbital setiferous pores present on each side; body unicolor, chestnut.

Description. Habitus (Figs. 1, 2), body length 15–16.6 mm, width 3.9–4.4 mm, dorsum, underside, legs, antennae, and palpi unicolor–chestnut.



FIGURES 1, 2. *Pterostichus neilgaimani* sp. nov., male, holotype, 1—dorsal view, 2—ventral view.

Head. Length 3.4–3.6 mm, width 3.2–3.6 mm, genae prominent, eyes small, rudimentary, much closer to anterior angle of genae than to temples; temples long and evenly rounded, frons with 7–9 setiferous pores present on each side (Figs 3, 4), as 2–3 pores are situated in anterior part at eye level, and other 5–6 are situated in posterior part at mid-temple level. Tooth of mentum short, bifid, with shallow apical hollow. Genae on ventral side rugose.

Thorax. Pronotum cordiform, length 3.2–3.6 mm, width 3.4–3.8 mm, basal margin deeply emarginated in the middle, hind angle prominent, lateral margin with 4–6 marginal setae in anterior half and one seta at hind angle. Prosternum smooth, prosternal process not beaded, mesosternum rugose, scarcely punctate, metasternum smooth; pro-, meso- and metepisterna coarsely punctate, twice as long as wide.

Elytra. Elongate and narrow, almost parallel, widest at posterior third part, length 8.3–9.4 mm, width 3.9–4.4 mm;

shoulder rounded, without prominent angles; striae well-impressed, parascutellar stria distinct; interval 3 with 3–4 pores, first one–two adjoining stria 3, others adjoining stria 2; hind wings reduced.

Abdomen. Sternite 1 coarsely punctured laterally, sternites 2–5 smooth in the middle, coarsely punctate in lateral part, anal sternite smooth, with two marginal pores.

Metatrochanter. Straight, not curved apically, as long as half of metafemur (Fig. 5).

Aedeagus. Bent at base almost at right angle (Figs. 6, 7), apical lamella of median lobe well developed, rounded at tip (fig. 8). Parameres are typical for the subgenus, left paramere straight and slender, right one wide and rounded (Fig. 9).



FIGURES 3–9. *Pterostichus neilgaimani* sp. nov., holotype, 3—head, dorsal view, 4—head, left lateral view, 5—left metafemur and left metatrochanter, 6–8—aedeagus: 6—median lobe, right lateral view, 7—median lobe, left lateral view, 8—apical lamella of median lobe, 9—parameres.

Type locality. Sacred grove (Lat.: 42.40276, Lon.: 44.69885) is located approximately within one kilometre from village Khevsha, Dusheti Municipality, Eastern Georgia (Fig. 10).

Habitat. Sampled area corresponds to a mountainous forest located on the southern slopes of Greater Caucasus (Fig. 11). The forest is dominated by *Fagus orientalis* together with other woody species such as *Acer platanoides*, *Ulmus minor* and *Sorbus aucuparia*. Altitude ranges between 1721–2000 m. a.s.l. Minimum inclination of the slope is 29 degrees while maximum is significantly steeper 45 degrees. Forest floor is dominated by ferns, shrubs and forb: *Polystichum aculeatum*, *Polypodium vulgare*, *Rubus* sp., *Thlaspi macrophyllum*, *Cardamine quinquefolia*, *Cardamine bulbifera*, *Asperula odorata*, and *Paris incompleta*.

Other ground beetles species with large body size found in the area are *Carabus nothus* Adams, *C. ibericus ibericus* Fischer, *C. adamsi* Adams, *C. septemcarinatus* Motschulsky, *C. osseticus* Adams, *C. scabrosus caucasicus* Adams, *Cychnus aeneus* Fisher-Waldheim, and *Thermoscelis insignis* Chaudoir.

Remarks. Given that we performed sampling for seven month using twenty pitfall traps, and that we could only find two specimens, it seems that the new species is as rare as usual for representatives of *Aphaonus*. However, subterranean (MSS) traps (see Mamola *et al.* 2016) could provide better results.

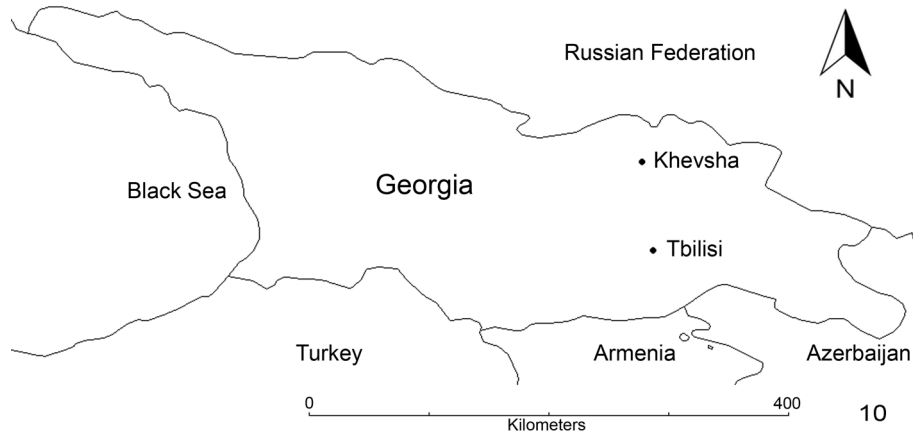


FIGURE 10. Map of Georgia showing location of Khevsha, type locality of *Pterostichus neilgaimani* sp. nov.



FIGURE 11. Forest close to Sacred Grove of Khevsha, type locality of *Pterostichus neilgaimani* sp. nov.

As the type locality of *P. neilgaimani* sp. nov. is far from the known area of other *Aphaonus* species, it seems that species of this subgenus possibly lived in a continuous area of undisturbed forests, and that populations were fragmented due to habitat disturbance. In any case, density of *Aphaonus* populations is usually low along the southern strip of the Great Caucasus range.

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