

## What new do we know about *Notiophilus persicus* Breit, 1914 (Coleoptera: Carabidae)?

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*N. persicus* Breit is a little-known species, which, to date, has not been described in the scientific literature to the full. While carrying out the examination of the genus represented in more than 60 museum collections, the author of the present article has asserted only 4 specimens of this species. The article describes the appearance of *N. persicus* Breit, a special emphasis being put on the male's morphology and the peculiarities of its genitalia, since the species has been considered only on the basis of females' description before. The key for the identification of the species similar to *N. persicus* Breit has been worked out. The new data on its distribution are published indicating it for the territory of Turkmenistan for the first time.

Key words: *Notiophilus persicus*, Coleoptera, Carabidae, fauna, distribution, taxonomy, Turkmenistan, Copet-Dagh

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### INTRODUCTION

*Notiophilus persicus* Breit, 1914 (Coleoptera: Carabidae) is one of 60 species of the genus *Notiophilus* Dumeril, 1804 that are known in the world up to date. The species is a little-known one, it is rarely represented in collections and, since its description, the information on it is scarce.

Austrian entomologist Josef Breit described the species considering 2 females, which had been collected by Hauser, and cited the following label of the collection specimen "Pers.[ia], Kopet-Dagh, Descht, Juni 1902" (Breit 1914). No male of *N. persicus* Breit has been described before.

The list of the species of the genus *Notiophilus* Dum. (Bousquet, Barševskis 2003) in "Catalogue of Palearctic Coleoptera" indicates, that the species is distributed in Iran. To state the particular place of its collection is problematic, since the data presented in the labels of the specimens belonging to this species, which were collected at the beginning of the 20<sup>th</sup> century, are incomplete. Both in Iran and in Turkmenistan there are several settlements named 'Descht' or 'Dascht'. In the Farsi language this word is often used to designate 'a plain'. The mountain range Copet-dagh juts also into Turkmenistan. Commencing the research, the author put forward the hypothesis that, possibly, the areal of the species' distribution is greater and it can jut into the territory

of Turkmenistan. To date, *N. persicus* Breit has not been indicated for the territory of the former USSR. Also the voluminous work “A checklist of Ground-Beetles of Russia and Adjacent Lands (Insecta, Coleoptera, Carabidae)” (Kryzhanovskij et al 1995), which is to be considered the basic list of the family of ground beetles (Coleoptera: Carabidae) for the territory of the former USSR, does not include the indication of this species.

The aim of the present research was to clarify the taxonomic status of the species and its distribution. Since the description of the species in 1914, the information about it is very scarce. It is to be found mainly in some lists or catalogues of the species of ground beetles, but it does not contain any definite data on the findings of the species. Initially, J. Breit (1914) described this taxon as *N. pusillus* Waterh. v. *persicus* nov. var. (Breit, 1914), a variety of *N. aestuans* Dejean, 1826 (= *N. pusillus* Waterhouse, 1833 nec (Schreber, 1759)). Unfortunately, the author does not have any information whether there are any types of this species preserved.

In a later publication “Catalogus Coleopterorum regionis palearcticae” (Winkler 1924-1932) this taxon is already indicated as a subspecies of *N. aestuans* Dej. (syn. *N. pusillus* Waterh. nec (Schreb.)). In “Systematic list of extant ground beetles of the world”, W.Lorentz (2005) has included this taxon as a valid species.

While carrying out the examination of the collections of more than 60 world museums, it has been discovered that some of them contain specimens collected in Iran and that they have been determined as *N. pusillus persicus* Breit. After the verification of identification, it turned out that they belonged to other species, in most cases, to the species *N. interstitialis* Reitter, 1889. Only one specimen, which is kept in the collection of beetles of the Zoological Institute of the Russian Academy of Sciences (St. Petersburg, Russia) proved to be identified correctly. It has been identified by the outstanding entomologist O.L.Kryzhanovskij (the beetle has the identification label attached; the label has been written by O.L.Kryzhanovskij himself: *N. aestuans* ssp.

*persicus* Breit, Kryzhanovskij det., 1990]. These facts testify that the description of the species published by J.Breit (1914) is insufficient for the species to be precisely identified; therefore it is necessary to work out the key for the identification of these species.

The given article presents the description of the morphology of the species, emphasizing the particularities of a *N. persicus* Breit, 1914 male's morphology and structure of its genitalia; the key for the identification of the species has been worked out. The new data on its distribution are published indicating it for the territory of Turkmenistan for the first time.

## MATERIALS AND METHODS

To carry out the revision of the genus *Notiophilus* Dum. the author has examined more than 60 museum collections. *N. persicus* Breit is a little-known species, which, out of 60 collections, is represented only in two, where all in all there are 4 specimens of this species deposited. These collections are the following:

ZISP – Zoological Institute, Russian Academy of Science, Saint-Petersburg, Russia – 1 ex.;  
DUBC – Institute of Systematic Biology, Daugavpils University, Daugavpils Distr., Ilgas, Latvia – 3 ex.

Laboratory research and measurements have been done using *Nikon* AZ100 and *Nikon* SMZ745T digital stereomicroscopes, NIS-Elements 6D software, and the photo camera *Canon* 60D.

The schematic map of the species' distribution has been worked out by Māris Nitcis (Coleopterological Research Centre, Institute of Systematic Biology, Daugavpils University, Daugavpils Distr., Ilgas, Latvia), making use of the program ArcGis.

**Materials examined:** 4 ex. TURKMENISTAN: W Turkmenistan, Kyzyl, , 1400 m, 31.04.1979. (2) [DUBC]; W Turkmenistan, Kara – Kala, 1100 m, 20.04.1989. (1) [DUBC], W Copet-dagh Mts.,

Hasardagh, 1630 m, 07.05.1989., (1, W.Rešl. leg.)  
[*N. aestuans* ssp. *persicus* Breit, Kryzhanovskij  
det., 1990] [ZISP].

– 1630 m above sea level, in springs – April and  
May. Most probably, the biology of *N. persicus*  
Breit is similar to that of other species of this  
genus.

## RESULTS

*N. persicus* Breit is a little-known endemic of  
Copet-dagh mountain range, it is distributed in  
the territories of Iran and Turkmenistan. The  
present article indicates *N. persicus* Breit for  
Turkmenistan for the first time. The distribution  
of the species is demonstrated in Figure 1.

For the present, there is no information concern-  
ing the biology of this species, but the study of  
the labels of the 4 specimens at our disposal tes-  
tifies to the fact that the species has been ob-  
served in mountains, in the height of about 1300

This article will further present the characteriza-  
tion of the morphology of *N. persicus* Breit and  
the redescription of the species. A special em-  
phasis is put on the features that distinguish a  
male from a female, since only females have been  
described before.

### Redescription of *N. persicus* Breit

**General description.** The body is monochro-  
matic, black, its surface has bronze lustre (Fig.  
2). The body length is 4.80 – 4.90 mm. The body  
is slender, with almost parallel sides. The head

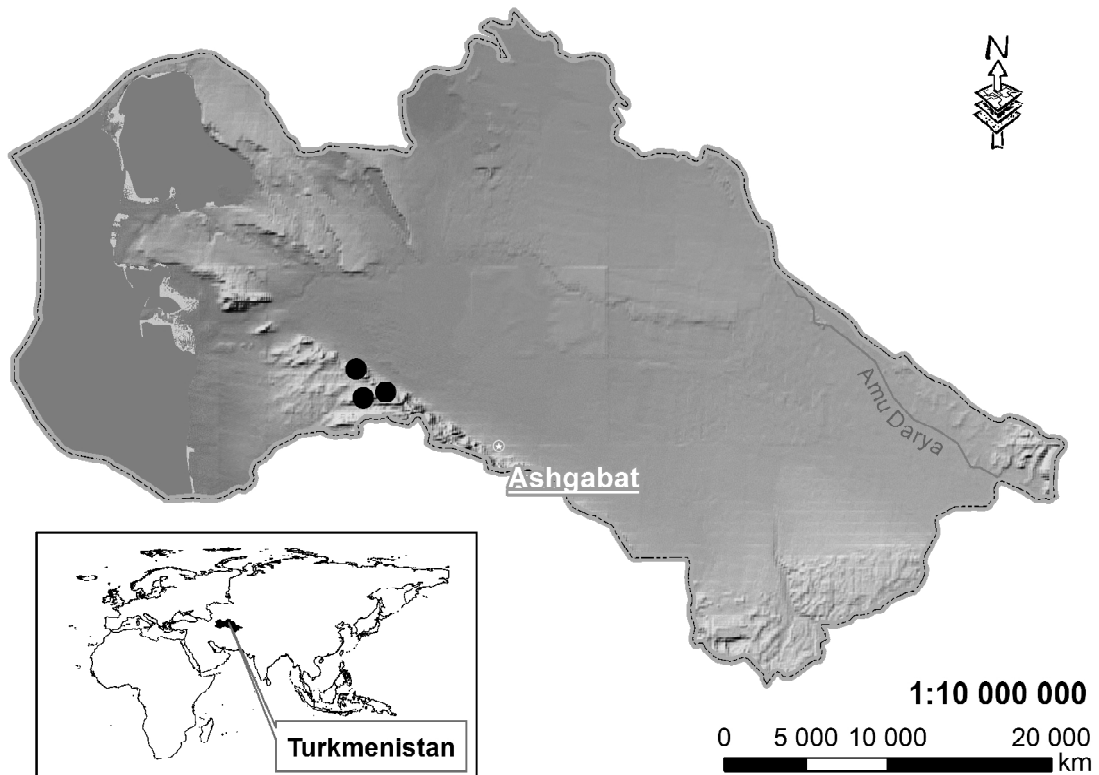


Fig. 1. The distribution of *N. persicus* Breit in Turkmenistan

and the pronotum are of the same width, the elytra are a little wider. The width proportion of all the three body parts is 1.40:1.40:1.50.

**Head.** Eyes are large, moved sideward. The width of the head is 1.40 - 1.45 mm. The forehead between the eyes has 6 almost parallel frontal furrows. The male had some frontal furrows doubled at one or both ends; therefore, their number seems to be greater if not inspected carefully. Predominantly, the number of frontal furrows of the species belonging to the genus *Notiophilus* Dum. is specific to the species. The number of frontal furrows is variable only in some species of this genus. Most probably it is not the feature of sexual dimorphism in *N. persicus* Breit, rather the only male is an aberrant specimen. The antennae are dark, with 2- 4 lighter antennomeres. The palpomeres are dark with lighter base segments.

**Pronotum.** The sides are S-shape convex. The hind corners are sharp, a little moved sideways. The disc of pronotum is roughly punctate at the edges and the hind corners, it is more or less plicate and lustrous. The centre line is squeezed and well expressed in the middle of the pronotum disc. The basal impressions are deep. The width of the pronotum is 1.40 – 1.45 mm.

**Elytra.** The sides are almost parallel, the surface is lustrous. The second interval of the elytra is smooth and has a dissipated, fine punctate; in the middle, this interval is narrower than the following three intervals taken together. The first interval in the basic part has fine and rather dense punctate both in males and females. Beginning with the third interval, the elytra have fine microsculpture and thin, dissipated dots. The elytral microsculpture is more expressed in the top part. They look as if mat at the top. The elytra have two apical pores at the top. The intervals 3 and 4 are of similar width. The dorsal pore is situated in the 4<sup>th</sup> interval of the elytra. At the basis, the elytral lines of dots are not squeezed or are squeezed a little and consist of big, well-pronounced dots. They become finer and even a

little smoothed down in the top part. The width of the elytra is 1.50 – 1.60 mm.

**Lower side of the body.** It is black, lustrous, its separate parts, including thorax, are roughly dotted. Legs are black. Tarsomeres of the male's front legs are a little broadened. The last abdominal segment in males has two setiferous punctures, but in females it has four setiferous punctures.

**Male genitalia.** *Aedeagus* in all three similar species is depicted in Fig. 5.

**Differential diagnosis.** Considering the form of the body, which has almost parallel sides, the form of frontal furrows, and the fine punctate of the second smooth interval of the elytra, which is not characteristic of most of other species of the genus *Notiophilus* Dum., this species is similar to *N. aestuans* Dej. (Fig. 3) and *N. interstitialis* Reitt. (Fig. 4). The feature, which distinguishes it from *N. aestuans* Dej., is that, beginning with the third one, the elytral intervals have marked, fine microsculpture and a little different form of the pronotum and its hind corners. This species differs from *N. interstitialis* Reitt. with the different form of the body, finer punctate of the surface, especially in the lines of dots and along the sides of the thorax shield. The elytral microsculpture, beginning with the 3<sup>rd</sup> interval, is more marked and regular unlike *N. interstitialis* Reitt., in which the microsculpture or its traces on the elytra is only occasionally discernible.

#### The key for the identification of the species similar to *N. persicus* Breit

1(4) The body has almost parallel sides. The surface has finer punctate. The lines of dots have fine punctate, they become utterly fine, often smoothed down in the top part.

2(3) The intervals between the lines of dots on the elytra have no microsculpture, smooth, with only fine dissipated punctate. 3.70 – 5.50 mm.....*N. aestuans* Dej.



Fig. 2. *N. persicus* Breit



Fig. 3. *N. aestuans* Dej.

3(2) Already beginning with the 3<sup>rd</sup> one, the intervals between the lines of dots on the elytra have fine microsculpture and fine dissipated punctate. 4.80–4.90 mm.....*N. persicus* Breit

4(1) The body has rounded sides, it is almost egg-shaped. The surface has rougher punctate. The lines of dots consist of rough dots, the dots are finer before the top, the lines are a little smoothed down. 5.0 – 6.0 mm.....  
.....*N. interstitialis* Reitt.

The author hopes that in future the proposed key for the identification of the species and the pictures of genitalia will allow for a more precise identification of this little-known species.

### CONCLUSIONS

*N. persicus* Breit is a little-known species, which to date has not been thoroughly described in the scientific literature. From more than 60 museum collections, which the author has processed while carrying out the examination of the genus, only 4 specimens of this species have been found in two collections. That allowed for the redescription of the appearance of *N. persicus* Breit, a special emphasis being put on the male's morphology and the peculiarities of its genitalia, since the species has been de-



Fig. 4. *N. interstitialis* Reitt.



Fig. 5. Aedeagus: A - *N. interstitialis* Reitt.; B - *N. aestuans* Dej.; C - *N. persicus* Breit

scribed only on the basis of females' description before. In the result of the research it has been stated that the species is more widespread in the Copet-Dagh mountain range and is found not only in the territory of Iran, but also that of Turkmenistan, for the fauna of which this species is indicated for the first time.

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