

***Georissus persicus* sp. nov. from Iran, with notes on the  
West-Palaeartic species of the *G. laesicollis* group  
(Coleoptera: Georissidae)**

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**Abstract.** *Georissus persicus* sp. nov. belonging to the *G. laesicollis* group is described from Iran (Khuzestan and Fars Provinces). Relevant characters of the new species are illustrated and the species is compared with *G. laesicollis* Germar, 1831 and *G. trifossulatus* Motschulsky, 1843. The latter species is redescribed and its lectotype is designated.

**Keywords.** Coleoptera, Hydrophiloidea, Georissidae, *G. laesicollis* group, new species, lectotype designation, Iran, Georgia, Palaeartic Region

### Introduction

The hydrophiloid family Georissidae includes 78 described species accommodated in a single genus *Georissus* Latreille, 1809. Adults and larvae usually inhabit wet muddy or sandy banks of running as well as standing waters. They occur in all zoogeographic regions, with the highest number of species known from the Old World tropics (HANSEN 1999). The tropical fauna was partly revised by DELÈVE (1967a,b,c, 1969, 1972, 1974a,b). Fauna of the Palaeartic Region remains largely neglected, with recent papers concerning only the fauna of Japan (SATÔ 1972, NAKANE 1995). The European and Near Eastern fauna of *Georissus* was until recently considered very species deficient, containing five widely distributed species, *G.* (s. str.) *crenulatus* (Rossi, 1794), *G.* (s. str.) *substriatus* Heer, 1841, *G.* (*Neogeorissus*) *caelatus* Erichson, 1847, *G.* (*N.*) *costatus* Castelnau, 1840, and *G.* (*N.*) *laesicollis* Germar, 1831. One additional species of dubious status, *G.* (*N.*) *trifossulatus* Motschulsky, 1843 was recorded from Georgia and Egypt (MOTSCHULSKY 1843, ALFIERI 1976).

However, a new species of *Georissus* was discovered recently in the United Arab Emirates (FIKÁČEK & TRÁVNÍČEK 2009). Another new species was surprisingly discovered in the material collected between 2008–2010 by the second author of this paper as well as in the

material collected in 1977 during the Expedition of the National Museum in Prague to Iran (HOBERLANDT 1983). This species is described below. Types of *Georissus trifossulatus* were studied in order to confirm the distinct status of the new Iranian species, and are therefore also redescribed.

### Material and methods

A portion of the examined specimens were dissected, genitalia and abdominal ventrites were mounted in Euparal resin (soluble in pure alcohol) on a small piece of cover glass attached below the respective specimen. Heads of the dissected specimens were detached from the rest of the body in order to examine their dorsal sculpturing. Male genitalia and abdominal ventrites were examined using the Olympus BX40 compound microscope, genitalia were drawn using the drawing tube, and photographs of abdomens were taken using an Olympus Camedia C-5060 digital camera, both attached to the same microscope. Habitus photographs were prepared using the same camera attached to the Olympus SZX-ILLK200 binocular microscope. Superficial sculpturing was examined using a Hitachi S-3700N scanning electron microscope using uncoated type specimens. Drawings of the head's sculpturing were traced from SEM micrographs and photographs.

Examined material is deposited in the following collections:

- HNHM Hungarian Natural History Museum, Budapest, Hungary (Gy. Makranczy);  
 HYMC Hiroyuki Yoshitomi collection, Matsuyama, Japan;  
 KSEM Natural History Museum, University of Kansas, Lawrence, USA (A. E. Z. Short);  
 NMPC National Museum, Prague, Czech Republic (M. Fikáček);  
 SFCQ Shahram Falamarzi collection, Qir, Iran;  
 SUIC Plant Protection Department, Shiraz University, Shiraz, Iran (K. Minaei);  
 YUIC Plant Protection Department, Yasuj University, Yasuj, Iran (A. R. Monfared);  
 ZMUM Zoological Museum, University of Moscow, Moscow, Russia (N. B. Nikitskiy).

### Taxonomy

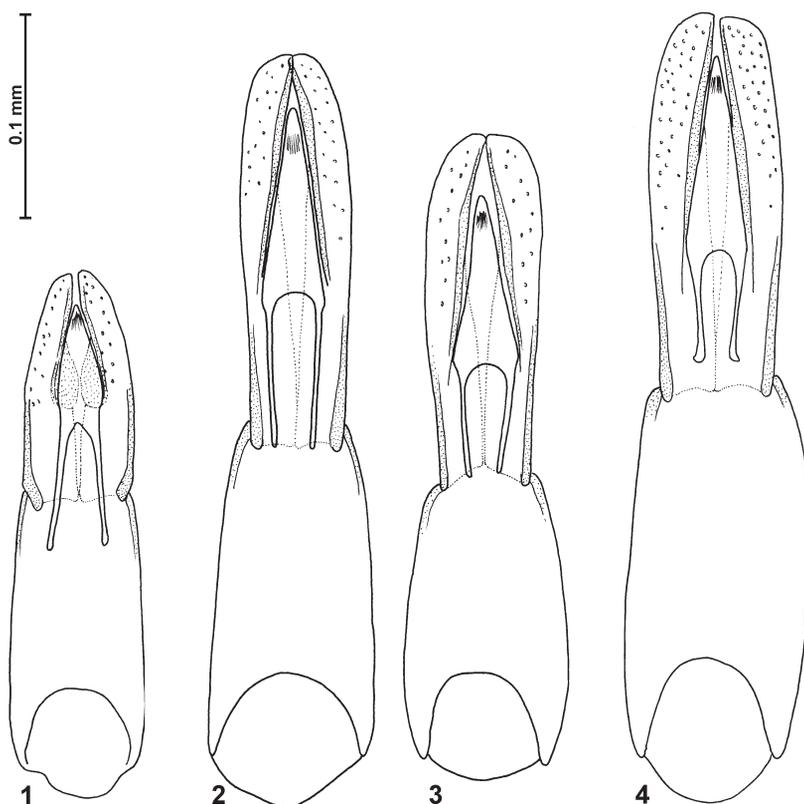
#### *Georissus (Neogeorissus) persicus* sp. nov.

(Figs. 1, 5, 7–8, 11)

**Type locality.** Iran, Khuzestan Province, Hoseiniyeh, Bala Rud valley, 28 km NNW of Andimeshk, 360 m a.s.l., 32°41'N 48°16'E (see HOBERLANDT 1983).

**Type material.** HOLOTYPE: ♂ (NMPC): 'SW. Iran Hoseiniyeh / 28km NNW Andimeshk / 12-13.4.1977, 360 m // Loc. no. 286 / Exped. Nat. Mus. / Praha'. PARATYPES: 5 spec. (SFCQ, NMPC, SUIC, YUIC), 'IRAN: Fars Province / Reykan, 11 km NW of Qir / 28°34'10"N, 52°59'42"E / 1052m; 15.viii.2008 / small stream; Sh. Falamarzi'; 1 ♂, 11 spec. (SFCQ, NMPC, HYMC, KSEM, SUIC, YUIC), 'IRAN: Fars Province / Shaldan, 10 km NW of Qir / 28°33'49"N, 52°59'32"E / 1077m; 25.iii.2010 / small stream; Sh. Falamarzi'; 1 spec. (SFCQ), same locality, but '19.ix.2008'.

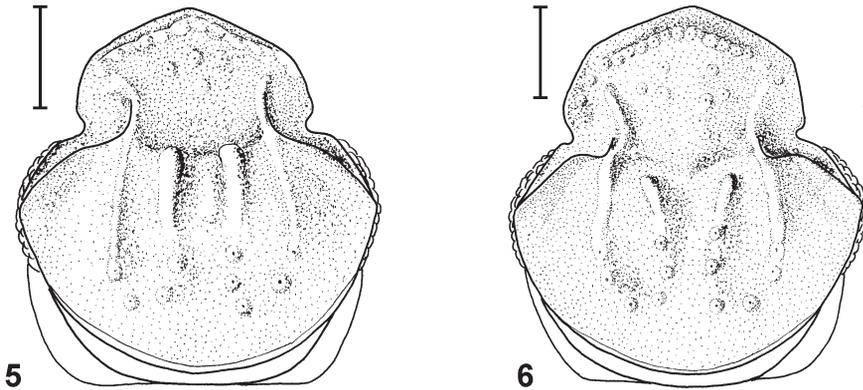
**Description.** Body elongate oval, weakly convex. Length 1.20–1.45 mm (holotype 1.20 mm); width of pronotum 0.60–0.70 mm (holotype 0.60 mm); maximum width of elytra 0.75–0.90 mm (holotype 0.75 mm). Coloration dark reddish to black, anterior portion of pronotum slightly paler than rest of the body, head black.



Figs. 1–4. Aedeagophores of *Georissus* species. 1 – *G. persicus* sp. nov., holotype; 2–3 – *G. trifossulatus* Motschulsky, 1843 (2 – lectotype; 3 – paralectotype); 4 – *G. laeicollis* Germar, 1831, non-type specimen from Bosnia Herzegovina.

Head. Clypeus smooth, with a line of low granules along anterior margin and sparsely scattered granules on disc. Sublateral longitudinal ridge arising at lateral portion of clypeus and reaching midlength of frons, posteriorly connected to submedian pair of elongate bulges by an arc of sparsely arranged granules; submedian bulges parallel to each other, reaching anterior margin of frons.

Pronotum 1.5× as broad as than long, with maximum width at posterior fourth; lateral margin with large curved protrusion on each side. Anterior portion slightly convex, with shallow median longitudinal groove; anterolateral portions with moderately dense granulation more or less arranged in irregular longitudinal series. Median portion with variably deep rhomboidal depression surrounded by irregular series of granules; depression slightly wider than long. Posterolaterally on each side of central depression with rounded depression surrounded by the densely arranged granules. Lateral portions of pronotum above the lateral protrusions with a small sparsely granulated bulge on each side.



Figs. 5–6. Head of *Georissus* species, dorsal view. 5 – *G. persicus* sp. nov.; 6 – *G. trifossulatus* Motschulsky, 1843. Scale bar: 0.1 mm.

Elytra combined  $1.1\times$  as long as than wide, base of elytra ca. as wide as maximum width of pronotum. Humeral bulge distinct, sparsely granulate. Even and odd intervals elevated to same height, all intervals bearing a longitudinal series of very distinct prominent granules. Lateral ridges on each elytron highly elevate, bearing only indistinct small granules. Elytral punctures indistinct.

Abdomen with lateral margins of ventrites 1 and 2 strongly narrowing posteriad. Ventrite 1 bearing sparse scattered granules on the whole surface; sublateral teeth on posterior margin developed, large. Ventrite 2 depressed anteriorly, posteriorly bearing small teeth facing those on ventrite 1.

Aedeagus small, 0.26 mm long. Parameres slightly shorter than ( $0.8\times$  as long as) phallobase, their basal portions combined ca. as wide as anterior portion of phallobase; paramere slightly angular laterally at very base, nearly parallel-sided in basal half, slightly arcuately narrowing into the obtusely angular apex. Length of median lobe ca. equal to length of paramere; apical portion triangular, moderately wide, widest at anterior 0.4 of total length; basal struts long, longer than apical triangular portion of median lobe. Phallobase ca.  $2.3\times$  longer than wide, only indistinctly widening posteriad; posterior portion with large basal foramen.

**Variation.** Slight variation was observed in the coloration (dorsal surface usually completely black, but slightly paler in the holotype, and completely reddish in one, most probably teneral, paratype) and in the sculpturing of the pronotum (anterior median groove shallow to rather deep, median pronotal depression indistinct to shallowly impressed and delimited by a distinct row of densely arranged granules at least at posterior margins). Morphology of the aedeagus and the dorsal sculpture of the head agrees completely in all specimens examined for these characters.

**Differential diagnosis.** *Georissus persicus* sp. nov. belongs to the *G. laeicollis* group sensu DELÈVE (1967a). In the western Palaearctic Region it may be confused only with the species of the *G. laeicollis* complex (*G. laeicollis*, *G. trifossulatus* and possibly some additional

undescribed species, see under *G. trifossulatus*). It differs from all these taxa by the combination of the following characters: submedian bulges on frons parallel to each other (distinctly divergent anteriorly in *G. laeicollis* complex); elytral intervals bearing high and distinctly isolated tubercles (tubercles more or less merging with adjacent ones in *G. laeicollis* and *G. trifossulatus*, forming rather continuous, at most indistinctly tuberculate ridges); body elongate oval (widely oval in *G. trifossulatus*, elongate oval in *G. laeicollis*); aedeagus 0.26 mm long (0.37–0.42 mm long in *G. laeicollis*, 0.32–0.37 mm in *G. trifossulatus*); parameres shorter than phallobase (slightly longer than phallobase in *G. laeicollis* complex); parameres combined widest at base, narrowing apicad (narrow at base and widening apicad in *G. laeicollis* and *G. trifossulatus*); basal struts of median lobe longer than apical triangular portion of the lobe (longer than the apical portion in *G. laeicollis* complex).

Nine Afrotropical and seven Oriental species were included to the *G. laeicollis* group by DELÈVE (1967a,b,c, 1969, 1972, 1974a). All of them differ distinctly from *G. persicus* sp. nov. by the morphology of the aedeagus.

**Etymology.** The species name is an adjective derived from Persia, the Latin name used for the area of Iran.

**Biology.** Paratypes were collected on the sandy sediments at the margin of a small permanent stream in the semidesert area (Figs. 13–14; see also FALAMARZI et al. (2010: Fig. 3) for the photograph of the locality of Shaldan). Unlike other *Georissus* species, the beetles of this species were not covered by a layer of sand or mud when collected. Collecting circumstances for the holotype are unknown, but the respective locality in the Khuzestan province is situated in a deep canyon with a river at the bottom situated in a steppe area (HOBERLANDT 1983).

**Distribution.** Known from three localities in southern Iran, one situated in the southern Khuzestan, and two close localities in the southern Fars.

### *Georissus (Neogeorissus) trifossulatus* Motschulsky, 1843

(Figs. 2–3, 6, 9–10, 12)

*Georissus trifossulatus* Motschulsky, 1843: 658.

*Georissus trifossulatus*: ERICHSON (1847: 504, synonymized with *G. laeicollis*), REITTER (1901: 66, specific rank confirmed), ALFIERI (1976: 110, faunistic record from Egypt), HANSEN (1999: 49, catalogue).

**Type locality.** ‘Sur le bord du fl. Alasan à Matany en Géorgie’ [= Georgia, Matani, at the margin of the Alazani river, ca. 42°05'N 45°13'E].

**Type material.** LECTOTYPE (hereby designated): ♂ (ZMUM), ‘Matany // *Georissus / tri fossulatus / mihi / Matany (Alasan) // 1752*’. PARALECTOTYPES: 2 ♂♂, 7 spec. (ZMUM), same label data as lectotype [all specimens originally mounted on a single piece of transparent plastic].

**Redescription.** Body widely oval, weakly convex. Length 1.20–1.40 mm (lectotype 1.40 mm); width of pronotum 0.60–0.70 mm (lectotype 0.65 mm); maximum width of elytra 0.75–0.90 mm (lectotype 0.90 mm). Coloration dark reddish, anterior portion of pronotum slightly paler than rest of the body, head dark reddish.

Head. Clypeus smooth, with a line of low granules along anterior margin and sparsely scattered granules on disc. Sublateral longitudinal ridge arising at lateral portion of clypeus and reaching midlength of frons, posteriorly connected to submedian pair of elongate bulges by an arc of sparsely arranged granules; submedian bulges divergent anteriorly, not reaching anterior margin of frons.

Pronotum 1.6× as broad as long, with maximum width at posterior third; lateral margin with large curved protrusion on each side. Anterior portion slightly convex, with shallow median longitudinal groove; anterolateral portions with sparse granulation more or less arranged in irregular longitudinal series. Median portion with deep rhomboidal depression surrounded by irregular series of granules; depression slightly longer than wide. Posterolaterally on each side of central depression with oval depression surrounded by the densely arranged granules. Lateral portions of pronotum above the lateral protrusions with a small sparsely granulated bulge on each side.

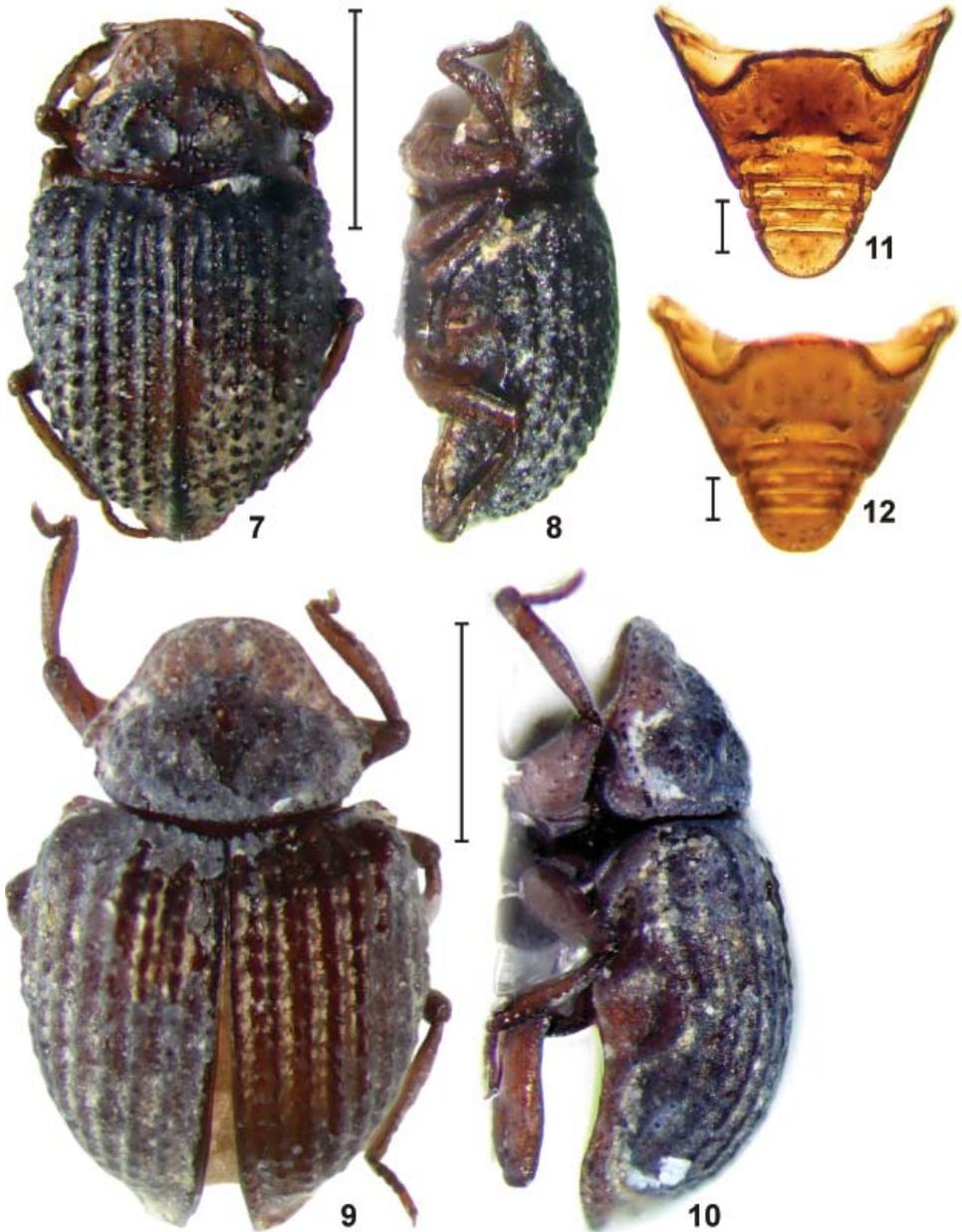
Elytra combined 1.1× as long as wide, base of elytra ca. as wide as maximum width of pronotum. Humeral bulge distinct, sparsely granulate. Even and odd intervals elevated to same height, all intervals more or less uniformly elevate, bearing only indistinctly prominent rounded granules. Lateral ridges on each elytron highly elevate, consisting of distinct granules. Elytral punctures indistinct.

Abdomen with lateral margins of ventrites 1 and 2 strongly narrowing posteriad. Ventrite 1 bearing sparse scattered granules on the whole surface; sublateral teeth on posterior margin developed, large. Ventrite 2 depressed anteriorly, posteriorly bearing small teeth facing those on ventrite 1.

Aedeagus medium large, 0.30–0.37 mm long (0.37 mm in lectotype). Parameres slightly longer than (1.15× as long as) phallobase, their basal portions combined distinctly narrower than anterior portion of phallobase; paramere straight at very base, widening apicad, wide and strongly convex laterally in apical portion. Length of median lobe slightly shorter than (0.80× as long as) length of paramere; apical portion triangular, narrow, widest at posterior 0.4 of total length; basal struts short, shorter than apical triangular portion of median lobe. Phallobase ca. 2.0× longer than wide, slightly widening posteriad; posterior portion with large basal foramen.

**Variation.** Except for the body measurements and size of the aedeagus, the type specimens of *G. trifossulatus* vary slightly in the depth of the median pronotal depression (very distinct and rather deep in the lectotype, slightly less distinctly developed in some of the paralectotypes) and in the general body shape (widely oval in the lectotype, slightly more elongate in some of the paralectotypes). Morphology of the aedeagus is rather uniform in all dissected specimens, with the different proportions of the phallobase (see Figs. 2–3) caused by its variable torsion in respect to parameres. Arrangement of the submedian bulges of frons is constant in all specimens examined for this character.

**Comments on the taxonomic status.** The species was described as distinct from *G. laesicollis* on the basis of the differences in pronotal sculpture (MOTSCHULSKY 1843: 661). Based on the examination of the specimens from Georgia deposited in his collection, ERICHSON (1847) synonymized the species with *G. laesicollis* a few years later. REITTER (1901) removed *G. trifossulatus* from synonymy with *G. laesicollis* on the basis of a specimen collected in Uzbekistan (Bukhara). Reexamination of this specimen (deposited in HHNM) showed that it differs from both *G. laesicollis* and *G. trifossulatus* in many characters (body larger, anterior portion of pronotum widely pale, lateral portion of pronotum with one large and multiple small protrusions, abdominal ventrite 1 without tubercles on posterior margin, aedeagus clearly different from *G. laesicollis* and *G. trifossulatus*) and seems to be similar to the Himalayan



Figs. 7–12. Type specimens of *Georissus* species. 7–8, 11 – *G. persicus* sp. nov., holotype; 9–10, 12 – *G. trifossulatus* Motschulsky, 1843, lectotype. 7–10 – habitus (7, 9 – dorsal view; 8, 10 – lateral view); 11–12 – abdominal ventrites. Scale bars: 0.5 mm (habitus), 0.1 mm (abdomen).



Figs. 13–14. Localities of *Georissus persicus* sp. nov. in southern Fars, Iran. 13 – Reykan; 14 – Shaldan. Photos: Sh. Falamarzi.

species *G. bipartitus* Champion, 1923 and *G. instabilis* Champion, 1923 based on its external morphology. REITTER's (1901) confirmation of the specific rank of *G. trifossulatus* was therefore based on the misidentified specimen.

Based on the examination of the type material of *G. trifossulatus*, we can confirm that this taxon is extremely similar to the European *G. laeicollis*. We compared the types of *G. trifossulatus* with non-type specimens of *G. laeicollis* from Austria ('Carinthia, lgt. Reitter'), Bosnia Herzegovina ('Herzegowina, lgt. Th. v. Wanka') and northeastern Turkey ('Trapezund [= Trabzon], 4. IV. 1917, lgt. Dr. W. Eicher'), all deposited in NMPC. Both species agree in all details of the superficial sculpture of the head, pronotum and elytra, but seem to differ in the body proportions (body elongate oval in *G. laeicollis* specimens, widely oval in *G. trifossulatus* types) and in the depth of the elytral striae (deeply grooved in *G. trifossulatus* types, striae shallower in *G. laeicollis* specimens). Aedeagus morphology of both species is very similar, with the phallobase slightly shorter than the parameres, wider than the combined width of the paramere bases and the parameres narrow basally but widening apicad; both species, however, slightly differ in the size of the genitalia (0.37–0.42 mm in *G. laeicollis* specimens, 0.32–0.37 mm in *G. trifossulatus* types) and in the general proportions (aedeagus of *G. trifossulatus* (Figs. 2–3) is more subtle and narrower than that of *G. laeicollis* (Fig. 4) even in specimens with the same length of the aedeagi).

Based on the specimens examined for this study, we are not able to decide whether *G. trifossulatus* is a distinct species or if it falls into the variability of *G. laeicollis*, and we therefore refrain from its synonymization. The situation with the *G. laeicollis* complex seems to be rather complicated based on our initial study done for this paper – there seem to be more 'morphotypes' of *G. laeicollis* even in European material examined, and a small sample of material examined from Kazakhstan (deposited in HHNM) also contains specimens slightly differing from both *G. laeicollis* and *G. trifossulatus* in the morphology of the aedeagus, but otherwise corresponding with these species in external morphology. Moreover, the types of *G. laeicollis* have to be reexamined in detail to understand the real meaning of this name.

## Discussion

The results of this study clearly show that the taxonomy and distribution of the *Georissus* species is far from understood even in the western Palaearctic which was considered well known in this aspect. A detailed revision study of the Palaearctic *Georissus* fauna seems to be essential. The reexamination of all relevant type specimens is a basic step in this revision. Within this study we have started the revision of types with the redescription of *G. trifossulatus* which was necessary to confirm the status of *G. persicus* sp. nov. Redescription of remaining species described by MOTSCHULSKY (1843) will be published in a separate paper.

The West-Palaearctic material of Georissidae was identified solely using external morphology by most previous authors, and the only genitalia drawing of European *Georissus* may be found in the redescription of *G. crenulatus* by BAMEUL (1991). The present study as well as some initial work on other European *Georissus* material by the first author shows, however, that the examination of male genitalia is necessary to provide reliable identification. Identifications based solely on the external morphology and not confirmed by the examination

of the aedeagus should be taken as unreliable at least for the time being, until the status and differential characters of West-Palaeartic fauna are better understood.

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