

New records of *Bembidion (Ocydromus) irregulare* Netolitzky, 1934 and *Bembidion (Euperyphus) giganteum reinigi* Netolitzky, 1934 in China (Coleoptera Carabidae Bembidiina)

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ABSTRACT

This work presents the redescription of Bembidion irregulare Netolitzky, 1934 from Northern Eastern Karakorum, usually ranked as species incertae sedis or, doubtfully attributed to Bembidion subg. Bembidionetolitzkya Strand, 1929. Tentatively this species is attributed here to the subgenus Ocydromus Clairville, 1806 sensu Kryzhanovskij et al. (1995), i.e. a complex of species groups sharing several diagnostic characters in different combinations, often not allowing the separation into monophyletic groups which could lead to treat them as independent subgenera. Bembidion (Euperyphus) giganteum reinigi Netolitzky, 1934, described from Western Pamir, is reported for the first time for China. This is also the first citation for China of the subgenus Euperyphus Jeannel, 1941.

Key words: Coleoptera, Carabidae, Bembidiina, Bembidion, Ocydromus, Euperyphus, Palaearctic region, China, taxonomy, redescription.

RIASSUNTO

Nuovi ritrovamenti di *Bembidion (Ocydromus) irregulare* Netolitzky, 1934 e *Bembidion (Euperyphus) giganteum reinigi* Netolitzky, 1934 in Cina (Coleoptera Carabidae Bembidiina). *Questo lavoro presenta la ridecrizione di Bembidion irregulare Netolitzky, 1934 del Karakorum nordorientale, di solito classificata come specie incertae sedis o dubitativamente attribuita a Bembidion subg. Bembidionetolitzkya Strand, 1929. Questa specie è attribuita qui provvisoriamente al sottogenere Ocydromus Clairville, 1806 sensu Kryzhanovskij et al. (1995), cioè un complesso di gruppi di specie che condividono vari caratteri diagnostici in diverse combinazioni, spesso in modo tale da non permettere la loro separazione in gruppi monofiletici che possano suggerire di trattarli come sottogeneri indipendenti. Bembidion (Euperyphus) giganteum reinigi Netolitzky, 1934, descritto del Pamir occidentale, è segnalato per la prima volta in Cina, così come il sottogenere Euperyphus Jeannel, 1941.*

Parole chiave: Coleoptera, Carabidae, Bembidiina, Bembidion, Ocydromus, Euperyphus, regione paleartica, Cina, tassonomia, ridecrizione.

MATERIALS AND METHODS

This paper is based on the study of 20 specimens belonging to the species here investigated. Sources of material are the following collections:

- CBUL Petr Bulirsch Collection, Praha, Czech Republic
 CNFO Paolo Neri Collection, Forlì, Italy
 CSCR Martin Slachta Collection, Ceske Budejovice, Czech Republic
 CTVR Luca Toledano Collection, Verona, Italy
 MSNM Museo Civico di Storia Naturale di Milano (Dr. Fabrizio Rigato, Mr. Maurizio Pavesi)
 NHMHS National Museum of Natural History, Bul-

garian Academy of Sciences, Sofia (Dr. Borislav V. Guéorguiev)

NHMW Naturhistorisches Museum, Wien, Austria (Dr. Heinrich Schönmann, Dr. Manfred Jäch, Dr. Harald Schillhammer)

Measurements, made with a Leica MZ12 stereobinocular microscope at 25 x (body) and 100 x (phallus), are expressed in the text by these abbreviations:

- pw/pl pronotum width / pronotum length ratio;
 pw/hw pronotum width / head width ratio;
 el/ew elytral length / elytral width ratio;
 ew/pw elytral width / pronotum width ratio;
 bl/al total body length / antennal length ratio.

Body length was measured for card-mounted specimens from the front margin of the clypeus to the apex of the elytra, and the antennal length from base of antennomere 1 to the apex of antennomere 11. Pronotal length is measured in the middle.

Dissections were made using standard techniques. Genitalia and small parts were preserved in Euparal, attached to label-size acetate sheets and mounted on the same pins as the specimens.

Photo of Fig. 1 was taken with a Nikon Coolpix 995 digital camera on a Leica MZ12 stereobinocular microscope. Drawings of the phallus were made by correcting images taken with the same digital camera on the same microscope with the Adobe Photoshop® Elements 3.0 program on a Macintosh Powerbook G4 computer.

The subgenus *Ocydromus* Clairville, 1806 is intended here sensu Kryzhanovskij et al. (1995) because it is a complex of species-groups sharing several diagnostic characters in different combinations. This often does not allow the separation into monophyletic groups which could be treated as independent subgenera. In any case we still refrain here from a formal synonymization of the taxa downgraded to species groups waiting for more evidence.

Bembidion (Ocydromus) irregulare Netolitzky, 1934
(Figs. 1, 2, 3, 4, 5, 6)

Diagnosis

A large species (6.00 to 7.24 mm) from Northern Eastern Karakorum showing long, reddish-brown elytra, three discal elytral pores, flat and narrow pronotum, somewhat similar in habitus to a *Bembidionetolitzkya* Strand, 1929 (*peliopterum* Chaudoir, 1850 species group, Schmidt, 2004); short, “S” shaped flagellum and “coffee sclerite” in the endophallus.

Systematic notes

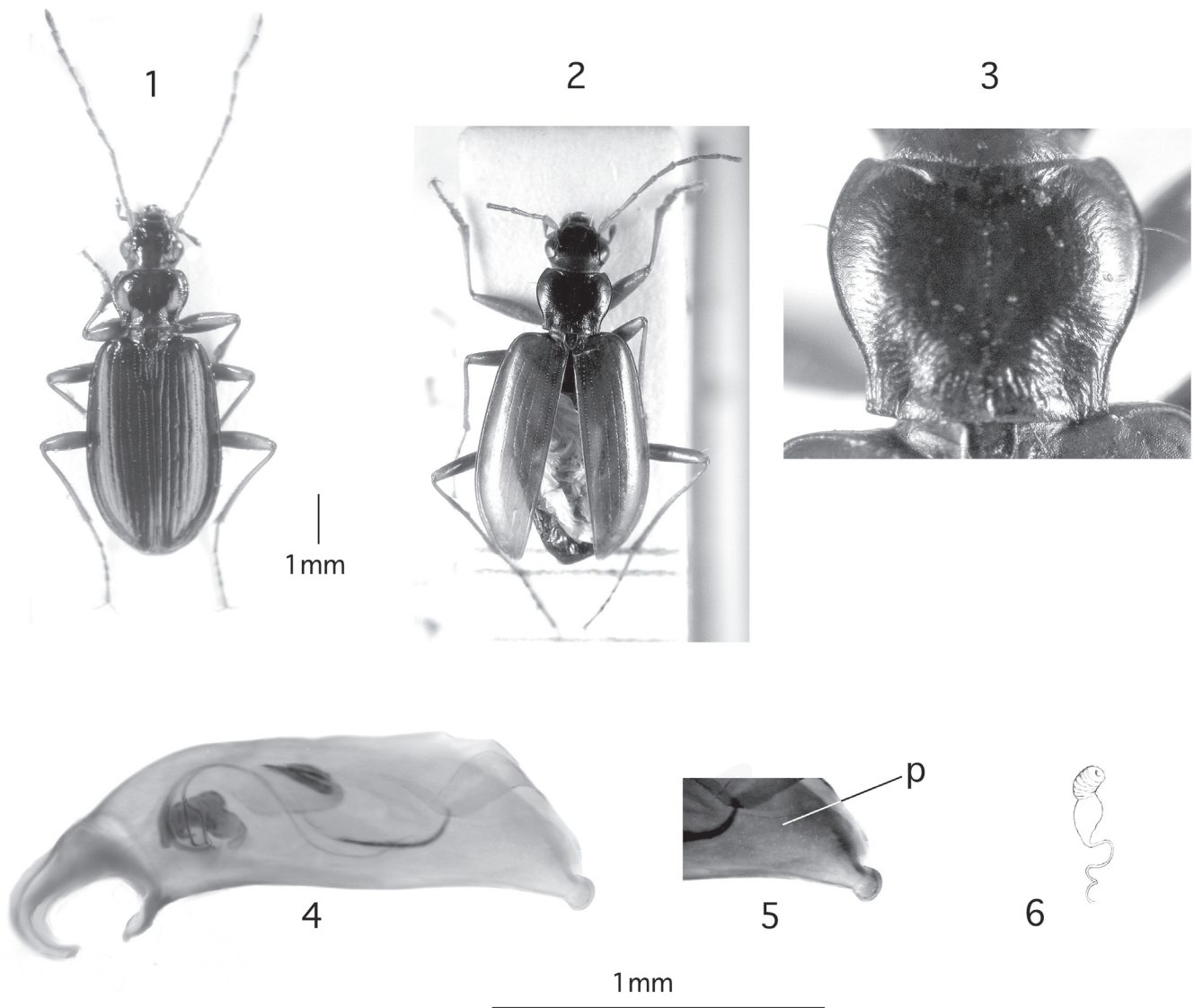
Hitherto this species was classed as *Bembidion* incertae sedis (Schmidt, 2004; Lorenz, 2005). Tentatively, based on the original description of the habitus, somewhat similar to the species of subg. *Bembidionetolitzkya*, *peliopterum* species-group (long species with depressed pronotum, flat and long reddish-brown elytra and complete elytral striation) it has been regarded also as a species of the subgenus *Bembidionetolitzkya* (Lorenz, 1998; Marggi et al., 2003). On the determinaton label of the type specimen Netolitzky himself wrote “Daniela ?” (note: the name *Bembidionetolitzkya* replaced the name *Daniela* Netolitzky, 1910 fallen into homonymy with a Genus of Coelenterata). The study of the hol-

otype and of the other specimens we had the chance to examine revealed that the species actually belongs to the subgenus *Ocydromus* Clairville, 1806, intended *sensu lato* (Kryzhanovskij et al., 1995; Toledano, 2000, 2008). More precisely, *Bembidion irregulare* should be included within the “*Peryphus* species-group Stephens, 1828” sensu Kryzhanovskij et al. (1995), or, better, in an independent species group.

The localities “Gund” (Sind Tal), and “Tarimbeck-en” (Netolitzky, 1934) (= “Tarim basin, Shaksagan Valley”, Andrewes, 1935) and the other localities of the new material we examined in this study (China, Qogir su Camp, K2, and Pakistan, Kande, Hushe valley), are near to one another, therefore the species seems to have a limited distribution.

The comparison with the holotype (Fig. 2) confirmed that the other examined specimens belong to the same taxon as the type. Unfortunately, the type lacks the phallus. Probably it was dissected, but on the same pin as the type there is no label with reference to any separate slide containing this phallus. Therefore we were unable to study the male genitalia of the holotype. On the other hand, the extreme similarity of the habitus and the vicinity to the known collecting localities allowed us to describe the male genitalia of this species on the males more recently collected.

The species herewith redescribed shows an interesting endophallic apomorphy which is unique within the *Ocydromus* complex. The “coffee sclerite” (see below) seems to be a particular development of a structure present in other species groups of the complex (“dorsal plate + flagellar sheat”, Maddison, 1993; “poche ventrale + fourreau ventral”, Coulon, 2002). On the other hand, the presence of a thin but evident tubular flagellum in a phallus with a “*Peryphus* - like” shape (subg. *Ocydromus*, “*Peryphus* Stephens, 1828 species group” sensu Kryzhanovskij et al., 1995), i.e. with subparallel ventral and dorsal margins and triangular apical fifth, suggests the inclusion within the subgenus *Ocydromus*. The large size of *B. irregulare* could suggest relationships with the subgenus *Euperyphus* Jeannel, 1941 which, on the other hand, is excluded by the extreme homogeneity of the form of the endophallus of the *Euperyphus* species, lacking any structure showing analogies with the apomorphy of the species herewith described. *Euperyphus* species have a strong pronotal convexity, often a good indicator of phylogenetic relationships in the Bembidiina, certainly not shared by *B. irregulare*. Also the presence of three discal elytral pores does not suggest anything about its systematic position because, as already demonstrated (Toledano, 2000; Toledano & Siciak, 2004; Toledano & Schmidt, 2008) the presence



Figs. 1-6 - Habitus of *Bembidion irregulare* Netolitzky, 1934, 1) specimen from Northern Pakistan, Hushe valley, 2) holotype; 3) pronotum of *B. irregulare* (holotype); 4) Phallus of *Bembidion irregulare* Netolitzky, 1934, specimen from Northern Pakistan, Hushe valley; 5) detail of the pores of the median lobe's surface; 6) Spermatheca of *Bembidion irregulare* Netolitzky, 1934, specimen from Northern Pakistan, Hushe valley.

of supernumerary discal elytral pores should be in most cases ignored as supraspecific indicator in the Bembidiina. In any case we refrain from the description of a monospecific subgenus for this species.

The length of the holotype, according to the Netolitzky's (1934) original description is 5.5 mm, while the correct measurement of the specimen is 6.36 mm.

Examined material

Holotype, ♂, 1) "Sind - Tal // Gund - m.2500 // 9-IV-1929," (handwritten); 2) "Typus" (red, handwritten); 3) "Holotypus" (red, printed); 4) "Daniela?"

(handwritten) // irregulare Net. (handwritten) // Type (handwritten) // det. Netolitzky (printed)" (MSNM); 4♂♂, 6♀♀, N - Pakistan. Karakoram Mts., Baltistan pr., Hushe valley, Kande, 2940 ± 20m, N 35°21'45.7", E 076°22'07", 16.9.2001 Lgt.M Slachta (CSCR, CTVR, CNFO, CBUL); 1♂, 1♀, "China, Karakorum, river Shaksagan, 31.VIII.1988 Leg. P. Beron" (NHMHS, CTVR); 1♂ "China, Karakorum, K2, Qogir Su Camp, 1.IX.1988 Leg. P. Beron" (CNFO).

Redescription

Length 6.00 to 7.24 mm. Head and pronotum pi-

ceous, except for frons, neck and anterior pronotal margin brownish. Elytra reddish-brown, sometimes with sides slightly darker, with very faint metallic reflections at sides. Antennomeres 1 and 2 red; antennomere 3 red, sometimes slightly infuscated in the apical half, the remaining antennomeres slightly infuscated. Palpi light brown, with penultimate maxillar palpomere slightly infuscated at apex. Legs light reddish.

Head (pw/hw = 1.17 to 1.22) with parallel and moderately impressed frontal furrows, eyes of normal convexity and antennomeres very long (bl/al = 1.44 to 1.50).

Pronotum (Fig. 3) small (pw/pl = 1.28 to 1.35), depressed, cordiform, with sides evidently sinuate before the hind angles, median line and anterior transverse impression rather deep, posterior transverse impression slightly deeper, basal foveae flat and rugose as the entire base, hind angles sharp, of variable shape, obtuse in some specimens, right-angled in some others. Laterobasal carina rudimentary. Pronotum rugose near the margins, with long rugosities radially oriented from the middle of the pronotal disc.

Metaventral process bordered. Legs elongate.

Elytra (el/ew = 1.61 to 1.63) (ew/pw = 1.70 to 1.74), flat, elongate, with maximum width evidently behind the middle, shoulders narrow but marked, apex round. Elytral striae 1 to 6 almost complete, weakly punctate at the basal two thirds, weakly punctate-sulcate at the apical third. Stria 7 almost completely absent. Parascutellar stria long, apical stria long, connected with the apical trace of stria 7. Intervals flat. Three discal elytral pores in the third interval, in some cases adjoining stria 3, in some others more spaced from stria 3, evidently situated in the interval.

Microsculpture very superficial, isodiametric on neck, slightly more transverse on the pronotal sides; evident, isodiametric on the whole elytra.

Male genitalia (Fig. 4, 5). External shape of the median part of the phallus subparallel, thick, with apical fifth triangular, as in the species of the subg. *Euperyphus*. External surface of the median lobe covered of very fine pores (Fig. 5). Endophallus showing a strongly sclerotized sclerite ("brush sclerite", (Maddison, 1993); "paquet squamigère" (Coulon, 2002)), slightly less homogeneous than in the other species of the *Ocydromus* complex. The "coffee sclerite" is a strongly sclerotized "coffee-bean shaped" appendage situated on the dorsoapical margin of a flat, poorly sclerotized membranous suboval sclerite situated about at the middle of the endophallus ("dorsal plate + flagellar sheat", (Maddison, 1993); "poche ventrale + fourreau ventral", (Coulon, 2002)). Apically to

the dorsal plate there is a membrane, perhaps somewhat connected with the dorsal plate, showing an arcuate sclerotized ventroapical border, extended from the middle of the median lobe to its apical quarter. A very thin, sinuate tubular flagellum ends at the anterior third of the phallus, near the ostial flag, partially covered by the sclerotized ventroapical border mentioned above. Apex of phallus flat and rounded, relatively large. Parameres with three apical setae each.

Female genitalia. Spermatheca (Fig. 6) with elongate reservoir and coiled duct; not visible a sclerified annulus receptaculi.

Distribution

Known from Northern Eastern Karakorum.

Bembidion (Euperyphus) giganteum reinigi Netolitzky,
1934

This is the first citation of the species and the subgenus for China, and extends toward South East the distribution of the species.

Examined material

Holotype, ♂, "West Pamir, VII.X.28, Leg. Reining" (NHMW); paratype, f♂, same data as the holotype (NHMW); 1♂, 3♀, China, Karakorum, K2, 4000m, 2.IX.1988, leg. P. Beron (NHMHS, CNFO, CTVR).

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REFERENCES

- ANDREWES, H.E., 1935. *The Fauna of British India including Ceylon and Burma. Coleoptera. Carabidae. Vol. II. Harpalinae I*, London: 323 pp.
- COULON, J., 2002. Structure de l'endophallus des espèces françaises de Trechinae de la sous-tribu des Bembidiina (Coleoptera, Carabidae) *Bulletin de la Société entomologique de France* 107 (5): 449-470.
- KRYZHANOVSKIJ, O.L., BELOUSOV, I.A., KABAK, I.I., KATAEV, B.M., MAKAROV, K.V. & SHILENKOV, V.G., 1995. A Checklist of the Ground-Beetles of Russia and Adjacent Lands (Insecta, Coleoptera, Carabidae). *Pensoft Publishers, Sofia-Moscow*. 274 pp.
- LORENZ, W., 1998. *A systematic list of extant ground beetles of the world (Coleoptera «Geadephaga»: Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae)*. Tutzing, Germany, (published by the autor): 502 pp.
- LORENZ, W., 2005. *A systematic list of extant ground beetles of the world (Coleoptera «Geadephaga»: Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae)*. 2nd edition. Tutzing, Germany, (published by the autor): 530 pp.
- MADDISON, D., 1993. Systematics of the holarctic beetle subgenus *Bracteon* and related *Bembidion* (Coleoptera: Carabidae). *Bulletin of Museum of Comparative Zoology*, 153 (3): 143-299.
- MARGGI, W., HUBER, C., MÜLLER-MOTZFELD, G. & HARTMANN, M., 2003. In: Löbl I. & Smetana A. (Eds.) *Catalogue of palaearctic Coleoptera. Volume 1: Archostemata - Myxhophaga - Adephaga*, Apollo Books: 819 pp.
- NETOLITZKY F., 1934. Materiali zoologici raccolti dalla spedizione italiana al Karakorum (1929 - Anno VII). Coleoptera, Carabidae: Bembidiini. *Atti del Museo Civico di Storia Naturale, Trieste* 12: 89-100.
- SCHMIDT J., 2004. Revision der *Bembidion* - Untergattung *Bembidionetolitzkya* E. Strand, 1929 des Himalaya (Coleoptera, Carabidae, Bembidiini). *Veröffentlichungen Naturkundemuseum, Erfurt* (23): 151-176.
- TOLEDANO, L., 2000. Systematic notes on the Palaearctic Bembidiini with particular reference to the fauna of China (Coleoptera Carabidae). *Memorie della Società Entomologica Italiana*, 78: 5-70.
- TOLEDANO, L. & SCIAKY, R., 2004. Two new species of the genus *Bembidion* Latreille, 1802 from China (Coleoptera: Carabidae). *Koleopterologische Rundschau*, 74: 1-9.
- TOLEDANO, L., 2008. Systematic notes on the Palaearctic *Bembidion* Latreille, 1802 (Coleoptera, Carabidae) with particular reference to the fauna of China. *Memorie del Museo Civico di Storia naturale di Verona - 2. serie - Sezione Scienze della Vita*, 18: 5-46.
- TOLEDANO, L. & SCHMIDT, J., 2008. Notes on the Chinese species of *Bembidion* subg. *Bembidionetolitzkya* Strand, 1929 with description of twenty new taxa (Coleoptera, Carabidae, Bembidiina). *Memorie del Museo Civico di Storia naturale di Verona - 2. serie - Sezione Scienze della Vita*, 18: 47-78.

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