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Notes on genus *Bembidion* Latreille, 1802, subgenus *Peryphidium* Tschitschérine, 1895

(Insecta: Coleoptera: Carabidae: Bembidiina)

Abstract

Some taxonomical, geographical and nomenclatorial aspects of *Bembidion* Latreille, 1802 subgenus *Peryphidium* Tschitschérine, 1895 are discussed here.
Bembidion tizianoi Marggi & Huber, 1999 and *Bembidion seminskiense* Shilenkov, 1990 are transferred to the species "*incertae sedis*"; *Bembidion damavandense* Marggi & Huber, 1999, formerly listed as subspecies of *Bembidion kokandicum* Solsky, 1874 is reinstated as a species; *Bembidion kunarense* Kirschenhofer, 1989 and *Bembidion gagates sindicum* Netolitzky, 1935 are synonymized with *Bembidion gagates* Andrewes, 1924. *Bembidion* (*Peryphidium*) *validum salangense* ssp. n. is described from Afghanistan.
The following new records are reported: India, Himachal Pradesh for *Bembidion gagates*, Kashmir (Ladakh) for *Bembidion kokandicum*, Pakistan and Kashmir for *Bembidion validum validum* Netolitzky, 1920.
Italian and English keys for the species of subgenus *Peryphidium* are also provided.

Key words: *Bembidion*, *Peryphidium*, *Testediolum,* synonymy, Afghanistan, Kashmir, Ladakh, India, Himachal Pradesh, Pakistan, identification keys.

Riassunto

[*Note sul genere* Bembidion *Latreille, 1802, sottogenere* Peryphidium *Tschitschérine, 1895 (Insecta: Coleoptera: Carabidae: Bembidiina)*]
Sono discussi alcuni aspetti tassonomici, geografici e nomenclatoriali del genere *Bembidion* Latreille, 1802 sottogenere *Peryphidium* Tschitschérine, 1895.
Bembidion tizianoi Marggi & Huber, 1999 e *Bembidion seminskiense* Shilenkov, 1990 vengono collocati tra le specie "*incertae sedis*"; *Bembidion damavandense* Marggi & Huber, 1999, precedentemente considerata sottospecie di *Bembidion kokandicum* Solsky, 1874, viene elevata a "bona species"; *Bembidion kunarense* Kirschenhofer, 1989 e *Bembidion gagates sindicum* Netolitzky, 1935 vengono messi in sinonimia di *Bembidion gagates* Andrewes, 1924. Viene descritto *Bembidion* (*Peryphidium*) *validum salangense* ssp. n. dell'Afghanistan.
Vengono segnalati i seguenti nuovi records: India, Himachal Pradesh per *Bembidion gagates*,

Kashmir (Ladakh) per *Bembidion kokandicum*, Pakistan e Kashmir per *Bembidion validum validum* Netolitzky, 1920.
Viene fornita una chiave per le specie del sottogenere *Peryphidium*, in italiano e in inglese.

Introduction

The subgenus *Peryphidium* Tschitschérine, 1895 was considered a synonym of subgenus *Testediolum* Ganglbauer, 1891 until Bonavita & Vigna Taglianti (2010) removed it from synonymy, assigning to it all the Asian species formerly attributed to *Testediolum*. We decided to study here the subgenus, clarify its rehabilitation and provide a key for the identification of its species.

Materials and methods

We examined external morphology, male genitalia and bibliography of almost all the species belonging to subg. *Peryphidium*, 990 specimens in total.
The body length was measured, in mounted specimens, from the front margin of the labrum to the apex of the elytra, 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.
The photography of the habitus, made by LT, is a composite image with progressive focusing obtained with a Nikon DSFi1 digital camera controlled by Nikon DS-L2 stand alone remote controller mounted on a Leica Z6 microscope equipped with a 1.0x Leica lens and a customized motorized stand made by LT, then processed with Helicon Focus® 6.4.3 and optimized with Photoshop® Elements 14. Photographs of the aedeagi and microsculpture are made by LT with the same setup and processing method described above, although using a 5x Infinity Corrected Nikon Fluor lens on the Z6 microscope. The drawings of the spermathecae were made by Ivo Gudenzi.

The material examined is preserved in the following collections:

CTVR	coll. Luca Toledano, Verona, Italy
DE	coll. Dominique Echaroux, Etréchy, France
MNHN	Muséum National d'Histoire Naturelle, Paris, France
NHMW	Naturhistorisches Museum, Wien, Austria
PN	coll. Paolo Neri, Forlì, Italy
PS	coll. Peer Schnitter, Halle, Germany

Bembidion Latreille, 1802, subgenus *Peryphidium* Tschitschérine, 1895

Historical notes. Tschitschérine (1895) describes the subgenus *Peryphidium* for the species *Bembidion* (*Peryphidium*) *tjanschanicum* n. sp. from "Lac Issik-kul"

[Kyrgyzstan]; with the description of the species, the author describes also the diagnostic characters of the subgenus, and in a footnote mentions the differences in respect to the two most closely related subgenera that he retains: *Peryphus* Dejean, 1821 (by the base of antennae of metallic black) and *Testediolum* Ganglbauer, 1891 (by the more elongate and parallel shape, less depressed, by the narrow head, the slender antennae, etc.); later, *B. tjanschanicum* will be regarded as subspecies of *B. armeniacum* Chaudoir, 1846 (Netolitzky, 1920), then (De Monte in Netolitzky, 1943 page 52/148) only an aberration of *B. armeniacum kokandicum* Solsky, 1874 and at last (Lorenz, 1998; 2005) its synonym.
Literature deals with *Peryphidium* by including it within *Testediolum* (Netolitzky, 1921; 1943) or as a synonym of *Testediolum* (Csiki, 1928; Kryzhanovskji et al., 1995; Lorenz, 1998; 2005; Marggi et al., 2003). Only Lorenz (1998; 2005), listing the species of subgenus *Testediolum*, splits them into two groups: the "*glaciale* group", which includes all the European species, and "*armeniacum* group", which includes all the Asian species.
Bonavita & Vigna Taglianti (2010) rehabilitate the subgenus *Peryphidium* assigning to it all the Asian species, move *B. armeniacum* to the subgenus *Nepha* Motschulsky, 1864, while *B. kokandicum*, formerly retained subspecies of *B. armeniacum*, is raised to good species and assigned to *Peryphidium*.
Currently (Marggi et al., 2017) the following Asian taxa, including their synonyms, are listed in the subgenus *Peryphidium*: *B. kokandicum kokandicum* Solsky, 1874 (juniores synonyms: *tjanschanicum* Tschitschérine, 1895; *fortius* Netolitzky, 1920); *B. kokandicum damavandense* Marggi & Huber, 1999 (nomen novum for *davatchii* Morvan, 1971); *B. kokandicum tizianoi* Marggi & Huber, 1999 (nomen novum for *zagrosense* Morvan, 1973); *B. validum validum* Netolitzky, 1920; *B. validum marquardti* Netolitzky, 1920; *B. gagates gagates* Andrewes, 1924; *B. gagates sindicum* Netolitzky, 1935 (junior synonym: *kumatai* Habu, 1973); *B. olympicum* De Monte, 1946; *B. montei* Fassati, 1959; *B. kunarense* Kirschenhofer, 1989; *B. seminskiense* Shilenkov, 1990.

Discussion and conclusions. We believe that the subgenus *Peryphidium* is more closely related to *Peryphus* than to *Testediolum*, from which it is recognizable by exoskeletal characters, including the colour of the appendages (antennae often not completely black, tibiae usually orange-brownish) but also by characters of the genitalia.
In *Testediolum* the reservoir of the spermatheca has the distal cavity less curved and showing 3, 4 or more annular narrowings (figs. 17, 18), while in *Peryphidium* usually it has the classical "baby shoe" shape with the distal cavity without or with only one annular narrowing, usually shared also by the *Peryphus* species, and the proximal cavity showing at base a kind of "baseplate", more or less evident (figs. 19-25) not shared by the subgenera *Testediolum* and *Nepha,* usually regarded as closely related to the species dealt with here.

Also the aedeagus shows endophallus with some sclerites evidently different from those of *Testediolum* and *Nepha* and that suggest a relationship with the wide "world" of *Peryphus*.
At least provisionally we confirm the rehabilitation of the subgenus *Peryphidium*, waiting for molecular evidence that could confirm or modify this choice.

Notes on some species of subg. *Peryphidium*

***Bembidion* (*Peryphidium*) *damavandense* Marggi & Huber, 1999 valid species**
Peryphidium davatchii Morvan, 1971
Bembidion (*Testediolum*) *armeniacum davatchii* (Morvan, 1971)
Bembidion (*Testediolum*) *armeniacum damavandense* Marggi & Huber, 1999

Historical notes. Morvan (1971) describes *Peryphidium davatchii* from Iran (Elburz range, massif du Kuh-i-kahar et Mont Damavand, 2600 - 3500 m) on more than one exx.; the description, precise and detailed, includes also the drawing of habitus, aedeagus and spermatheca. Kirschenhofer (1989), assigns to the species a new status: *Bembidion* (*Testediolum*) *armeniacum davatchii* (Morvan, 1971). Marggi & Huber (1999) rename the taxon as *Bembidion* (*Testediolum*) *armeniacun damavandense* because the name is preoccupied by *Bembidion* (*Ocyturanes*) *culminicola davatchii* Morvan, 1971. Marggi et al. (2003) synonymize *davatchii* with *armeniacum armeniacum* Chaudoir, 1846.
Bonavita & Vigna Taglianti (2010) move *B. armeniacum* to the subgenus *Nepha* Motschulsky, 1864, while *B. kokandicum* Solsky, 1874, previously considered a subspecies of *B. armeniacum*, is raised to good species and assigned to *Peryphidium*; they also suspect that *B. davatchii*, and therefore *damavandense*, may be synonymous with *B. kokandicum*. Finally, Marggi et al. (2017), list the Iranian taxon *damavandense* as a subspecies of *B. kokandicum*.

Material examined. From CTVR: 1 ♂ "Iran, VI.1977 / Mt. Sabalan /2600, Morvan"; 1 ♂ "Iran, Elburz / Elika, 3100 / VI.1973 Morvan"; 9 ♂♂ 4 ♀♀ "N Iran, Mazandarān / 70km SW Čalūs, 2870 m / 18.VI.1999 / lgt. E.&P. Hajdaj"; 8 ♂♂ 6 ♀♀ "NW Iran P. Azarbaygan-e / 30 Km SE Tabriz 3000m / 24.VI.2000 / lgt. E.&P. Hajdaj"; 2 ♂♂ "Iran, Prov. Kerman, Kuh-e Lalehzar / 04.06.2014 3610 m / leg. Schnitter"; 7 ♀♀ "NW Iran P. Azarbaygan-e / 15 Km S Mešginšahr / 2000m / 20.VI.2000 lgt. Hajdaj E.P."; 12 ♂♂ 4 ♀♀ "Iran, Prov. Kerman, Rayen / waterfall near Kuh-e Hazar / 05.06.2014 2920m / leg. Schnitter"; 1 ♂ 1 ♀ "Iran, Mazandaran, 2-6-99 /vers Nord M Elburz / m 2600-2800 leg. Sabni"; 1 ♂ 1 ♀ "IR Binalut Geb. / Shandiz 2000m // C. Blumenthal / 36.1974"; 1 ♂ "Iran, Zagros Mts., Esfahan prov. / Feraeidunshahr-Karaman road / Karaman pass, Ferdun Mts. 2900 / 3100m J. Riegr lgt., 17-18.7.2016"; 2 ♂♂ 4 ♀♀ "Iran, Prov. Teheran,

Elburz Mts. / Tajrish N, Kandovan pass / 10.06.2014 / leg. Schnitter"; 1 ♂ "Iran (Kerman prov.) / Kūh-e Lālehzār / nr Lālehzār vill. 3110-3300 m / (mountain steppe, / running at wet sites) / 3.VI.2014 Wrase & Laser"; 5 ♂♂ 6 ♀♀ "Iran, Prov. Kerman, Kuh-e Lalehzar / Lalehzar vill. / 03.06.2014 3110 m"; 5 ♂♂ 2 ♀♀ "Iran, Horasan / 50 Km NE Mashhad / VII.1974 an Licht (45) / leg. Pretzmann & Jady".
From DE: 1 ♂ 1 ♀ "Iran, Mazandaran / Kavaher Deh, 1750 m / 8.1992 "; 22 ♂♂ 10 ♀♀ "Iran, pr. Mazandaran / Alam Kuh 2700 m / VIII 1992 "; 10 ♂♂ 12 ♀♀ "Iran / Alam-Kuh 3500m / 8.1972 / Leg. Ledoux".
From PN: 1 ♂ "Iran, Mazandaran prov. / Elborz, under Tachte Suleiman / 5-6.2001, 2000-3000m / R. Reitmaier leg."; 3 ♂♂ "Iran, Ardabil, 2900m /MeshinShahr env. / 23.5.10 Skoupý leg."; 2 ♂♂ 1 ♀ "Iran, Zagros Mts., Esfahan prov. / Feraeidunshahr-Karaman road / Karaman pass, Ferdun Mts. 2900 / 3100m J. Riegr lgt., 17-18.7.2016"; 7 ♂♂ 3 ♀♀ "Iran, pr. Mazandaran / Alam-Kuh 2700m / VIII.1992 Echaroux"; 6 ♂♂ "Iran, prov. Teheran / Dizin 3500m VIII.1972 / Echaroux"; 2 ♂♂ 1 ♀ "Iran, Alam-Kuh 3500 m / 8.1972 / Leg. Ledoux".
All the material mentioned above has been labelled as "*Bembidion* (*Peryphidium*) *damavandense* Marggi & Hub. det. Neri & Toledano 2021".

Discussion and conclusion. After analysing the remarkable nomenclatorial vicissitudes of the species, we tried to investigate the value of the assignment to subspecies of *B. kokandicum*. The larger average size of the specimens, the base of the pronotum more oblique towards the corners, the corners themselves more obtuse, the lower convexity of the ventral margin of the aedeagus (fig. 6) and its longer average length, convince us of the existence of specific characters compared to *kokandicum*. We therefore state here the following new status: ***Bembidion* (*Peryphidium*) *damavandense* Marggi & Huber, 1999 valid species** and not subspecies of *kokandicum* Solsky, 1874.

***Bembidion* (*Peryphidium*) *gagates* Andrewes, 1924**
Bembidion (*Testediolum*) *gagates sindicum* Netolitzky, 1935 **syn. nov**.
Bembidion (*Peryphus*) *kumatai* Habu, 1973
Bembidion (*Testediolum*) *kunarense* Kirschenhofer, 1989 **syn. nov.**

Historical notes. Andrewes (1924) describes *Bembidion* (*Testediolum*) *gagates* from Kashmir (several localities); besides giving an accurate description he also points out that the species, shiny black in colour, can also occur with a small, ill-defined, preapical yellow spot. Netolitzky (1935) describes the subspecies *Bembidion* (*Testediolum*) *gagates sindicum* from Kashmir on two specimens; he differentiates it from the nominotypical form by the presence of a yellow preapical spot and by the pronotum with the base more punctured and the laterobasal carina more distinct. Andrewes (1935), in redescribing *gagates*, also mentions "*Bembidion gagates* var. *sindicum*" (Andrewes, 1935), differentiating it from

the nominotypical form by the preapical spot only, and thus downgrading it to a colour variety.
Jedlička (1953) describes as a new aberration *Bembidion gagates chinensis* ab. n. from China (Fukien = FUJ) on a single ♀; it is differentiated from the nominotypical form by having reddish yellow antennae and legs.
Habu (1973) describes from Nepal *Bembidion* (*Peryphus*) *kumatai* based on two specimens; the description, very accurate, presents also drawings of habitus and aedeagus.
Kirschenhofer (1989) describes from Afghanistan (Nouristan, Kunar), based on several specimens, *Bembidion* (*Testediolum*) *kunarensis* (sic!); the description, quite detailed, reports also the keys of the species then considered belonging to the subgenus *Testediolum* Ganglbauer, 1891, of the group with preapical spots; it includes an extremely schematic drawing of the aedeagus.
Marggi et al. (2003, p. 20) synonymize *B. kumatai* with *B. gagates sindicum* without explanation; furthermore, the name *kunarensis* has a change of ending due to correction of the incorrect original spelling and becomes *kunarense*.
Lorenz (1998, 2005) includes the species in the "*armeniacum* group" that includes all the Asian species. Bonavita & Vigna Taglianti (2010) assign to the subgenus *Peryphidium* all the Asian species previously attributed to *Testediolum*.
Marggi et al. (2017) list the species mentioned sub *Peryphidium*: *B. gagates gagates* Andr. (A: FUJ, KA, PA, UP), *B. gagates sindicum* Net. (=*kumatai* Habu) (A: NP), *B. kunarense* Kirsch. (A: AF). As *Bembidion gagates* ab. *chinensis* Jedl. is a simple aberration, it is ignored and therefore included in *B. gagates gagates* and its distributional range, Fukien, included in the range of the typical species.

Material examined.

***B. gagates* Andrewes, 1924.** From NHMW: 9 ♂♂ 12 ♀♀ "Kashmir, Zagipal b. / Pahalgam, 3500-3600 m / lg. Franz, Okt. 1977"; 1 ♀ "Kashmir, Pahalgam / lg.H. Franz, Okt. 1977".
From PN: 2 ♂♂ "Pakistan Kagan valley / Lago Saiful Maluk / m 3200 4.VII,1986 / L. Dacatra [det. Müller-Morzfeld]"; 1 ♂ "Pakistan Kagan valley / Naran m 2400 c. / 2.VII.1986 / L. Dacatra [det. Müller-Morzfeld]"; 2 ♂♂ "Kashmir, Zadipal b. / Pahalgam 3500-3600m / lg. H. Franz Okt. 1977".
From DE: 1 ♂ 1 ♀ "Pakistan Nord, Shogran / VI.1987"; 1♀ "Cachemire / Baltal 12.7.81 / Ledoux"; 8 ♂♂ 9 ♀♀ "Cachemire Thajiwas / Glacier de Sonamarg / 13.7.81 Ledoux"; 2 ♂♂ 1 ♀ "Cachemire / Pahalgam – Sheshnag / 288 – 3400 m / 20.8.79 Ledoux"; 1 ♂ "Cachemire / Pahalgam – Chandanwari / 2800 m / 22.8.79 Ledoux"; 1 ♂ "Cachemire 14.8.78 / Col de Zodgi La / 3200-3300 m coté NE / Leg. Ledoux"; 2 ♂ 1 ♀ "Cachemire, Pahalgam / Vallée du glacier Kolahoi / 3400 m 16.8.79 Ledoux"; 22 exx. "Cachemire 2400 m / à val de Sonamarg / 6.8.78

Ledoux". 7 ♂♂ 1 ♀ "Cachemire Pahalgam / Aru 2700-2800 n / 12.8.79 Ledoux"; 5 ♂♂ 2 ♀♀ "India – Uttar Pradesh / Col Rohtang 3900 m / 17.8.1980 Ledoux".
From CTVR: 1 ♀ "N Pakistan, Diamir district / Nanga Parbat, Raikhot v / Fairy Meadows, 3300m / 18.7.1999, M. Šlachta"; 1 ♀ "North Pakistan / S. Prepsl leg." 1 ♂ "Swat, Pakistan / W. Wittmer // Kalam 5.VI / 2000-2400m"; 1 ♂ 2 ♀♀ "Kashmir, 1976 / W. Wittmer // Yusmarg 5.7 / 2300-2400; 1 ♂ "Kashmir – Pahalgam / lg. H. Franz Okt. 1977"; 2 ♂♂ 2 ♀♀ "India: Kashmir: Tangmarg / Pir Panjal Gebirge / 2600m, 21-25.V.1976 // Martens & Schawaller leg."; 1 ♂ 1 ♀ "Kashmir, Zadipal b. / Pahalgam 3500-3600m / lg. H. Franz Okt. 1977"; 1 ♂ "India, Cashmire / Baltal 3000m / 8.VIII.1992 / leg. S. Dacatra"; 2 ♂♂ "Umg. Maharigaon / 3000-3500m //Gebiet von Jumla / Westnepal, lg. H. Franz"; 1 ♂ 2 ♀♀ "Ufer des Tila Khola / b. Jumla 26.9 – 4.10.1972"; 1 ♂ "Umg. Katrain b.Kulu / Himachal-Pradesh / Indien, lg. H. Franz".

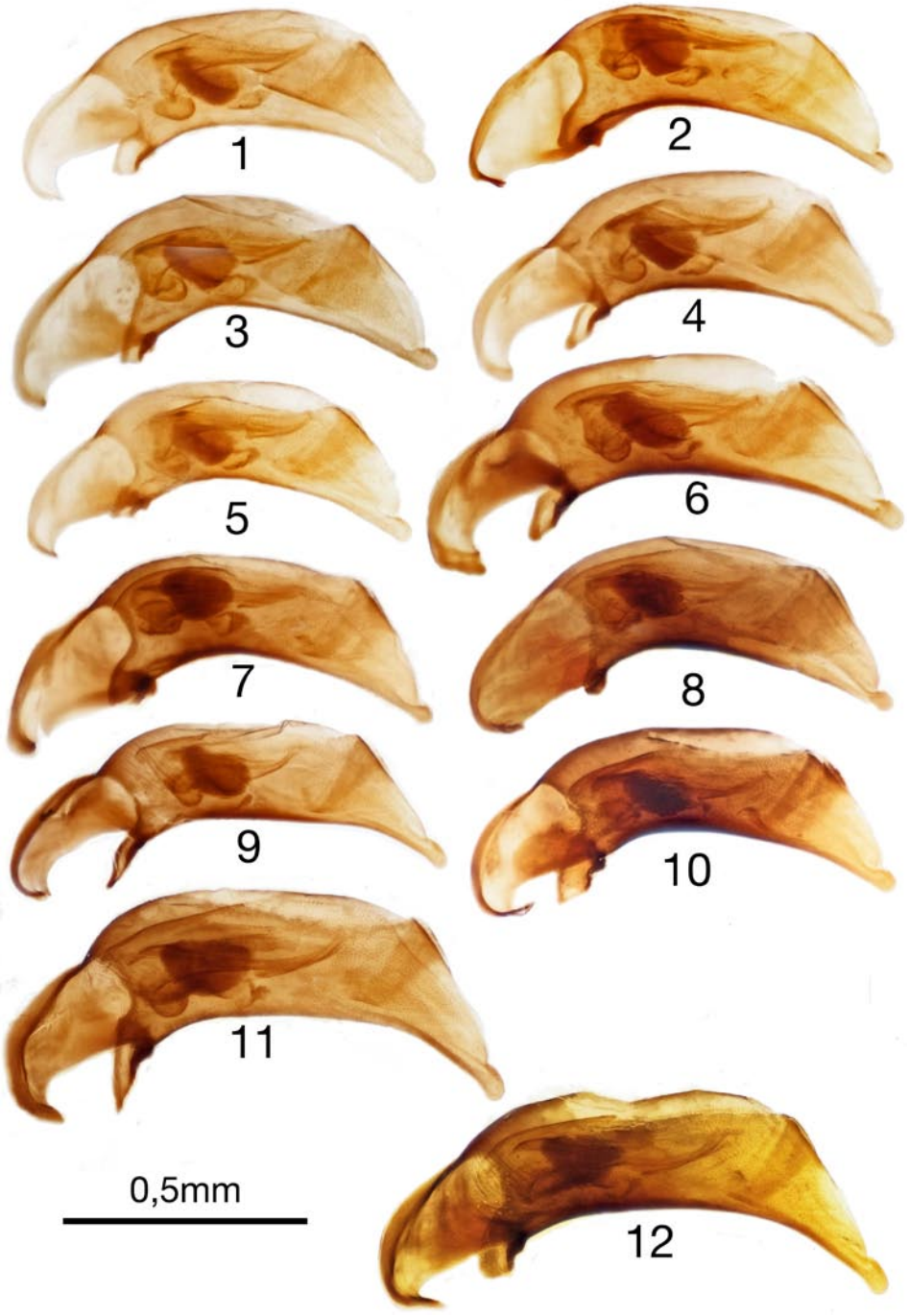
***B. gagates sindicum* Netolitzky, 1935.** From DE: 3 ♂♂ "Cachemire Pahalgam / Aru 2700-2800 m / 12.8.79 Ledoux".
From PN: 2 ♂♂ "Pakistan, Swat / s. Miandam 2300m / 19.V.1983 / Besuchet – Löbl"; 1 ♂ "Kashmir 1978 / W. Wittmer // Pahalgam 8.7 / 2200-3100m".
From CTVR: 2 ♂♂ 1 ♀ "Naltartal Umg. Jagot / 1-4.8.1974 / lg. F. Gartner // Karakorum exped. 1974 / Leite Helmut Linbichler"; 2 ♂♂ 1 ♀ "N Pakistan, Diamir district / Nanga Parbat, Raikhot v / Fairy Meadows, 3300m / 18.7.1999, M. Šlachta"; 1 ♂ "Pakistan, Swat /s.Miandam 2300m / 19.V.1983 / Besuchet – Löbl"; 2 ♂♂ 1 ♀ "Pakistan (Dir): / Lawarai – Pass / 2700 – 3300m 28.VI.1982 / Erber & Heinz leg."; 1 ♂ "(PK) Dir 3000 m / Lowari pass / 17.7.1991 I.S.Dacatra"; 1 ♂ 1 ♀ "North Pakistan / S. Prepsl leg."; 1 ♀ "Pakistan Swat / Malam Jabba / 2500-2600m, 18.5.83 / Besuchet – Löbl"; 2 ♂♂ 1 ♀ "Pakistan, Chitral / s.Madaglasht, 27.V.1983 /2900-3050m /Besuchet – Löbl"; 1 ♂ "NW Pakistan NW Frontier / Province, Babusar Pass / 4601m, 30Km S Chilas, leg. / J. Rejsek 21-23.7.1998"; 2 ♂♂ 2 ♀♀ "N Pakistan, Dir Distr. / Lawari pass, 3100 m / 11.8.1999 / lgt M. Šlachta"; 1 ♂ "NE Pakistan / Kaschmir, Nathiagali / 26.IV.2009 / 1200 m leg. Reuter"; 1 ♂ "Cachemire Thajiwas / Glacier de Sonamarg / 13.7.1981 Ledoux"; 1 ♂ "Kashmir 1978 / W. Wittmer // Pahalgam 8.7 / 2200-3100m"; 1 ♂ "India Cashmire / Baltal 3000 m / 8.VIII.1992 / leg. S. Dacatra"; 1 ♂ "Umg. Katrain b. Kulu / Himachal Pradesh / Indien, lg. H. Franz"; 1 ♂ "India, North Uttarprades / Mandoli-Lohajang / 24-26.4.2006 2600 m / leg. E. Kucera"; 2 ♀♀ "N India – Uttaranchal state / ca 30 Km N of Bageshwar / Khati village env. / 2100-2300m 27-30.VI.2000 / Z. Keyval & M. Tryzna lgt.".

***B. kumatai* Habu, 1973.** From NHMW: 4 ♂♂ 4 ♀♀ "Umg. Maharigaon / 3000 – 3500 m // Gebiet von Jumla / Westnepal, lg. Franz [India, Uttarakhand]"; 1 ♀ "Umg. Alm Darghari / b. Maharigaon, 4000m // Gebiet von Jumla / Westnepal, lg. Franz [India, Uttarakhand]"; 3 ♂♂ 3 ♀♀ "Umg. Jarkot Nepal / Thakholoagebiet / 4000 – 4300 m, lg. H. Franz".

From CTVR: 2 ♂♂ 2 ♀♀ “Zentral Nepal / Sept. – Okt. Lg. H. Franz // Kali-Gandaki-Tal / zw. Lete u. Tukche”; 3 ♂♂ “Umg. Jarkot Nepal / Thakholoagebiet / 4000 – 4300 m, lg. H. Franz”.
From PN: 1 ♂ “Nepal, Kali Gandaki / Kagbeni, 2800 m / 22.X.1984 leg. P. Beron”; 2 ♂♂ “Zentral Nepal / Sept. – Okt. Lg. H. Franz // Kali-Gandaki-Tal / zw. Lete u. Tukche”.

***B. kunarense* Kirschenhofer, 1989.** From MNHN: 1 ♂, holotype, “Afghan. Kunar / H Vallée / d’Agök Kunar [handwritten] // 3200 à 3900 / 24.8.76 / G. Ledoux [handwritten] // HOLO / TYPUS [red, handwritten and printed] // *Bembidion* [printed] (*Tested*.) [handwritten] / *kunarensis* m. [handwritten] / det. E. Kirschenhofer [printed] // Museum Paris [printed] / G. Ledoux [handwritten, yellow]”.

Figs 1-12. Median lobe of the aedeagus of: 1. *Bembidion* (*Peryphidium*) *kunarense* Kirschenhofer, holotype (MNHN); 2. *Bembidion* (*P.*) *kunarense* Kirschenhofer, paratype, Afghanistan, Nouristan, Vallèe du Peck (PN); 3. *Bembidion* (*P.*) *gagates* Andrewes, Cachemire, Pahalgam, Vallèe du Glacier Kolanoi, 3400 mm (DE); 4. *Bembidion* (*P.*) *gagates* Andrewes, India, Huttar Pradesh, Col Rohatang 3900 m (CTVR); 5. *Bembidion* (*P.*) *kumatai* Habu, Nepal, Kali-Gandaki-Tal zw. Lete u. Tukche (CTVR); 6. *Bembidion* (*P.*) *damavandense* Marggi & Huber, Iran, Mazandaran prov., Elburz, under Takht-e Soleymān, 2000-3000 m (PN); 7. *Bembidion* (*P.*) *kokandicum* Solsky, Kirgizstan, Grigoryevka, Kyungey Alatau 3000 m (CTVR); 8. *Bembidion* (*P.*) *kokandicum* Solsky, Aulie Ata, Syr Daria, det. G. Müller 1988 (PN); 9. *Bembidion* (*P.*) *montei* Fassati, Afghanistan, Prov. Maydan, Oizir, South of Unai, 2400 m (CTVR); 10. *Bembidion* (*P.*) *olympicum* De Monte, Turkey, Bursa, Uludağ 1900-2100 m (PN); 11. *Bembidion* (*P.*) *validum validum* Netolitzky, Inner Tijan-Schan, Ak-Shyrak, Kumtor, 3000 m (PN); 12. *Bembidion* (*P.*) *validum marquardti* Netolitzky, Kirgistan, W Abh. von Ferganaki C.K. 2300 m (PN).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0,5mm

From PN: 1 ♂, paratype, “Afghan / Nouristan / Vallée du Peck [handwritten] // 1200 à 2300 m / 14.8.77 / G. Ledoux // PARA / TYPUS [red, handwritten and printed] // *Bembidion* [printed] (*Tested*.) [handwritten] / *kunarensis* m. [handwritten] / det. E. Kirschenhofer [printed]”; 1 ♀ “Afghanistan Vallèe du / Peck de 1200 à 2300m / 14.8.1077 Leg. Ledoux”; 1 ♂ “Afghanistan – Konar / Kouchtous 1900-2700 m / 19.8.1976”.
From CTVR: 1 ♂, paratype, “Afghan / Nouristan / Vallée du Peck [handwritten] // 1200 à 2300 m / 14.8.77 / G. Ledoux // PARA / TYPUS [red, handwritten and printed] // *Bembidion* [printed] (*Tested*.) [handwritten] / *kunarensis* m. [handwritten] / det. E. Kirschenhofer [printed]”; 1 ♀ “Afghanistan / Vallée de la Waygle / 2500 m Kouchtous / 24.8.76 G. Ledoux”; 1 ♂ 1 ♀ “Afghanistan, A mont de / Nanghalam Vallée du / Pech 1200 à 2300 m / 11.8.77 Leg.Ledoux”; 1 ♂ 1 ♀ “Afghanistan Vallée / Paroum, entre Paroum et / Astiway, 2700 à 2899m / 19-20.8.77 Leg. Ledoux”; 1 ♀ “Afghanistan Vallée / Agôk Khwar 2400 à / 3000m 24.6.78 / Leg. Ledoux”; 1 ♂ “Afghanistan Nouristan / Darah i Nour 2500 à / 3000 m Forêt Vt. N / 8.8.1976 Leg. Ledoux”; 1 ♂ “Afghanistan massif du / Nouristan, entre Camdech / et Kouchtous 1400 à 2000 /19.8.1976 Leg. Ledoux”; 1 ♀ “AFG Indukush / Salang pass 3000 m // C. Blumenthal / 12.6.1974”; 1 ♂ 2 ♀♀ “Afghanistan – Konar / Kouchtous 1900-2700 m / 19.8.1976”.
From DE: 2 ♂♂ 4 ♀♀ “Afghanistan – Konar / Vallée du Pech 1200 / 2300 m, 14.8.1977 Ledoux”; 2 ♂♂ 6 ♀♀ “Afghanistan – Konar / Kouchtous 1900-2700 m / 19.8.1976”; 1 ♂ 1 ♀ “Afghanistan Vallée du / Pourlah (Kouchtous) 2700 / à 3250 m 21.8.1967 / Leg. Ledoux”; 1 ♀ “Afghanistan / Nuristan Paroum / Astiway 2800 m / 19.8.77 D. Echaroux”.
All material mentioned above has been labelled as “*Bembidion* (*Peryphidium*) *gagates* Andr., det. Neri & Toledano 2021”.

Discussion and conclusion. Andrewes (1924) in the original description points out that *B. gagates* can be completely black and shiny, but can also have an ill-defined yellow preapical spot. Later (Andrewes, 1935) downgrades to variety the subspecies *sindicum* recently described by Netolitzky (1935) because the taxon was considered new only because it has a yellowish preapical spot. However, *gagates sindicum* continues to the present day to be listed in catalogues as a good subspecies. After noting the complete exoskeletal and aedeagic equality of the two taxa and the fact that some populations present specimens both with and without the preapical spots, we believe that *sindicum* must be considered synonym of the nominotypical form.
The study of some specimens of *kumatai* (fig. 5), currently reported as synonym of *sindicum* (Marggi et al., 2003), leads us to confirm the synonymy, and consequently its synonymy with nominotypical *gagates*; also among the specimens of this species we observe both the presence and the absence of the preapical spot.
We had for study the holotypus (fig. 1) and two paratypes of *B. kunarense*, as well as many other specimens of the species (e.g. fig. 2); during the analysis we found some important differences between the description and the reality: the very schematic drawing of the aedeagus shows an internal sclerification and a

ventral margin not corresponding to the aedeagus of the holotypus. The seventh elytral stria, described as absent or greatly reduced, is also variable in the abundant material examined, from stria with very fine points to stria with coarser points, almost as visible as the sixth (in the humeral half) in the holotypus and in the paratypes.
Finally, we would like to point out that the examined specimens of *B. gagates gagates* show aedeagi both regularly and irregularly curved in the ventral margin; the drawing in original description of *B. kumatai* shows the ventral margin regularly curved, while in the various extractions seen, the ventral margin may be slightly variable; since both descriptions of *B. sindicum* and *B. kumatai* were made on only two specimens, it is obvious that any slight variability has not been considered.
On the basis of the above we establish the following synonymies (with junior synonyms listed first): ***Bembidion* (*Peryphidium*) *gagates sindicum* Netolitzky, 1935 = *Bembidion* (*Peryphidium*) *gagates* Andrewes, 1924 syn. nov.**
***Bembidion* (*Peryphidium*) *kunarense* Kirschenhofer, 1989 = *Bembidion* (*Peryphidium*) *gagates* Andrewes, 1924 syn. nov.**

B. kumatai, formerly already synonymized with *B. gagates sindicum*, automatically becomes synonym of *B. gagates* Andr.

After these new synonymies, the distribution of *B. gagates* is the following: A: AF, FUJ, HP, KA, NP, PA, UP, where HP (India: Himachal Pradesh) is a new record for *B. gagates*.

Note. Jedlička (1953) describes as a new aberration *Bembidion gagates chinensis* from China (Fukien) on a single ♀; the taxon, as it is considered only an aberration of colour from the typical form because of the yellow-red colouration of legs and antennae (almost entirely black or dark in *B. gagates*), is not reported in later catalogues, including Marggi et al. (2017). It should be noted that the species is mentioned from Fukien although this Chinese province is located on the Pacific coast, some 3,000 km from the species' range; we think that the specimen should be revised, as this is probably a determination error or mislabelling.

Additional material examined.

***Bembidion kokandicum* Solsky, 1874:** Kyrgyzstan (105 exx., CTVR; 18 exx., PN; 11 exx., DE); Kazakhstan (2 exx., CTVR); Uzbekistan (1 ex., CTVR); Tadjikistan (3 exx., CTVR; 2 exx., PN); Afghanistan (11 exx., CTVR; 1 ex., PN); Kashmir (27 exx, CTVR; 4 exx, PN).

***B. validum validum* Netolitzky, 1920:** Kyrgyzstan (52 exx., CTVR; 6 exx. DE; 3 exx., PN); Tadjikistan (61 exx., CTVR; 11 exx., PN); Pakistan (2 exx., CTVR); Kashmir (1 ex., NHMW); Afghanistan (12 ex., CTVR; 1 ex., DE; 1 ex., NHMW).

***B. validum marquardti* Netolitzky, 1920**: Kyrgyzstan (59 exx., CTVR; 23 exx.,

PN); Kazakhstan (3 exx., CTVR); Tadjikistan (2 exx., CTVR); Afghanistan (8 exx., CTVR).

***B. olympicum* De Monte, 1946**; Turkey: Uludağ (4 exx., PN; 2 exx., CTVR).

***B. montei* Fassati, 1959**; Afghanistan (36 exx., CTVR; 5 exx., PN).

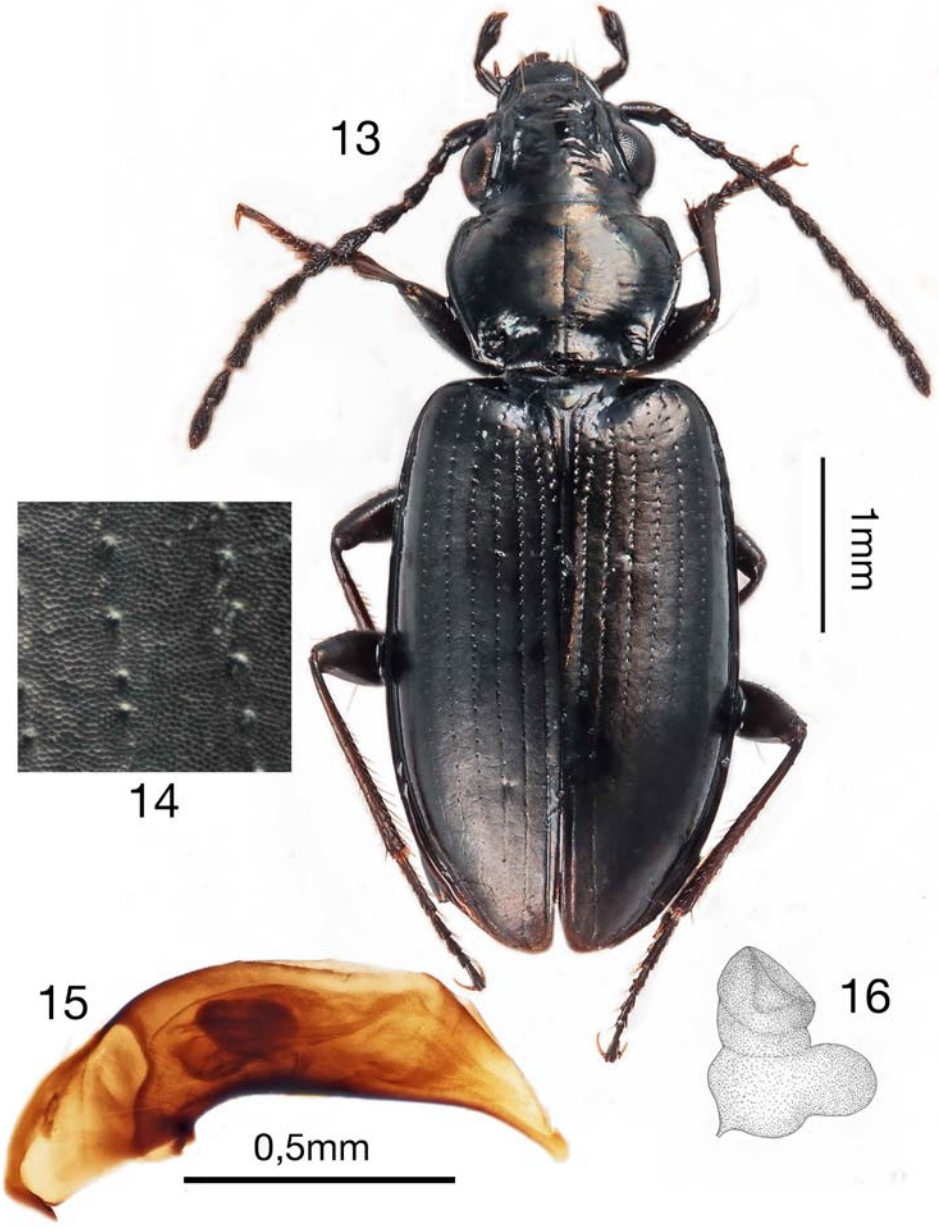
***Bembidion* (*Peryphidium*) *validum salangense* n. ssp.** (figs 13, 14, 15, 16)

Diagnosis. A subspecies of *Bembidion* (*Peryphidium*) *validum* Netolitzky, 1920 from Afghanistan, distinguishable from the other two subspecies of *validum* by the full, well impressed and clearly isodiametric elytral microsculpture of the ♀♀ and by the spermatheca with the distal cavity short and compressed.

Type locality. Afghanistan, N. du Salang 3000 – 3200 m.

Type series. Holotype, ♀, "Afghanistan / N. du Salang 3000 – 3200 m / 10.VII.75 Ledoux" [printed] (PN). The spermatheca, in Euparal, is preserved on the same pin as the specimen. We added to the specimen the following label: *Bembidion* (*Peryphidium*) *validum salangense* ssp.n. P. Neri & L. Toledano, 2021 / HOLOTYPUS [red, printed].
Paratypes. 132 exx with the same label as the holotype (CTVR, DE, PN). 126 exx: "Afghanistan / Sud du Salang 2900 m / 5-6.VIII.74 Ledoux" (CTVR, DE, PN). 29 exx: "Afghanistan / Lac du Salang 3700 m / 4.8.74 Leg. Ledoux" (CTVR, DE, PN). 8 exx: "Afghanistan environ / 3400 m bord torrent près / du tunnel du Salang / 4.8.74 Leg. Ledoux" (CTVR, DE, PN). 1 ♀, "AFG Hindukush / Salang Pass 3000 m" (CTVR). All labels are printed.
We added to all paratypes the following label: "*Bembidion* (*Peryphidium*) *validum salangense* ssp. n. Neri & Toledano, 2021 – PARATYPUS" [red, printed].

Description of the holotype. Long 4.75 mm. Colouration: head, pronotum and elytra blackish; legs blackish with tibiae and tarsi orange; antennae blackish with extreme of base of third and fourth antennomere reddish; palpi blackish with last palpomere light.
Head: maximum width, including eyes, 1.02 mm; interocular distance 0.62 mm; frons smooth and glossy, frontal furrows wide, evident. Eyes protruding, temples very short, almost absent. Antennae long 2.36 mm.
Pronotum (length on the median line 0.91 mm; width of anterior margin 0.93 mm; maximum width 1.23 mm; width of base 0.93 mm; pronotal width / pronotal length ratio = 1.35) slightly convex, transverse, sides completely rebordered, gently narrowing towards base, with which they form an obtuse angle; lateral gutter of uniform width; all surface smooth, glossy, with some faint transverse impressions in the central portion; laterobasal carina present; longitudinal line present, transverse anterior impression present with a few punctures; base irregularly punctured in the transverse impression and showing lateral foveae markedly rugose.
Elytra: long 2.93 mm, overall maximum width 1.86 mm; sides almost parallel, maximum width slightly beyond middle, evident shoulders; completely microsculptured with sharp isodiametric sculpticells giving to the specimen a matt, bronze reflection



Figs 13-16. *Bembidion* (*Peryphidium*) *validum salangense* Neri & Toledano: 13. Habitus, paratype, Afghanistan, Lac du Salang, 3700 m (PN); 14. Detail of the elytral microsculpture; 15. Median lobe of the aedeagus, paratype, Afghanistan, bord torrent près du tunnel du Salang, 3400 m (CTVR); 16. Spermatheca, holotype, 0.11 mm (PN).

(fig. 14). Elytral striae punctured, punctation visible almost up to the apical fifth where it is very faint, barely visible; stria 7 barely visible, desappearing towards apex. Macropterous species.

Spermatheca of the holotype (fig. 16). Long 0.11 mm, with distal cavity short, compressed and showing anular narrowing; proximal cavity swollen and with evident basal portion.

Paratypes and variability. Length of ♂♂ and ♀♀ from 4.00 to 5.20 mm. Aedeagus (fig. 15) 0.86 to 1.03 mm similar to that of the nominotypical form. The elytra of the ♀♀ may have a more or less dark bronze reflection, according to the maturity of the specimen. Elytral stria 7 may be from barely visible to almost desappearing.

Derivatio nominis. The name derives from the collecting locality, in NE Afghanistan.

Distribution. The subspecies is currently known only from Salang Pass (Parwan Prov. and Baghlan Prov., in NE Afghanistan).

Comparative notes. *B. validum salangense* n. ssp. is distinguishable from the other two subspecies of *validum* by the full, well impressed and clearly isodiametric elytral microsculpture of the ♀♀ and by the spermatheca with the distal cavity short and compressed. From the other species of subgenus *Peryphidium* by the larger size of body and aedeagus, by the clearly isodiametric elytral microsculpture and by the elytra always lacking preapical spots.

Notes on some species attributed to subg. *Peryphidium*

***Bembidion* (*inc. sedis*) *tizianoi* Marggi & Huber, 1999 nov. status**
Testediolum zagrosensis Morvan, 1973
Bembidion (*Peryphidium*) *kokandicum tizianoi* Marggi & Huber, 1999

Historical notes. Morvan (1973) describes *Testediolum zagrosensis* n. sp. from Iran (Zagros Mountains, Kurang, 3200 m) based on 12 exx.; the description, precise and detailed, includes also the drawing of the habitus and of the aedeagus; he reports also "Proche de *turcicum* G.&H., 1868" species, this last, belonging to the subgenus *Nepha* Motschulsky, 1864. Marggi & Huber (1999) rename the species as *Bembidion* (*Testediolum*) *tizianoi* because the name is preoccupied by *Emphanes zagrosensis* Morvan, 1972; the authors guess that the species might not belong to *Testediolum*, but, waiting for a revision of the subgenus, they do not take a decision. Bonavita & Vigna (2010) assign also *tizianoi* to *Peryphidium*. Finally, Marggi et al. (2017) downgrade the species to subspecies of *B. kokandicum*.

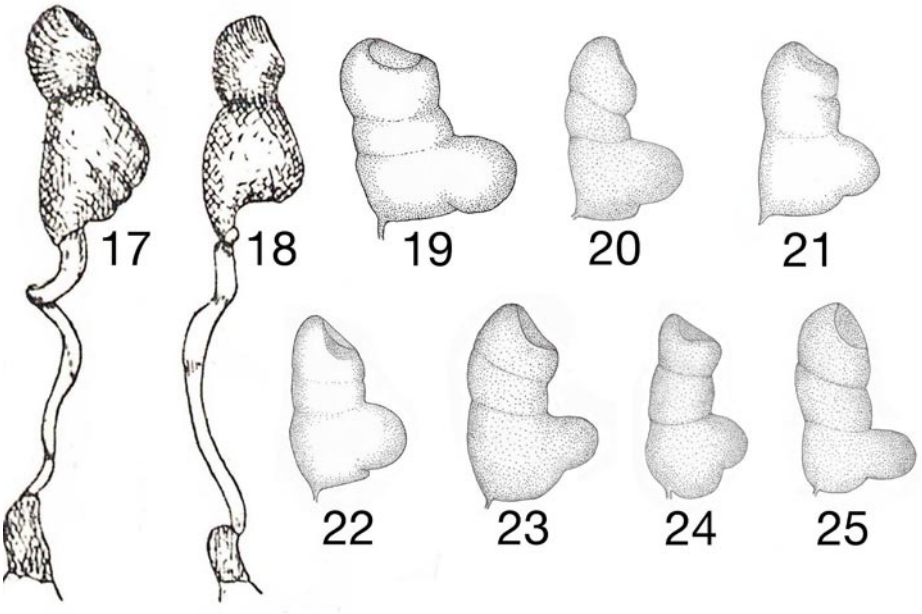
Discussion and conclusion. We wanted to investigate the reason why Marggi & Huber (1999) expressed doubts about the species belonging to *Testediolum*. After analysing the description and studying carefully the drawings of Morvan (1973), we are sure that the species belongs neither to *Testediolum* nor to *Peryphidium*, and that the initial attribution to *Testediolum* was only due to the colouration. In addition, the description mentions, among others, some characters that surprised us

because they are unusual in the subgenera in question: apical elytral third reddish, base of the pronotum narrower than the anterior margin, parameres with 3 apical setae.
On this basis, despite the original drawing by Morvan (1973) suggesting that the species probably belongs to *Nepha*, we prudently decide to temporarily place the species in "*incertae sedis*" until we can verify its belonging by studying the typical series of the Morvan collection currently at MNHN, material not yet available to researchers because it is a "collection in arrangement" (Azadeh Taghavian, personal communication): ***Bembidion* (*inc. sedis*) *tizianoi* Marggi & Huber, 1999 nov. status.**

***Bembidion* (*inc. sedis*) *seminskiense* Shilenkov, 1990 nov. status**
Bembidion (*Testediolum*) *seminskiensis* Shilenkov, 1990
Bembidion (*Peryphidium*) *seminskiense* Shilenkov, 1990

Historical notes. Shilenkov (1990) describes *Bembidion* (*Testediolum*) *seminskiensis* (sic!) from Russia (Altai Republic, Seminskii Mt., Sar-lyk, 2100 - 2500 m) based on a single female specimen. The author states that such are the differential characters found that even a single female is sufficient for the description. The description, precise and detailed, also includes drawings of the pronotum, sternite and tergite, anal sternite and genital apparatus, but the spermatheca is schematic and unclear. In later catalogues (among others Kryzhanovskij et al., 1995; Marggi et al., 2003) *seminskiense* (name with a change of ending due to correction of incorrect original spelling) is always cited as belonging to the subgenus *Testediolum* Ganglbauer, 1892.
As mentioned above, Bonavita & Vigna Taglianti (2010) rehabilitating the subgenus *Peryphidium* also include *B. seminskiense* in the subgenus. Finally, Marggi et al., 2017 list *seminskiense* sub *Peryphidium*, following the indication of Bonavita & Vigna Taglianti (2010).

Discussion and conclusion. After analysing the description and carefully studying the drawings, we have considerable doubts about assigning the species to one of the subgenera assumed so far: *Testediolum* or *Peryphidium*. In *B. seminskiense* the head and the pronotum are microsculptured, while in the subgenera considered the microsculpture is present only at the base of the neck. Also the structure of the pronotum is different: in *B. seminskiense* the basal transverse impression and the lateral foveae are very wide, the lateral margin, after the middle, is enlarged and flattened (as in the description and drawing); this character is evident in several species of the subgenus *Pamirium* Netolitzky, 1920, but not in the subgenera considered. Finally, the drawing of the spermatheca does not allow us to assign with certainty the species to any subgenus. We also contacted Shilenkov himself, but he could not give us any further information.
On this basis we consider more prudent to assign the species temporarily to "*incertae sedis*" waiting for new material to examine: ***Bembidion* (*inc. sedis*) *seminskiense* Shilenkov, 1990 nov. status.**



Figs 17-25. Spermathecae of: 17. *Bembidion* (*Testediolum*) *glaciale* Heer, 0.15 mm (from: De Monte, 1946); 18. *Bembidion* (*T.*) *jacqueti* Jeannel, 0.14 mm (from: De Monte, 1946); 19. *Bembidion* (*Peryphidium*) *damavandense* Marggi & Huber, Iran, Alam-Kuh, 3500 m, 0.13 mm (PN); 20. *Bembidion* (*P.*) *gagates* Andrewes, India, Kashmir, Glacier Sonamarg, 2400 m, 0.13 mm (DE); 21. *Bembidion* (*P.*) *kokandicum* Solsky, Kirgizstan, Ala-Tau environments, Ala-Artscha-Schl., 2500 m, det. G. Müller 1986, 0.12 mm (PN); 22. *Bembidion* (*P.*) *montei* Fassati, Afghanistan, Vt. N. Salang, Khenjan, stream edge, 2150 m, 0.12 mm (PN); 23. *Bembidion* (*P.*) *olympicum* De Monte, Turkey, Bursa, Uludağ, 2000-2400 m, 0.14 mm (PN); 24. *Bembidion* (*P.*) *validum validum* Netolitzky, Tadzikistan, 3300-3400 m, det. G. Müller 1986, 0.13 mm (PN); 25. *Bembidion* (*P.*) *validum marquardti* Netolitzky, Aulie Ata, Syr Daria. det. G. Müller 1981, 0.13 mm (PN).

Catalogue of *Bembidion* subgenus *Peryphidium* Tschitschérine, 1895

damavandense Marggi & Huber, 1999: **A**: IN
davatchii Morvan, 1971

gagates Andrewes, 1924: **A**: AF, FUJ, HP, KA, NP, PA, UP
sindicum Netolitzky, 1935
kumatai Habu, 1973
kunarense Kirschenhofer, 1989

kokandicum Solsky, 1874: **E**: AB, AR, GG, ST; **A**: AF, ES, IN, KA, KI, KZ, LE, TD, TR, UZ
tjanschanicum Tschitschérine, 1895
fortius Netolitzky, 1920
incipiens Netolitzky, 1920

montei Fassati, 1959: **A**: AF

olympicum De Monte, 1946: **A**: TR (Ulu Dağ)

validum validum Netolitzky, 1920: **A**: AF, KA, KI, PA, TD, UZ

validum marquardti Netolitzky, 1920: **A:** AF, KI, KZ

validum salangense Neri & Toledano 2021: **A:** AF

Key to the species of *Bembidion* subgenus *Peryphidium* Tschitschérine, 1895

For the identification of the species the examination of the male genitalia is compulsory (PW/PL = pronotal width / pronotal length ratio)

1 elytral microsculpture absent or limited to the apical third (it may be evident also in the outer elytral intervals) …….....……2

– microsculpture present on the whole elytra or almost so (sometimes hardly visible on disc) …….5

2 elytra with preapical spots; aedeagus small, 0.72 to 0.81 mm, ventral margin more or less regularly arcuate, apex stout (figs. 3, 4); species on average small: 3.50 to 4.70 mm; appendages black – brownish with tarsi and tibiae lighter and extreme of base of antennomeres 2 to 4 reddish; pronotum transverse, PW/PL = 1.27 to 1.39, with hind angles almost right or barely obtuse, base faintly punctured, elytral stria 7 with punctuation similar as stria 6, sometimes sharper in the middle third, with microsculpture absent or present only at apex; spermatheca (fig. 20): proximal cavity with evident base and distal cavity with one anular narrowing; **A**: AF, FUJ, HP, KA, NP, PA, UP ……

……..……***gagates gagates*** Andrewes, 1924

– elytra without preapical spots ……..……..3

3 aedeagus (figs. 3, 4) smaller in size, 0.72 to 0.81 mm, with ventral margin more or less regularly arcuate, apex stout; species on average small: 3.50 to 4.70 mm; appendages black – brownish with tarsi and tibiae lighter and extreme of base of antennomeres 2 to 4 reddish; pronotum transverse, PW/PL = 1.27 to 1.39, with hind angles almost right or barely obtuse, base faintly punctured, elytral stria 7 with punctuation similar as stria 6, sometimes sharper in the middle third, with microsculpture absent or present only at apex; spermatheca (fig. 20): proximal cavity with evident base and distal cavity with one anular narrowing; **A**: AF, FUJ, HP, KA, NP, PA, UP …… ……..……***gagates gagates*** Andrewes, 1924

Jedlička (1953) describes *Bembidion gagates chinensis* ab. n. on a single ♀ specimen from Fukien (FUJ), Chinese Province on the Pacific Ocean; the taxon, retained only a colour aberration due to the yellowish-red colour of legs and antennae (almost entirely black or dark in *gagates*), should be revised.

– aedeagus (figs. 11, 12, 15) larger in size, 0.86 to 1.03 mm, with the middle third of the ventral margin subrectilinear and its slender apical third more or less bent ventrally; spermatheca (figs. 16, 24, 25): proximal cavity with evident base and distal cavity with one anular narrowing; species on average larger in size: 4.00 to 5.20 mm; pronotum transverse (PW/PL = 1.35 to 1.43) with hind angles evidently obtuse (the apex of the angle can be protruding, but in general the obtusity of the angle is evident); appendages blackish with tibiae and tarsi more or less lighter; ♀♀ with elytra completely microsculptured or microsculptured at least in the apical third; elytral stria 7 variable, from similar to stria 6 to very faint with fine punctuation .....…4

4 elytra completely without microsculpture or with microsculpture visible only at the extreme apex (♂) or with microsculpture in irregular sculpticells, from almost isodiametric to short and transverse in the apical third (♀); 4.10 to 5.00 mm; aedeagus (fig. 11) 0.90 – 1.03 mm, spermatheca in fig. 24; **A**: AF, KI, TD, UZ (Marggi et al., 2017)..... ***validum validum*** Netolitzky, 1920

– elytra with full microsculpture (♀) in irregular sculpticells, from almost isodiametric to short and transverse, sometimes barely visible on disc; ♂ microsculptured only up to the apical third, rarely also at sides; 4.00 to 5.20 mm; aedeagus (fig. 12), 0.86 – 1.03 mm, spermatheca in fig. 25; **A:** AF, KI, KZ (Marggi et al., 2017) ……..... ***validum marquardti*** Netolitzky, 1920

– elytra with full microsculpture (♀) evidently isodiametric (fig. 14), giving to the specimens a bronze, matt reflection; ♂ microsculptured only up to the

apical third, rarely also at sides; 4.00 – 5.20 mm; aedeagus (fig. 15) 0.86 – 1.03 mm; spermatheca (fig. 16) with distal cavity more compressed in respect to the other subspecies; **A:** AF (Col du Salang)..... ..... ***validum salangense*** ssp. nov.

The diagnostic characters for the subspecies *marquardti* and *salangense* are evident in the ♀♀, therefore for the identification of the ♂♂ of a population it is preferable to have ♀♀ from the same collecting locality.

5 elytra with preapical spots 6

– elytra without preapical spots 8

6 aedeagus (fig. 9) with central third of the ventral margin rectlinear and apical third bent ventrally and slender, extreme of the apex more elongate, 0.74 to 0.84 mm; cordiform pronotum with longer basal rectilinear portion of the lateral sinuature (about 1/6 of the whole pronotal length), PW/PL = 1.32 to 1.41; body length 3.40 to 4.30 mm; elytral stria 7 barely visible or only faintly punctured; spermatheca (fig. 22): proximal cavity with reduced base and distal cavity with one reduced anular narrowing; **A**: AF (Marggi et al., 2017) .....***montei*** Fassati, 1959

– aedeagus with ventral margin more or less arcuate and with the apical half only slightly bent ventrally, extreme of apex shorter and rounded, apical fourth more stout; cordiform pronotum with shorter basal rectilinear portion of the lateral sinuature (about 1/10 of the whole pronotal length) 7

7 species on average smaller in size, 3.50 to 4.60 mm; small hind pronotal angles almost right or only slightly obtuse, PW/PL = 1.31 to 1.39; elytral stria 7 almost as deeply impressed as stria 6 or with sharper punctures; aedeagus (figs. 7, 8) 0.73 to 0.84 mm, ventral margin more markedly curved at the basal third, apical half more or less bent ventrally; spermatheca (fig. 21): proximal cavity with evident base and distal cavity with one anular narrowing; **E**: AB, AR, GG, ET; **A**: AF, ES, IN, KI, KZ, LE, TD, TR, UZ (Marggi et al., 2017) .....***kokandicum*** Solsky, 1874

Here are included the aberrations of *kokandicum* with preapical spots: ab. *tjanschanicum* Tschitschérine, 1895 (distinct preapical spot and coarser elytral punctuation; according to Tschitschérine (1895) 5.25 mm long; according to Netolitzky (1943) 4.00 mm long; according to Fassati (1959) 4.40 mm long) and ab. *incipiens* Netolitzky, 1920 (indistinct preapical spot and sharper elytral punctuation; according to Netolitzky (1943) 3.50 mm).
The species is reported from Lebanon, (LE), but we suspect that this mention, already reported in Marggi et al. (2003) sub *armeniacum kokandicum,* should be revised.

– species on average larger in size (most specimens 4.30 to 5.00 mm, but exceptionally specimens can reach 3.60 mm); pronotal base markedly

oblique towards hind angles that, even though small and right, as a whole may appear obtuse; PW/PL = 1.32 to 1.40; elytral stria 7 with very fine punctures; aedeagus (fig. 6) on average larger in size (in most specimens is long between 0.82 and 0.92 mm, but exceptionally it may reach 0.78 mm), ventral margin slightly arcuate, apical two/thirds almost rectlinear or only slightly bent ventrally; spermatheca (fig. 19): proximal cavity with reduced base and distal cavity with one anular narrowing; **A**: IN (Marggi et al., 2017) ……..……***damavandense*** Marggi & Huber, 1999

8 aedeagus (figs. 12, 15) larger in size, 0.86 to 1.03 mm, ventral margin with central third rectilinear and apical third more or less bent ventrally and slender; species on average larger, 4.00 to 5.20 mm; elytral microsculpture present in the ♂♂ only in the apical half or third, in the ♀♀ on whole elytra in irregular sculpticells, almost isodiametric or completely isodiametric …….....9

– aedeagus smaller (0.73 to 0.84 mm), with apex stout; species on average smaller (3.50 to 4.60 mm); elytral microsculpture in short and transverse sculpticells in both sexes ……10

9 ♀ with elytra fully microsculptured with isodiametric sculpticells or irregular with short, barely transverse sculpticells (sometimes barely visible on disc); ♂ with microsculpture on the apical elytral third only, rarely also at sides; spermatheca (fig. 25): proximal cavity with evident base and distal cavity with one anular narrowing; pronotum transverse (PW/PL = 1.35 to 1.43) with hind angles normally evidently obtuse (the apex of the angle may be protruding, but as a whole the obtusity of the angle is evident); appendages blackish with tibiae and tarsi more or less lighter; **A:** AF, KI, KZ (Marggi et al., 2017)…….… ***validum marquardti*** Netolitzky, 1920

– elytra with full isodiametric microsculpture (♀, fig. 14) very evident, giving to the specimens a bronze, matt reflection; spermatheca (fig. 16) with distal cavity more compressed in respect to the other subspecies; **A:** AF (Col du Salang) …….....…….***validum salangense*** ssp. nov.

The diagnostic characters for the subspecies *marquardti* and *salangense* are evident in the ♀♀, therefore for the identification of the ♂♂ of a population it is preferable to have ♀♀ from the same collecting locality.

10 cordiform pronotum with basal margin as wide as the anterior one and sides more evidently sinuate towards base, lateral gutter narrow, hind angles slightly obtuse, PW/PL = 1.28 to 1.33; elytral stria 7 with very fine punctures; long 3.80 to 4.50 mm; aedeagus (fig. 10) similar to *kokandicum*; spermatheca (fig. 23); **A**: TR: Uludağ (Marggi et al., 2017)…… …….. ***olympicum*** De Monte, 1946

The species seems to be an endemism of Uludağ (Bursa).

– pronotum less cordiform with base slightly larger than the anterior margin and sides less sinuate towards base, wider lateral gutter, hind angles from right to slightly obtuse; PW/PL = 1.31 to 1.39; elytral stria 7 almost as impressed as stria 6 or with sharper punctures; long 3.50 to 4.60 mm; aedeagus (figs. 7, 8) with apical quarter more or less bent ventrally; spermatheca (fig. 21): proximal cavity with evident base and distal cavity with anular narrowing; **E**: AB, AR, GG, ST; **A**: AF, ES, IN, KI, KZ, LE, TD, TR, UZ (Marggi et al., 2017); **KA** (N. India, Ladakh, Leh env., 6.1995, R. Sauer leg., coll. LT, 31 exx.) …….....***kokandicum*** Solsky, 1874

Here is included the aberration *fortius* Netolitzky, 1920 (striae more deeply punctured). We report that in Kryzhanovski et al. (1995) the aberration is mistakenly mentioned as *fortipes*.
The species is reported from Lebanon (LE), but we believe that this mention, already present in Marggi et al. (2003) sub *armeniacum kokandicum,* must be reviewed.

Chiavi per le specie dei *Bembidion* sottogenere *Peryphidium* Tschitschérine, 1895

È indispensabile la preparazione degli apparati genitali.
(PW/PL = rapporto larghezza / lunghezza del pronoto)

1 elitre senza reticolazione o con reticolo al più nel terzo apicale (può essere evidente anche sulle interstrie laterali)…….……2

– elitre completamente o quasi completamente reticolate (a volte difficile visibilità sul disco) ……...…… 5

2 elitre con macchie preapicali; edeago (figg. 3, 4) piccolo, 0.72 - 0.81 mm, con margine ventrale arcuato più o meno regolarmente, apice tozzo; specie mediamente piccola: 3.50 – 4.70 mm; appendici nero brunastre con tarsi e tibie brune più chiare e antenne con l'estrema base del secondo, terzo e quarto articolo rossastro; pronoto trasverso, PW/PL = 1.27 - 1.39, con angoli basali quasi retti o appena ottusi, base debolmente punteggiata; settima stria elitrale con punteggiatura simile alla sesta, nel terzo medio talvolta più fine, senza microscultura o con questa presente solo all'apice; spermateca (fig. 20): cavità prossimale con base evidente e cavità distale con una strozzatura anulare; **A**: AF, FUJ, HP, KA, NP, PA, UP…… ……..……***gagates gagates*** Andrewes, 1924

– elitre senza macchie preapicali ……....……3

3 edeago (figg. 3, 4) piccolo, 0.72 - 0.81 mm, con margine ventrale arcuato più o meno regolarmente, apice tozzo; specie mediamente piccola: 3.50 – 4.70 mm; appendici nero brunastre con tarsi e tibie brune più chiare e antenne

con l'estrema base del secondo, terzo e quarto articolo rossastro; pronoto trasverso, PW/PL = 1.27 - 1.39, con angoli basali quasi retti o appena ottusi, base debolmente punteggiata; settima stria elitrale con punteggiatura simile alla sesta, nel terzo medio talvolta più fine, senza microscultura o con questa presente solo all'apice; spermateca (fig. 20): cavità prossimale con base evidente e cavità distale con una strozzatura anulare; **A**: AF, FUJ, HP, KA, NP, PA, UP ……..…….. ***gagates gagates*** Andrewes, 1924

Jedlička (1953) descrive del Fukien (FUJ), provincia cinese sull'Oceano Pacifico, *Bembidion gagates chinensis* ab. n. su di una sola ♀; il taxon, considerato solo una aberrazione di colore a causa della colorazione giallo rossa di zampe ed antenne (quasi interamente nere o scure in *B. gagates*), deve essere rivisto.

– edeago (figg. 11, 12, 15) più grande, 0.86 – 1.03 mm, con il terzo ventrale mediano subrettilineo e terzo apicale più o meno piegato ventralmente, slanciato e affusolato; spermateca (figg. 16, 24, 25): cavità prossimale con base evidente e cavità distale con strozzatura anulare; specie mediamente più grande: 4.00 – 5.20 mm; pronoto con angoli basali notevolmente ottusi (l'apice dell'angolo può essere sporgente, ma nel complesso l'ottusità dell'angolo è evidente), trasverso, PW/PL = 1.35 – 1.43; appendici nerastre con tibie e tarsi più o meno schiariti; ♀♀ con elitre completamente reticolate o reticolate almeno nel terzo apicale; settima stria variabile, da simile alla 6ª a debole con fine punteggiatura …….....…….4

4 elitre completamente senza microscultura o con questa visibile solo all'estremo apice (♂) oppure reticolo a maglie irregolari, quasi isodiametriche o corte e trasverse nel terzo apicale (♀); 4.10 – 5.00 mm; edeago (fig.11) 0.90 – 1.03 mm, spermateca in fig. 24; **A**: AF, KI, TD, UZ (Marggi et al., 2017 …… …….....…..***validum validum*** Netolitzky, 1920

– elitre con microscultura completa (♀) a maglie irregolari, corte e trasverse o quasi isodiametriche, a volte di difficile visibilità sul disco; ♂ reticolato fino al terzo apicale, raramente anche lateralmente; 4.00 – 5.20 mm; edeago (fig. 12), 0.86 – 1.03 mm, spermateca in fig. 25; **A:** AF, KI, KZ (Marggi et al., 2017) …….....……***validum marquardti*** Netolitzky, 1920

– elitre con microscultura completa (♀) e nettamente isodiametrica che dà agli esemplari un riflesso opaco, bronzeo; ♂ reticolato fino al terzo apicale, raramente anche lateralmente; 4.00 – 5.20 mm; edeago (fig. 15) 0.86 – 1.03 mm; spermateca (fig. 16) con cavità distale più compressa rispetto alle sottospecie precedenti; **A:** AF (Col du Salang) ……. ……***validum salangense*** ssp. nov.

I caratteri tipici delle sottospecie *marquardti* e *salangense* sono evidenti nelle ♀♀, quindi per la determinazione dei ♂♂ di una popolazione è preferibile disporre di ♀♀

della stessa località di raccolta.

5 elitre con macchie preapicali ……..……...6

– elitre senza macchie preapicali ……....……..…… 8

6 edeago (fig. 9) con terzo centrale del margine ventrale rettilineo e terzo apicale piegato ventralmente e affusolato, estremo apice più allungato, 0.74 – 0.84 mm; pronoto cordiforme, con la parte basale rettilinea della sinuatura laterale più lunga (circa un sesto della lunghezza del pronoto stesso), PW/PL = 1.32 - 1.41; lunghezza totale 3.40 – 4.30 mm; elitre con 7ª stria appena visibile o punteggiata debolmente; spermateca (fig. 22): cavità prossimale con base appena accennata e cavità distale con strozzatura anulare appena accennata; **A**: AF (Marggi et al., 2017) …….……....……..***montei*** Fassati, 1959

– edeago con il margine ventrale più o meno arcuato e con la metà apicale solo leggermente piegata ventralmente, estremo apice più corto e sferico, quarto apicale più tozzo; pronoto cordiforme, con la parte basale rettilinea della sinuatura laterale più corta (circa un decimo della lunghezza del pronoto stesso) .....……7

7 specie mediamente più piccola, 3.50 – 4.60 mm; angoli basali del pronoto piccoli, quasi retti o solo leggermente ottusi, PW/PL = 1.31 – 1.39; elitre con 7ª stria quasi come la sesta o con punti più fini; edeago (figg. 7, 8) 0.73 – 0.84 mm, margine ventrale con curvatura più marcata nel terzo basale, metà apicale più o meno piegata ventralmente; spermateca (fig. 21): cavità prossimale con base evidente e cavità distale con una strozzatura anulare; **E**: AB, AR, GG, ET; **A**: AF, ES, IN, KI, KZ, LE, TD, TR, UZ (Marggi et al., 2017) …….....…… ***kokandicum*** Solsky, 1874

Qui sono state inserite le aberrazioni di *kokandicum* con macchie preapicali: ab. *tjanschanicum* Tschitschérine, 1895 (macchia preapicale distinta e punteggiatura delle strie elitrali più grossa; da Tschitschérine (1895) lunghezza 5.25 mm; da Netolitzky (1943) 4.00 mm; da Fassati (1959) 4.40 mm) e ab. *incipiens* Netolitzky, 1920 (macchia preapicale indistinta e punteggiatura delle strie elitrali più fine; da Netolitzky (1943) 3.50 mm).

La specie viene citata del Libano (LE), ma noi pensiamo che questa citazione, già presente in Marggi et al. (2003) sub *armeniacum kokandicum,* sia da rivedere.

– specie mediamente più grande (la maggioranza degli individui misura dai 4.30 ai 5.00 mm, ma eccezionalmente vi sono esemplari fino a 3.60 mm); base del pronoto, verso gli angoli, notevolmente obliqua, tanto che gli angoli, pur essendo molto piccoli e retti, nel complesso possono apparire ottusi; PW/PL = 1.32 - 1.40; 7ª stria elitrale con punti molto fini; edeago (fig. 6) mediamente più grande (nella maggioranza degli individui misura

da 0.82 a 0.92 mm, ma eccezionalmente vi sono esemplari fino a 0.78 mm), margine ventrale leggermente arcuato, ultimi due terzi quasi lineari o solo leggermente piegati ventralmente; spermateca (fig. 19): cavità prossimale con base appena accennata e cavità distale con una strozzatura anulare; **A**: IN (Marggi et al., 2017)…….. ……...…….. ***damavandense*** Marggi & Huber, 1999

8 edeago (figg. 12, 15) più grande, 0.86 – 1.03 mm, margine ventrale con il terzo mediano rettilineo e il terzo apicale più o meno piegato ventralmente e slanciato, affusolato; specie mediamente più grande, 4.00 – 5.20 mm; reticolo elitrale nei ♂♂ presente solo nella metà o nel terzo apicale, nelle ♀♀ completo a maglie irregolari, quasi isodiametriche o completamente isodiametriche ……..9

– edeago più piccolo, 0.73 – 0.84 mm, con apice tozzo; specie mediamente più piccole, 3.50 – 4.60 mm; reticolo elitrale a maglie corte e trasverse in ambo i sessi …….....……10

9 reticolo elitrale delle ♀♀ irregolare, a maglie quasi isodiametriche o corte e appena trasverse (a volte di difficile visibilità sul disco); ♂♂ con reticolo sul terzo apicale, raramente anche lateralmente; spermateca (fig. 25): cavità prossimale con base evidente e cavità distale più slanciata e con strozzatura anulare; pronoto trasverso (PW/PL = 1.35 – 1.43) con angoli basali in genere notevolmente ottusi (l'apice dell'angolo può essere sporgente, ma nel complesso l'ottusità dell'angolo è evidente); appendici nerastre con tibie e tarsi più o meno schiariti; **A:** AF, KI, KZ (Marggi et al., 2017) ……...… ***validum marquardti*** Netolitzky, 1920

– reticolazione elitrale isodiametrica delle ♀♀ molto evidente, netta e chiara, che dà agli esemplari un riflesso opaco, bronzeo (fig. 14); spermateca (fig. 16) con la cavità distale più schiacciata e corta rispetto alle altre sottospecie; **A:** AF (Col du Salang) …….....***validum salangense*** ssp. nov.

I caratteri tipici delle sottospecie *marquardti* e *salangense* sono evidenti nelle ♀♀, quindi per la determinazione dei ♂♂ di una popolazione è preferibile disporre di ♀♀ della stessa località di raccolta.

10 pronoto cordiforme con base larga come la parte anteriore e lati maggiormente sinuosi verso la base, doccia laterale stretta, angoli basali leggermente ottusi, PW/PL = 1.28 – 1.33; elitre con 7ª stria con punti molto fini; 3.80 – 4.50 mm; edeago simile a *kokandicum* (fig. 10); spermateca in fig. 23; **A**: TR: Uludağ (Marggi et al., 2017)…… ……..…….. ***olympicum*** De Monte, 1946

La specie sembra essere un endemismo dell'Uludağ (Bursa).

– pronoto meno cordiforme con base appena più larga della parte anteriore e lati meno sinuosi verso la base, doccia laterale più larga, angoli basali da retti a leggermente ottusi, PW/PL = 1.31 – 1.39; elitre con 7ª stria quasi come la sesta o con punti più fini; 3.50 – 4.60 mm; edeago (figg. 7, 8) con quarto apicale più o meno piegato ventralmente; spermateca (fig. 21): cavità prossimale con base evidente e cavità distale con una strozzatura anulare; **E**: AB, AR, GG, ST; **A**: AF, ES, IN, KI, KZ, LE, TD, TR, UZ (Marggi et al., 2017); **KA** (N. India, Ladakh, Leh env., 6.1995, R. Sauer leg., coll. LT, 31 exx.) …….....…….***kokandicum*** Solsky, 1874

Qui è inserita l'aberrazione *fortius* Netolitzky, 1920 (strie più fortemente punteggiate). Segnaliamo che, per errore, in Kryzhanovski et al. (1995) l'aberrazione è citata come *fortipes*.

La specie viene citata del Libano (LE), ma noi pensiamo che questa citazione, già presente in Marggi et al. (2003) sub *armeniacum kokandicum,* sia da rivedere.

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