

Nomenclatural changes in the genus *Patrobus* (Coleoptera: Carabidae: Patrobini)

Alexandr ZAMOTAJLOV

Kuban State Agrarian University, Kalinina 13, 350044 Krasnodar, Russia

Received July 3, 2002; accepted March 15, 2003

Published October 3, 2003

Abstract. Treatment of the name *Patrobus septentrionis* Dejean, 1828 as nomen protectum and *P. alpinus* Curtis, 1827 as nomen oblitum is proved, the name *P. cinctus* Motschulsky, 1860 is resurrected and a new synonymy is established: *P. australis* J. Sahlberg, 1873 is regarded to be a new synonym of *P. septentrionis* Dejean, 1828; *P. fuscipennis* Motschulsky, 1860 and *P. tritus* Casey, 1920 – synonyms of *P. cinctus* Motschulsky, 1860, and *P. borealis* Motschulsky, 1844 – synonym of *P. assimilis* Chaudoir, 1844.

Taxonomy, nomenclature, synonymy, Coleoptera, Carabidae, *Patrobus*, Holarctic region

INTRODUCTION

The genus *Patrobus* Dejean, 1821 houses species, possessing the widest ranges of all known patrobines, only three genera, namely *Archipatrobus* Zamotajlov, 1992, *Diplous* Motschulsky, 1850 and *Platidiolus* Chadoir, 1878 being comparable in this respect. Several congeners form continuous Palaearctic, Nearctic or Holarctic (mainly circumpolar, boreal or boreomountainous) ranges, reaching the Lower Arctic. *Patrobus septentrionis* and related taxa seem to have the largest range, manifesting simultaneously the highest ecological valency. They occur at the banks of rivers and lakes with extremely humid conditions, at bogs, in bushes, heather and willow undergrowth, at grassy slopes, meadows and in tundra. Some of them easily bear cold, imago being common near snow or even on snow, larvae are known hunting on snow in winter e.g., Böcher (1988). This abundance of populated biotopes and localities results in numerous forms hitherto described, with the taxonomic status requiring precision. The present paper deals with some names utilized earlier for such taxa or as synonyms of *P. septentrionis* and is based on the morphological studies of the extensive material deriving from different localities of the Holarctic Realm.

ABBREVIATIONS USED

ECORCO – Eastern Cereal and Oilseed Research Centre, Agriculture and Agri-Food Canada, Ottawa;
HNHM – Hungarian Natural History Museum, Budapest;
ISU – Irkutsk State University, Irkutsk;
NMNHP – National Museum of Natural History, Paris;
ZISP – Zoological Institute, Russian Academy of Sciences, St.-Petersburg;
ZMMU – Zoological Museum, Moscow State University, Moscow;
ZMUC – Zoological Museum, University of Copenhagen, Copenhagen;
ZMUH – Zoological Museum, University of Helsinki, Helsinki.

Patrobis septentrionis Dejean, 1828, nom. protectum

TYPE MATERIAL STUDIED*. 1 M (NMNHP), labelled "M", "*Patrobis septentrionis* Dej." (Deuve's handwriting, designated here as lectotype); 1 F (NMNHP), labelled "*Patrobis septentrionis* Dej." (Deuve's handwriting); 1 F (NMNHP), labelled "F", "*hyperboreus* West in Groenland", "Type" (designated here as lectotype); 1 M (ZMUH), labelled "Pyhäj.", "J. Sahlb.", "1281.", "Mus. Zool. H:fors Spec. typ. No 25 *Patr. septentrionis* v. *australis* J. Sbg." (designated here as lectotype); 1 F (ZMUH), labelled "Pyhäj.", "J. Sahlb.", "Mus. Zool. H:fors Spec. typ. No 24 *Patr. septentrionis* v. *australis* J. Sbg."; 1 M (HNHM), labelled "*P. bitschnau* n. sp. Insbrück 15. 9. 1906" (Reitter's handwriting), "coll. Reitter", "*P. australis* J. Sahlb. det. Kuehnelt", "Holotypus *Patrobis bitschnau* Reitter 1908" (Kaszab's handwriting, designated here as lectotype).

ADDITIONAL MATERIAL STUDIED. Over 700 ex., male genitalia studied in 150 ex.

REMARKS. In accordance to clause 23.9 of the International Code of Zoological Nomenclature (fourth edition, 1999), the senior synonym *Patrobis alpinus* Curtis, 1827 should be substituted by the junior synonym *Patrobis septentrionis* Dejean, 1828. The first name has been not obviously used as valid since 1899 and must be treated as **nomem oblitum**, validity of *P. septentrionis* Dejean is proved by 30 papers here cited (Barševskis 1996, Böcher 1988, Bousquet 1991, Bousquet & Laroche 1993, Chernov et al. 2000, Downie & Arnett 1996, Dudko & Lomakin 1996, Freude 1976, Freude et al. 1976, Haberman 1968, Houston & Luff 1983, Kryzhanovskij et al. 1995, Kryzhanovskij et al. 1975, Laroche 1976, Lindroth 1961, Lindroth 1974, Lindroth 1985, Lorenz 1998, Luff 1993, Moore 1957, Shilenkov 1994, Shilenkov & Averinskiy 1989, Silfverberg 1979, Silfverberg 1992, Turin 1981, Voronin 1999, Yuferev 2001, Zamotajlov 1992, Zherebtsov 2000), published by 35 authors during 44 years (1957–2001). Lorenz (1998) recorded *Patrobis alpinus* as suppressed name, though gave no evidences or Resolution of the Commission on Zoological Nomenclature about this case. The most probably the first name used for *P. septentrionis* is actually *Tenebrio fossor* Fabricius, 1780, though there are no solid evidences, proving this fact.

The type specimens of *P. septentrionis* kept at the NMNHP represent actually two different species, treated below as *P. septentrionis* and *P. cinctus*. Since type locality of *P. septentrionis* has been pointed by Darlington (1938) as Lapland, we choose as lectotype a specimen, which better agrees in its characters with Scandinavian populations.

Examination of the extensive material from different localities of Europe, Asia and North America revealed highly developed external polymorphism of *P. septentrionis*. This resulted in the description of numerous forms, possessing, however, almost identical male genitalia structure (Figs 3, 4), showing constant difference from its twin-species (*P. cinctus* see below). Several investigators already realized this fact. Noteworthy, the subspecies *relictus* Neresheimer & Wagner has been synonymized with *P. bitschnau* Reitter by Kühnelt (1941). Furthermore, it is obvious from the collections, that this author regarded *P. bitschnau* Reitter as a synonym of the subspecies *australis* Sahlberg. Freude (1976) treated *relictus* Neresheimer & Wagner as a synonym of *australis* Sahlberg. All the forms mentioned above were informally called "the *bitschnau*-group". Lindroth (1985) elevated status of *australis* Sahlberg to specific, with no comments, however, all the discriminative features given by him are actually highly variable within *P. septentrionis* Dejean, for example, both robust *bitschnau*-like specimens with characteristic palpi and very slender *septentrionis*-like ones, as well as transitional individuals, occur in Fennoscandia, no distinct morphological hiatus being observed (studied 47 ex. from Finland – ZMUH – and 39 ex. from Korelian Peninsula – ZISP). Kühnelt (1941) made similar observation based on the material from Alps. Astonishing, Lindroth's

* During my visit to the NMNHP in 1990 I have had an opportunity to study the old R. Oberthür collection, comprising Dejean and Chaudoir material. All *Patrobis* species were kept in the box No 103, the number of probable syntypes being different from later loaned me by Dr. Th. Deuve: *P. septentrionis* – 2 ex.; *P. assimilis* – 3 ex. However, this collection included also further specimens, even their treatment as syntypes was not completely obvious.

point of view was shared by several successive authors, including Kryzhanovskij et al. (1995) and Lorenz (1998). We found no strict geographic regularity in the distribution of “the *bitschnau*-group” and similarity of its forms seem to reflect ecological adaptations (sometimes of altitude nature) rather than geographic speciation, both “nominotypical subspecies” and “the *bitschnau*-group” occur sympatric, thus no form deserves the subspecific status, i.e. *Patrobis australis* J. Sahlberg, 1873, **syn. n.** pro *Patrobis septentrionis* Dejean, 1828.

Lectotype of *P. hyperboreus* Dejean is a normally colored, fully pigmented specimen (in spite of the original description, even color is only an individual variation, as pointed by Darlington, 1938). All specimens from Greenland (studied 226 ex. – ZMUC – and 9 ex. – ZISP) belong to *P. septentrionis* Dejean, thus confirming previously established synonymy. Some populations resemble *australis*- or *bitschnau*-like forms from Europe.

Populations from the extreme East of the species’ range (Altai, Tuva, partially Krasnoyarsk Prov. and Baikal Region) possess usually smaller body size, partly reduced wings, and other distinguishable characters, representing an unnamed subspecies (being described separately).

The recent American authors synonymized all the forms from North America, related to *P. septentrionis* Dejean, with this species. Still we had no opportunity to study the types of species, described by Casey, however, based on the available comparative material (studied 89 ex. of the *septentrionis*-group – ECORCO), and taking into account distributional reasons, this synonymy is probably correct as regards *P. labradorinus* Casey and *P. minuens* Casey**.

DISTRIBUTION. Northern Europe, including Faeroe Isles and Iceland, Middle Europe (represented there by several disjunct populations or forming boreomontane disjunction, its range considerably coinciding with the territory covered by Valday Glaciation during its maximum and contemporary mountain glaciers), North-West Siberia nearly till Ob, mountains of Middle and Southern Siberia till Baikal, Greenland, North America (at least Middle and Northern Alaska, North-West Canada, Northern Quebec, Labrador Peninsula, and isolated mountain population in Leavenworth, Colorado: “Leavnwth Vall. Col. 10–11000 ft.”, American area being also highly disjunct and resembling in general pattern that of *P. stygicus* Chaudoir).

***Patrobis cinctus* Motschulsky, 1860, sp. ressur.**

TYPE MATERIAL STUDIED. 1 M (ZMMU), labelled “*Patrobis cinctus* Ménétr. Kamtsch. Kurilles” (Motschulsky’s handwriting), “16.” (designated here as lectotype); 2 M, 1 F (ZMMU), labelled as lectotype, all mounted together; 1 M, 2 F (NMNHP), labeled “M” or “F”, “*Patrobis septentrionis* Dej.” (Deuve’s handwriting); 1 F (ZMMU), labelled “Kamtschatka”, “*fuscipennis* Ménétr.” (Motschulsky’s handwriting, designated here as lectotype).

ADDITIONAL MATERIAL STUDIED. Over 200 ex., male genitalia studied in 50 ex.

REMARKS. This species possesses reliable differences from the previous one only in the structure of proximal copulatory piece of endophallus (Figs 1, 2), which is also longer and narrower, however, some other characters prevail in the majority of populations (at least in the Palaearctics) and could be utilized as supplementary evidences in determination: antennomere 2 comparatively longer, genae shorter, pronotum stronger transverse and usually less cordate, basal foveae deeper and broader, almost reaching base of median line, not forming distinct outer and inner ones, the latter

** Studied specimens from North America (including West St. Modest, type locality of both *P. labradorinus* Casey and *P. minuens* Casey) possess some minor (but constant) differences in the structure of proximal copulatory piece from the European and Asian populations and could deserve a particular taxonomic status within *P. septentrionis* Dejean, though we abstain from the more definite conclusion before study of the further material. Anyway American populations cannot be interpreted as unequivocally transitional between *P. septentrionis* Dejean and *P. cinctus* Motschulsky, on the contrary, are obviously close to the former and possess pronounced morphological hiatus from the latter, apparently prevailing in America species.

not forming prominent furrow, median line more superficial. Aedeagus usually slenderer, accessory spine usually longer, stronger curved, of more complicate structure (latter both in Eurasia and America).

Lectotype of *P. fuscipennis* Motschulsky agrees in its main characters with *P. cinctus* Motschulsky, except for longer genae, and represents rufous, not fully pigmented individual. According to the map, given by Motschulsky (1860), it had to be collected not far from Petropavlovsk-Kamchatskiy. Examination of the further material from Kamchatka (studied 12 ex. – ZISP – and 1 ex. – ISU) revealed its identity with *P. cinctus*. Thus, *Patrobis fuscipennis* Motschulsky, 1860, **syn. n.** pro *Patrobis cinctus* Motschulsky, 1860.

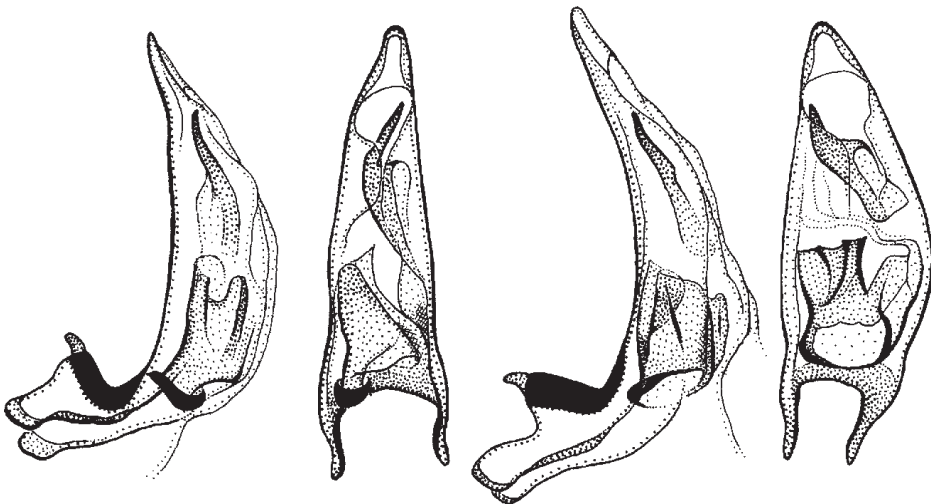
The most probably *P. tritus* Casey is the synonym of *P. cinctus* Motschulsky too, i.e. *Patrobis tritus* Casey, 1920, **syn. n.** pro *Patrobis cinctus* Motschulsky, 1860.

Casey's idea (1918) that *P. septentrionis* Dejean (actually *P. cinctus* Motschulsky) "does not cross the Rocky Mountain divide, the species of eastern North America being almost invariably distinct from the Pacific species – even in comparatively northern latitudes" seems to be incorrect, *P. cinctus* Motschulsky is widely distributed in North America, even reaching Atlantic Coast (Newfoundland). We do not know the detailed distribution of *P. cinctus* Motschulsky in America, though generally it seems not to exceed the southern border of the former Wisconsinian glacial maximum.

DISTRIBUTION. Northern Siberia from Taimyr to Chukotka, Magadan Province and Kamchatka, Middle and Southern East Siberia nearly from Irkutsk and Buryatia to Far East (forming in Siberia a characteristic range of the "*Diacheila*-type"), N Kuriles, Komandor Isles, North America (at least Aleutian Isles, S Alaska, Great Lakes, S Quebec, Newfoundland).

Patrobis assimilis Chaudoir, 1844

TYPE MATERIAL STUDIED. 1 M (NMNHP), labelled "M", "Suede", "Type", "*Patrobis assimilis* Chaud." (Deuve's handwriting, designated here as lectotype); 1 F (NMNHP), labelled "F", "*Patrobis assimilis* Chaud." (Deuve's handwriting); 1 M (NMNHP), labeled "*Patrobis assimilis* Chaud." (Deuve's handwriting); 1 F (NMNHP), labelled



Figs 1–4. *Patrobis* spp., aedeagus. 1, 2 – *P. cinctus* Motschulsky, lectotype; 3, 4 – *P. septentrionis* Dejean, lectotype. 1, 3 – right lateral view; 2, 4 – dorsal view. Scale bar: 1 mm.

“*assimilis* Chaud.”, “*Patrobus assimilis* Chaud.” (Deuve’s handwriting); 1 M (ZMMU), labelled “Turkinsk.”, “*Patrobus borealis* mihi” (Motschulsky’s handwriting, designated here as lectotype); 1 M, 1 F (ZMMU), labeled as lectotype, all mounted together.

ADDITIONAL MATERIAL STUDIED. Over 350 ex., male genitalia studied in 50 ex.

REMARKS. Csiki (1928), Kühnelt (1941), Kryzhanovskij et al. (1995), Lorenz (1998) and some other authors erroneously synonymized *P. borealis* Motschulsky with *P. septentrionis* Dejean. Examination of the type specimens revealed, that this form, described from Lake Baikal (“Turkinsk”), has no principle difference from *P. assimilis* Chaudoir, i.e. *Patrobus borealis* Motschulsky, 1844, **syn. n. pro** *Patrobus assimilis* Chaudoir, 1844. *P. assimilis* Chaudoir has been already recorded from Baikal vicinities by Shilenkov (1994) and other authors.

DISTRIBUTION. Northern Europe, including Faeroe Isles, Middle and partly Southern Europe (forming disjunct, mainly mountain populations), North-West Siberia till Ob, mountains of Middle and Southern Siberia nearly till Baikal, Tarbagatai Mts. in Kazakhstan.

A c k n o w l e d g e m e n t s

The author is greatly indebted to B. Kataev (ZISP), Y. Bousquet (ECORCO), and V. Shilenkov (ISU), collaborating in this work by communicating useful distribution data and loan of the comparative material, as well as to Th. Deuve (MNHN), B. Nikitsky (ZMMU), H. Silfverberg (ZMUH), G. Szél (HNHM), and O. Martin (ZMUC) for borrowing material for study, kept at the respective museums.

R E F E R E N C E S

- BARŠEVSKIS A. 1996: *The check-list of the Coleoptera: Carabidae of the fauna of Latvia*. Daugavpils: Divic, 27 pp.
- BÖCHER J. 1988: The Coleoptera of Greenland. *Bioscience* **26**: 3–100.
- BOUSQUET Y. (ed.) 1991: *Checklist of beetles of Canada and Alaska*. Ottawa: Biosystematics Research Centre, 430 pp.
- BOUSQUET Y. & LAROCHELLE A. 1993: Catalogue of the Geadephaga (Coleoptera: Trachypachidae, Rhysodidae, Carabidae including Cicindelini) of America north of Mexico. *Mem. Entomol. Soc. Canada* **167**: 1–397.
- CASEY T. L. 1918: Observations on the American Pogoninae, including Trechus. *Mem. Coleoptera* **8**: 394–412.
- CHEKNOV YU. I., MAKAROV K. V. & EREMIN P. K. 2000: [Family Carabidae (Coleoptera) in the Arctic fauna. Contribution 1]. *Zool. Zh.* **79**: 1409–1420 (in Russian).
- DARLINGTON P. J. Jr. 1938: The American Patrobini (Coleoptera, Carabidae). *Entomol. Amer. (N. S.)* **18**: 135–183.
- DOWNIE N. M. & ARNETT R. H. Jr. 1996: *The beetles of northeastern North America. 1: Introduction, suborders Archostemata, Adephaga, and Polyphaga, thru superfamily Cantharoidea*. Gainesville: Sandhill Crane Press, xiv + 880 pp.
- DUDKO R. Yu. & LOMAKIN D. E. 1996: [Vertical- poyasnoe distributin of carabids (Coleoptera: Carabidae) in the SE Altay]. *Sibir. Ecol. Zh.* **2**: 187–194 (in Russian).
- FREUDE H. 1976: Berichtigung und Ergänzungen zu meine Carabidenstudien 2 (Nachr. Bl. Bayer. Ent. 22, 6, 1973). *Nachrbl. Bayer. Entomol.* **25**: 6–7.
- FREUDE H., HARDE K. W. & LOHSE G. A. (eds) 1976: *Die Käfer Mitteleuropas. 2. Adephaga I*. Krefeld: Goecke & Evers, 302 s.
- HABERMAN H. 1968: *Eesti jooksiklased (Coleoptera, Carabidae) [Ground beetles of Estonia]*. Tallinn: Valgus, 598 pp.
- HOUSTON W. W. K. & LUFF M. L. 1983: The identification and distribution of the three species of *Patrobus* (Coleoptera: Carabidae) found in Britain. *Entomol. Gaz.* **34**: 283–288.
- KRYZHANOVSKIY 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)*. Sofia-Moscow: Pensoft, 271 pp.
- KRYZHANOVSKIY O. L., OKHOTINA M. V., BROMLEY G. F. & LAFER G. Sh. 1975: Check-list of carabids (Coleoptera, Carabidae) of the Kuril islands. *Tr. Biol. -Pochven. Inst. (N. S.)* **28**: 119–142 (in Russian).
- KÜHNELT W. 1941: Revision der Laufkäfergattungen *Patrobus* und *Diplous*. *Ann. Naturhistor. Mus. Wien* **51**: 151–192.
- LAFER G. Sh. 1989: 4. Sem. Carabidae – Zhuzhelitsy [4. family Carabidae – ground beetles]. Pp. 71–222. In: LER P. A. (ed.): *Opredelitel nasekomykh Dalnego Vostoka SSSR, 3. Zhestkokrylye ili zhuki, 1 [Key to identification of Coleoptera of the Far East of the Soviet Union, 3. Coleoptera 1]*. Leningrad: Nauka (in Russian).

- LAROCHELLE A. 1976: Manual d'identification des Carabidae du Québec. *Cordulia*, Suppl. **1**: 1–127.
- LINDROTH C. H. 1961: The ground beetles (Carabidae excl. Cicindelinae) of Canada and Alaska. 2. *Opusc. Entomol.*, Suppl. **20**: 1–208.
- LINDROTH C. H. 1974: Coleoptera: Carabidae. *Handbook for the identification of British insects*. Royal Entomological Society of London, 42: 1–148.
- LINDROTH C. H. 1985: The Carabidae (Coleoptera) of Fennoscandia and Denmark. *Fauna Entomol. Scand.* **15**: 1–225.
- LORENZ W. 1998: *Nomina Carabidarum. A directory of the scientific names of ground beetles (Insecta Coleoptera "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae)*. 1st ed. Tutzing: Lorenz, 937 pp.
- LUFF M. 1993: The Carabidae (Coleoptera) larvae of Fennoscandia and Denmark. *Fauna Entomol. Scand.* **27**: 1–187.
- MOORE B. P. 1957: The British Carabidae (Coleoptera) Part 1: A check list of the species. *Entomol. Gaz.* **8**: 129–137.
- MOTSCHULSKY V. 1860: Coléoptères rapports de la Sibérie orientale et notamment des pays situées sur les bords du fleure Amour par mm. Schrenk, Maack, Ditmar, Voznessenski etc. Pp.: 77–258, Tab. vi–xi. In: *Dr. L. v. Schrenk's Reisen und Forschungen im Amur-Lande. Bd 2 Zoologie: Lepidopteren, Coleopteren, Mollusken*. St.- Pétersbourg: Verfügung der Kaiserlichen Akademie der Wissenschaften, 1859–1867, 976 pp.
- SHILENKOV V. G. 1994: *The ground beetles (Coleoptera: Trachypachidae, Carabidae) of the Baikal-Transbaikal geographic region*. Irkutsk: Lisna & K, 60 pp.
- SHILENKOV V. G. & AVERINSKIY A. I. 1989: Materialy po faune zhuzhelits (Coleoptera, Trachypachidae, Carabidae) Yakutii [Materials of the ground beetles fauna (Coleoptera, Trachypachidae, Carabidae) of the Yakutiya. Pp. 51–71. In: *Nasekomye i paukoobraznye Sibiri [Insecta and Arachnida of Siberia]*. Irkutsk: IGU (in Russian).
- SILFVERBERG H. 1979: *Enumeratio Coleopterorum Fennoscandiae et Daniae*. Helsinki, 79 pp.
- SILFVERBERG H. 1992: *Enumeratio Coleopterorum Fennoscandiae et Baltiae*. Helsinki, 94 pp.
- TURIN H. 1981: *Provisional checklist of the European ground-beetles (Coleoptera, Cicindelidae & Carabidae)*. *Monografieën van de Nederlandse Entomologische vereniging*, 9. Amsterdam, 250 pp.
- VORONIN A. G. 1999: *Fauna i kompleksey zhuzhelits (Coleoptera, Trachypachidae, Carabidae) lesnoy zony Srednego Urala (ekologo-zoogeograficheskiy analiz) [Fauna i complexes of carabids of the forest zone of the Central Ural (ecological and zoogeographical analyses)]*. Perm: Izd-vo Permskogo universiteta, 244 pp (in Russian).
- YUFEREV G. I. 2001: Otriad Coleoptera – zhestkokrylye [Order Coleoptera – beetles]. Pp.: 120–180. In: ALALKIN N. M. (ed.). *Zhivotnyi mir Kirovskoy oblasti (bespozvonochnye zhivotnye)*. Dopolnenie 5 [Living world of the Kirov region (Vertebrata). Addendum 5]. Kirov: VGPU (in Russian).
- ZAMOTAJLOV A. S. 1992: Notes on classification of the subfamily Patrobinae (Coleoptera, Carabidae) of the Palaearctic Region with description of new taxa. *Mitt. Schweiz. Entomol. Ges.* **65**: 251–281.
- ZHEREBTSOV A. K. 2000: *Opredelitel' zhuzhelits (Coleoptera, Carabidae) Respubliki Tatarstan [Key to identification of carabids (Coleoptera, Carabidae) of the Tatarstan Republic]*. Kazan: Institut ekologii prirodnich sistem AN RT, 74 pp (in Russian).