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FAUNISTIC AND ZOOGEOGRAPHIC NOTES ON HYDROPHILOID BEETLES FROM THE PALAEARCTIC REGION (COLEOPTERA: HYDROPHILIDAE)

Additional localities of *Helophorus* (*Gephelophorus*) *sibiricus* Motschulsky (*Helophoridae*) and ten species of the *Hydrophilidae* *Berosus* (*Berosus*) *byzantinus* Ganglbauer, *Berosus* (*Berosus*) *punctipennis* Harold, *Cercyon* (*Cercyon*) *melanocephalus* Linnaeus, *Crenitis* *shaanxiensis* Ji & Komarek, *Cryptopleurum* *minutum* Fabricius, *Cryptopleurum* *subtile* Sharp, *Enochrus* (*Lumetus*) *halophilus* Bedel, *Enochrus* (*Lumetus*) *quadripunctatus* Herbst, *Hydrobius* *arcticus* Kuwert, *Sphaeridium* *bipustulatum* Fabricius are recorded. Aspects of *Hydrophiloidea* natural habitats' (ranges) typology is considered on the basis of longitude, altitude and latitude (zonal) constituents.

Introduction. The total number of species in the *Hydrophiloidea* stands at 3 340 species [1], [2], [3], [4], [5], [6], [7]. The distribution of the Palearctic fauna of the superfamily was reviewed by M. Hansen [8], F. Hebauer and S. K. Ryndevich [9], S. K. Ryndevich [5], [10], A. A. Prokin, S. K. Ryndevich, P. N. Petrov and T. R. Andrejeva [11] and A. A. Prokin [12], Gentili, E. & Fikáček, M. [13] and at present includes 690 species (*Helophoridae* — 152; *Epimetopidae* — 1; *Georissidae* — 14; *Hydrochidae* — 25; *Spercheidae* — 6; *Hydrophilidae* — 492). Examination of the material of private and museum collections revealed new localities for one species of *Helophoridae* and ten species of *Hydrophilidae*, which are presented in this contribution.

Material and methods. The examined specimens are deposited in the following collections:

CAK Collection of A. G. Koval (St. Petersburg, Russia);

CSR Collection of S. K. Ryndevich (Baranovichi, Belarus);

ZISP Zoological Institute of Russian Academy of Sciences (St. Petersburg, Russia).

The material was examined using an Leica MZ 12.5 stereomicroscope and MBS-10 stereomicroscope. The figures were prepared with the help of Photoshop CS4 program.

The nomenclature of the distribution patterns of the *Hydrophiloidea* is based on the earlier introduced typology of natural habitats that is based on universal geographic regularities of species distribution [14]. The following components were taken into consideration to define the distribution pattern of a particular species: longitude, altitude and (when necessary) latitude (zone). The order of toponyms in complex names is traditional — from west to east and from north to south. Taking into account the relative azonality or intrazonality in aquatic and some terrestrial representatives of the superfamily, the use of zonal terminology in the name makes it possible to link a species and its distribution area very distinctly. To define whether a species range is correlated with a distribution of a particular natural zone (or zones) we used terminology and sequence of zones (with minor changes) introduced by A. G. Isachenko and A. A. Shlyapnikov while building up the scheme of an ideal continent [15]. In names of natural habitats, names of transitional zones (for example, subtaiga, forest-tundra) are not used.

For the purposes of clarity we consider it necessary to explain some terms used in the article more in detail.

Subarctic — a natural habitat situated in the tundra, which can naturally border on the forest-tundra and in some places it goes as far as to the extreme northern areas of the taiga. If a species is distributed in the tundra and in the alpine zone in

the mountains, the term subarctic-alpine-mountain is used.

Boreal—natural habitats adjacent to the taiga zone.

Boreomountain — a disjunctive habitat which is situated in the forest-tundra and taiga zones and also in high altitudes of the mountains (in a boreal zone of mountains) as far as to the south of a taiga zone.

Subboreal — used in case when not less than two natural zones are embraced, approximately at the same latitude (excluding transitional zones) to the south of the taiga. Such natural habitats can run from the zone of mixed forests to the zone of desert in the temperate zone. The condition of occupying several natural zones in one geographical zone is explained by the necessity of excluding the error while defining the latitude constituent of the natural habitat in azonal or intrazonal species.

Temperate — natural habitat embracing natural zones from the taiga to the desert in the temperate zone (for instance, a species can inhabit natural zones from the taiga to the steppe). This is the boreal-subboreal natural habitat proper. If a temperate species penetrates into the subtropical zone, but can only come across the mountainous areas, it usually inhabits the zone of coniferous and deciduous forests — we are then referring to this species as temperate, not temperate-tropical.

Subtropical— used for natural habitats of species inhabiting only the subtropical zone or species with wide distribution which inhabit not less than 2 subtropical natural zones (inhabiting these zones in succession to say nothing of transitional zones).

For species which enter the fauna of Palaearctic subtaiga and inhabit natural zones in three and more zones (for instance, three and more zones in the temperate zone, two and more zones in subtropical and at least one in the tropical, subequatorial or equatorial), we use the term “polyzonal”.

If a species inhabits mountains, in the name of the natural habitat together with the name of the zone where the species can be come across we use the epithet “orian”. For species populating mountains of the temperate zone to the south of the taiga the term “subborealorian” is applied, for

species inhabiting mountains of the subtropical zone — “subborealorian”.

Results and discussion

Family HELOPHORIDAE Leach, 1815

Helophorus (Gephelophorus) sibiricus Motschulsky, 1860. Russia: E. Siberia, Taymyr, 12 km NE Norilsk, near Valek, pool, 11.07.2002, leg. S.V. Saluk, 2 spcms. (CSR). New for Taymyr.

Distribution: This species has circumholarctical boreo-mountain disjunctive distribution, inhabits forest-tundra and taiga zones of Eurasia and the North America, and also high altitudes (in boreal zone of mountains) in the south of a taiga zone. It reaches far to the south in mountain ranges in northern parts of Oriental region. **Palaearctic:** **Europe:** Finland, Norway, Russia (north of European part), Sweden. **Asia:** China (Heilongjiang), Japan, Mongolia, Russia (West Siberia, East Siberia, Far East). **Nearctic:** Canada (Northern Territories, Yukon), U.S.A. (Alaska). **Oriental:** China (Yunnan) [8], [16], [17].

Family HYDROPHILIDAE Latreille, 1802.

Berosus (Berosus) byzantinus Ganglbauer, 1904. Kazakhstan, Karatau, SE Aksumbe, h = 300 m, river Aktumasay, 17.5.2009, leg. E. Mongin, 1 spcm. (CSR). New for Kazakhstan.

Distribution: *B. byzantinus* has a disjunctive southern European Asia Minor Tjan-Shan mountain subtropical distribution. **Palaearctic:** **Europe:** Greece. **Asia:** Kazakhstan, Turkey [18].

Possibly, the species is more widely distributed and it will be found in southwest Asia and Middle Asia. Records of *Berosus (Berosus) signaticollis* Charpentier, 1825 for Middle Asia [19] may be erroneous and need confirmation.

Berosus (Berosus) punctipennis Harold, 1878. Russia: East Siberia: Transbaikalia: Novovozdvizhensk. dol. r. Ul'zy, Zab., 27.VI.925, leg. Vinogradov /in Russian/, 1 spcm. (CSR); raz. Suktuy, Nerchinsk. u., Zabayk., 29.VI.925, leg. Vinogradov /in Russian/, 1 spcm. (ZISP). New for East Siberia.

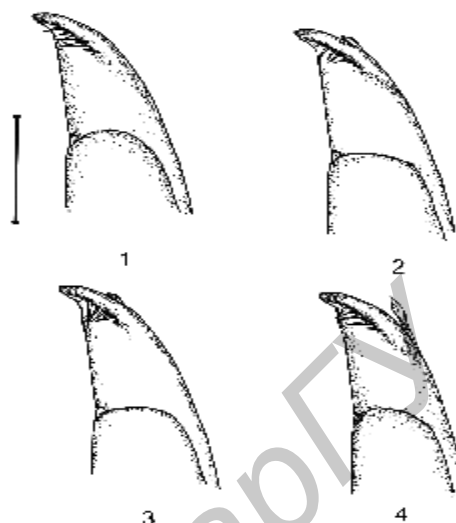
Russia: Far East: Far East: Amur reg.: z. Barsherta, r. Zeya, 50 km V. Blagoveshchenska, 17—19.V.914, leg. Popov /in Russian/, 1 spcm. (CSR). Khabarovsk area, Chirki, UF-light, 27.7.1992, leg. A.V. Frolov, 1 spcm. (CSR); Vinogradovka, Ussur. Kr., 4.VIII.929, leg. D'yakonov, Filip. /in Russian/, 3 spcm. (ZISP); same data, 1.VI.929, leg. Kirichenko /in Russian/, 3 spcm. (ZISP); Novovladimirovka Imanskogo u., 18.VIII.11, leg. Chernyy /in Russian/, 2 spcm. (ZISP); s. Trotskoe, oz. Khanka, Primor'e, 28.VII.09, leg. Chernyy /in Russian/, 1 spcm. (ZISP); Yakovlevka, Ussuri. kr., 9.VII.926, paseka Kvashuka, leg. D'yakonov, Filip'ev, /in Russian/, 1 spcm. (ZISP); St. Devitsa, yu. oz. Khanka, Ussuri. kr., 14.VII.927, leg. Sokolov /in Russian/, 1 spcm. (CSR); Kamen'-Rybolov, oz. Khanka, Yuzhnoussur., 7.V.08, leg. A. Chernyy /in Russian/, *B. signaticollis* v. *ussuriensis* Zaitzev det. /red round/, 1 spcm. (ZISP).

Notes. East Siberian specimens differ from the typical form distributed in Eastern Asia in the structure of male genitalia (position of the medial lobe) (figs. 1—4), but these distinctions are within an intraspecific variability. The same is true for the variation of the mesoventral elevation (figs. 7—16). Records of *B. signaticollis* from the Far East [20] are erroneous and all belong to *B. punctipennis*. The latter species clearly differs from *B. signaticollis* by the structure of the mesoventral elevation, which is lower in *B. signaticollis* (figs. 5—6).

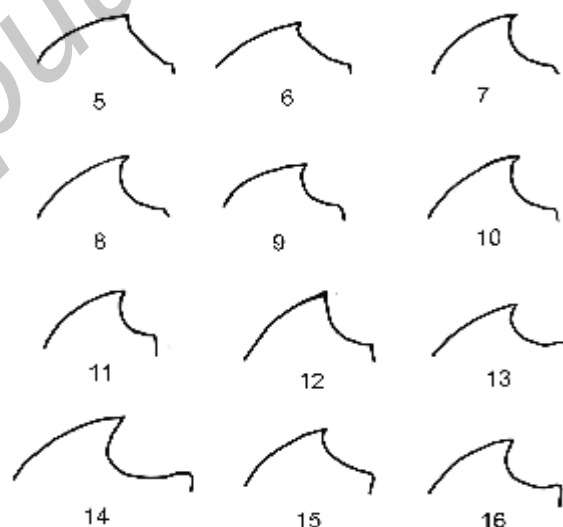
Distribution: Transbaikalian eastern Asian subboreal-subtropical species. **Palaeartic: Asia:** China (Heilongjiang, Inner Mongolia) Japan, Mongolia, Russia (East Siberia, Far East), South Korea. **Oriental:** China (Taiwan) [8], [18].

Cercyon (Cercyon) melanocephalus Linnaeus, 1758. Uzbekistan: Shar-su/in Russian/, 1 spcm. (ZISP). New for Uzbekistan.

Distribution: This species has European central palaeartic eastern Mediterranean temperate-subtropical distribution. **Palaeartic: Europe:** Armenia, Austria, Belarus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Russia



Figs. 1—4 — *Berosus punctipennis*: apex of male genitalia (ventral view): 1 — Trotskoe, oz. Khanka (Primorskiy Kray, Far East, Russia); 2 — Kamen'-Rybolov, oz. Khanka (Primorskiy Kray, Far East, Russia); 3 — Chirki (Khabarovsk area, Far East, Russia); 4 — Suktuy (Transbaikalia, East Siberia, Russia). Scale: 0,5 mm



Figs. 5—16 — Mesoventral elevation (ventral view): 5—6 — *Berosus signaticollis*; 7—16 — *Berosus punctipennis*: 5 — Baranovichi (Belarus); 6 — the Northern Vosges (France); 7 — Vinogradovka (Ussuriyskiy Kray, Far East, Russia); 8 — Devitsa (Ussuriyskiy Kray, Far East, Russia); 9 — Yakovlevka (Ussuriyskiy Kray, Far East, Russia); 10 — Kamen'-Rybolov, oz. Khanka (Primorskiy Kray, Far East, Russia); 11 — river Zeya, 50 km E. Blagoveshchensk (Amur reg. Far East, Russia); 12 — Novovladimirovka (Primorskiy Kray, Far East, Russia); 13 — Chirki (Khabarovsk area, Far East, Russia); 14 — Vinogradovka (Ussuriyskiy Kray, Far East, Russia); 15 — Suktuy, Nerchinsk; (Transbaikalia, East Siberia, Russia); 16 — Novovozdvizhensk (Transbaikalia, East Siberia, Russia)

(European part), Slovakia Slovenia, Sweden, Switzerland, Ukraine. **Asia:** Lebanon, Russia (West Siberia, East Siberia), Uzbekistan [8].

Crenitis shaanxiensis Ji & Komarek, 2003. China: S. Sichuan, SW of Hunzi village, left of tr.Lianhegau River, 2800—2900 m, 24.6.2000, leg. Belousov, Kabak, Davidian, 1 spcm. (CSR). This species was known only from two point of type locality.

Distribution: Species has Hengduan Shan-Qin Ling Shan subtropical distribution. **Palae- arctic:** **Asia:** China (Shanxi, Sichuan).

Cryptopleurum minutum Fabricius, 1775. Kirgizstan: Kirgizia, Tian-Shan, Ferganskiy Mts., h = 1800, near Kek-Art R., dung, 25.7.2010, leg. S.V. Saluk, 2 spcm. (CSR). Russia: Far East: Amurskaya obl., Arkharinskiy r-n, s. Ukrainka, 1.8.75, C. Vinter /in Russian/, 1 spcm. (ZISP). New to Kirgizstan and Amur reg. (Far East).

Distribution: *C. minutum* has circumholarctic temperate-subtropical distribution. **Palearctic:** **Europe:** Armenia, Austria, Belgium, Belarus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Italy, Latvia, Lithuania, Netherlands. Norway, Poland, Portugal, Romania, Russia (European part), Serbia, Slovakia, Slovenia, Sweden, Switzerland, Ukraine (includes the Crimea). **Asia:** China (Gansu), Kazakhstan, Kirgizstan, Russia (West Siberia, East Siberia, Far East). **Nearctic:** Canada (Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Nova Scotia, Ontario, Quebec), U.S.A. (California, Colorado, Connecticut, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Virginia, Vermont, Washington, West Virginia, Wisconsin) [8], [17].

Cryptopleurum subtile Sharp, 1844. Kirgizstan: Kirgizia, Tian-Shan, Ferganskiy Mts., h = 1 800, near Kek-Art R., dung, 25.7.2010, leg. S.V. Saluk, 1 spcm. (CSR). New for Kirgizstan.

Distribution: The species has circumholarctic south-east Asia polyzonal distribution. The species originally probably inhabited Southeast Asia, but later spread through wide areas of the Holarctic and Oriental regions. **Palae- arctic:** **Europe:** Austria, Belgium, Belarus, Czech Republic, Denmark, Finland, Germany, Great Britain, Italy, Netherlands, Norway, Poland, Sweden, Switzerland, the Ukraine (includes the Crimea). **Asia:** China (Beijing), Japan, Kirgizstan, Russia (East Siberia, Far East). **Nearctic:** Canada (Alberta, British Columbia, New Brunswick, Ontario, Quebec, Saskatchewan), U.S.A. (California, Colorado, Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Utah, Virginia, Wisconsin). **Oriental:** China (Taiwan), India, Nepal [8], [17].

Enochrus (Lumetus) halophilus Bedel, 1878. The Ukraine: the Crimea, Mezhdvodnoe, pond, 14.07.2011, leg. Ryndevich O. S. & Ryndevich A. V., 2 spcm. (CSR). New for the Crimea.

Distribution: The species has north-east Atlantic temperate-subtropical distribution, which includes coastal regions of Europe and Asia, from North Atlantic to the Mediterranean (not including the south coast), Black and Azov Seas. *Enochrus halophilus* is a halophilic species inhabiting not only the brackish waters on the sea coast, but also fresh water saline habitats far from the coast. **Palae- arctic:** **Europe:** Denmark, France, Germany, Great Britain, Ireland, the Netherlands, Spain, Sweden, Ukraine (includes the Crimea). **Asia:** Cyprus [8].

Enochrus (Lumetus) quadripunctatus Herbst, 1797. Russia: E. Siberia, Taymyr, 12 km NE Norilsk, near Valek, pool, 11.07.2002, leg. S.V. Saluk, 4 spcms. (CSR). New for East Siberia and Taymyr (Russia).

Distribution: The species has transeuroasian temperate distribution. **Palae- arctic:** **Europe:** Austria, Belgium, Bosnia and Herzegovina, Belarus, Bulgaria, Croatia, Czech Republic, Denmark,

Estonia, Finland, France, Germany, Great Britain, Hungary, Italy, Latvia, Lithuania, the Netherlands, Norway, Slovakia, Slovenia, Spain, Sweden, Ukraine (includes the Crimea). **Asia:** China, Iran, Israel, Kazakhstan, Kirgizstan, Russia (West Siberia, East Siberia, Far East) [8].

Hydrobius arcticus Kuwert, 1890. Russia: E. Siberia, Taymyr, 12 km NE Norilsk, near Valek, pool, 11.07.2002, leg. S.V. Saluk, 2 spcms. (CSR). New for East Siberia and Taymyr (Russia).

Distribution: The species has European east Siberian subarctic-alpine-mountain disjunctive distribution which includes the tundra and forest-tundra of Eurasia, and also the alpine mountain zone. **Palaeartic: Europe:** Finland, Norway, Russia (European part), Sweden. **Asia:** Russia (East Siberia), Turkey [8].

Sphaeridium bipustulatum Fabricius, 1781. Moldova: MSSR, Orgeev, r-n., Furgeny, 29.19.1978, leg. Kabakov /in Russian/, 1 spcm. (CAK) New for Moldova.

Distribution: Circumholarctic temperate-subtropical species. **Palaeartic: Europe:** Armenia, Austria, Belgium, Bosnia and Herzegovina, Belarus, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Italy, Latvia, Lithuania, Macedonia, Moldova, Netherlands, Norway, Portugal (includes Azores), Russia (European part), Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine (includes the Crimea). **Asia:** Afghanistan, Israel, Kazakhstan, Mongolia, Russia (West Siberia, East Siberia), Tadzhikistan. **North Africa:** Algeria, Spain (Canary Islands), Egypt, Tunisia. **Nearctic:** Northern America [8], [17].

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Приведены указания по дополнительным находкам *Helophorus (Gephelophorus) sibiricus* Motschulsky (Helophoridae) and ten species of the Hydrophilidae (*Berosus (Berosus) byzantinus* Ganglbauer, *Berosus (Berosus) punctipennis* Harold, *Cercyon (Cercyon) melanocephalus* Linnaeus, *Crenitis shaanxiensis* Ji & Komarek, *Cryptopleurum minutum* Fabricius, *Cryptopleurum subtile* Sharp, *Enochrus (Lumetus) halophilus* Bedel, *Enochrus (Lumetus) quadri-punctatus* Herbst, *Hydrobius arcticus* Kuwert, *Sphaeridium bipustulatum* Fabricius). Рассмотрены аспекты типологии ареалов Hydrophiloidea с учетом долготной, высотной и широтной (зональной) составляющей.