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## NEW DATA ON THE LITTLE-KNOWN SPECIES OF THE WATER SCAVENGER BEETLE *HELOPHORUS PITCHERI* ANGUS, 1970 (COLEOPTERA: HYDROPHILOIDEA: HELOPHORIDAE)

Шатровський, О. Г. Нові дані про маловідомий вид водолюбових твердокрилих *Helophorus pitcheri* Angus, 1970 (Coleoptera: Hydrophiloidea: Helophoridae). *Вісник Харківського ентомологічного товариства*. 2020. Т. XXVIII, вип. 1. С. 12–16. DOI: 10.36016/KhESG-2020-28-1-2.

Наведено нові дані про поширення, екологію та фенологію *Helophorus pitcheri* Angus, 1970, відомого до цього за трьома типовими екземплярами з Південного Сибіру та поодиноким знахідкою з Китаю. Вид уперше наведено для Далекого Сходу Росії з Амурської області та Хабаровського краю. Указано біотопи та подано перелік видів водолюбових, з якими *H. pitcheri* виявлений сумісно. Імовірно вид є ацидофільним стагнофілом. Імаго виявлено в червні та в серпні. 5 рис., 1 табл., 7 назв.

**Ключові слова:** *Helophorus pitcheri*, Далекий Схід Росії, морфологія, екологія, поширення, фенологія.

Шатровський, А. Г. Новые данные о малоизвестном виде водолюбовых жесткокрылых *Helophorus pitcheri* Angus, 1970 (Coleoptera: Hydrophiloidea: Helophoridae). *Известия Харьковского энтомологического общества*. 2020. Т. XXVIII, вып. 1. С. 12–16. DOI: 10.36016/KhESG-2020-28-1-2.

Приведены новые данные о распространении, экологии и фенологии *Helophorus pitcheri* Angus, 1970, известного до этого по трём типовым экземплярам из Южной Сибири и единичной находке из Китая. Вид впервые приведён для Дальнего Востока России из Амурской области и Хабаровского края. Указаны биотопы и дан перечень видов водолюбовых, с которыми *H. pitcheri* обнаружен совместно. Предположительно вид является ацидофильным стагнофилом. Имаго обнаружены в июне и в августе. 5 рис., 1 табл., 7 назв.

**Ключевые слова:** *Helophorus pitcheri*, Дальний Восток России, морфология, экология, распространение, фенология.

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New data on the distribution, ecology, and phenology of *Helophorus pitcheri* Angus, 1970, previously known from three type specimens from Southern Siberia and a single find from China, are presented. The species is recorded for the first time from the Russian Far East (Amur Region and Khabarovsk Territory). Biotopes are indicated, and a list of Hydrophiloidea species which was found with *H. pitcheri* is given. Presumably, the species is an acidophilic stagnophile. Adults were found in June and August. 5 figs, 1 tabs, 7 refs.

**Keywords:** *Helophorus pitcheri*, the Russian Far East, morphology, ecology, distribution, phenology.

**Introduction.** The world fauna of the genus *Helophorus* Fabricius, 1775 contains 189 species. Except for 32 purely Nearctic and about three Afrotropical forms, most of them are distributed in the Palearctic (Angus, Jia, 2019; Smetana, 1985).

The species *Helophorus pitcheri* Angus, 1970 was described from three specimens from the Lake Baikal region in the collection of E. Reitter. Two males (including the holotype) are labeled ‘Transbaikalien’, one female is labelled ‘Quell. d. Irbut’, — which is obviously an incorrect spelling of the name of the Irkut (Angus, 1995). Another specimen was collected on August 19, 1994 by M. Jäch in the city of Baihe, Changbai-Korea Autonomous County of Jilin Province of China (Angus, l. c.). No further information about this species has been published (Angus, Jia, Chen, 2014). Therefore, *H. pitcheri* was not included in the ‘Key to Insects of the Far East of the USSR’ (Shatrovskiy, 1989) — as a species known at that time only from Southern Siberia. It is present in the publication ‘Key to Freshwater Invertebrates of Russia and Adjacent Lands’ (Kirejtshuk, Shatrovskiy, 2001).

In the collections of the Moscow colleagues Alexander Ryvkin and Elena Veselova from Amur Region and Khabarovsk Territory, the author found nine specimens of this species. The findings are new indications of the distribution, ecology, and phenology of *H. pitcheri*.

**Materials and methods.** All studied specimens of *H. pitcheri* were collected in the Norsky Nature Reserve (Amur Region) and in the Bureinsky Nature Reserve (Khabarovsk Territory) in the summer seasons of 2004 and 2007. The researchers collecting these specimens were oriented on the study of beetles from the family Staphylinidae (mainly the genus *Stenus* Latreille, 1796). Numerous species from the genus *Stenus*

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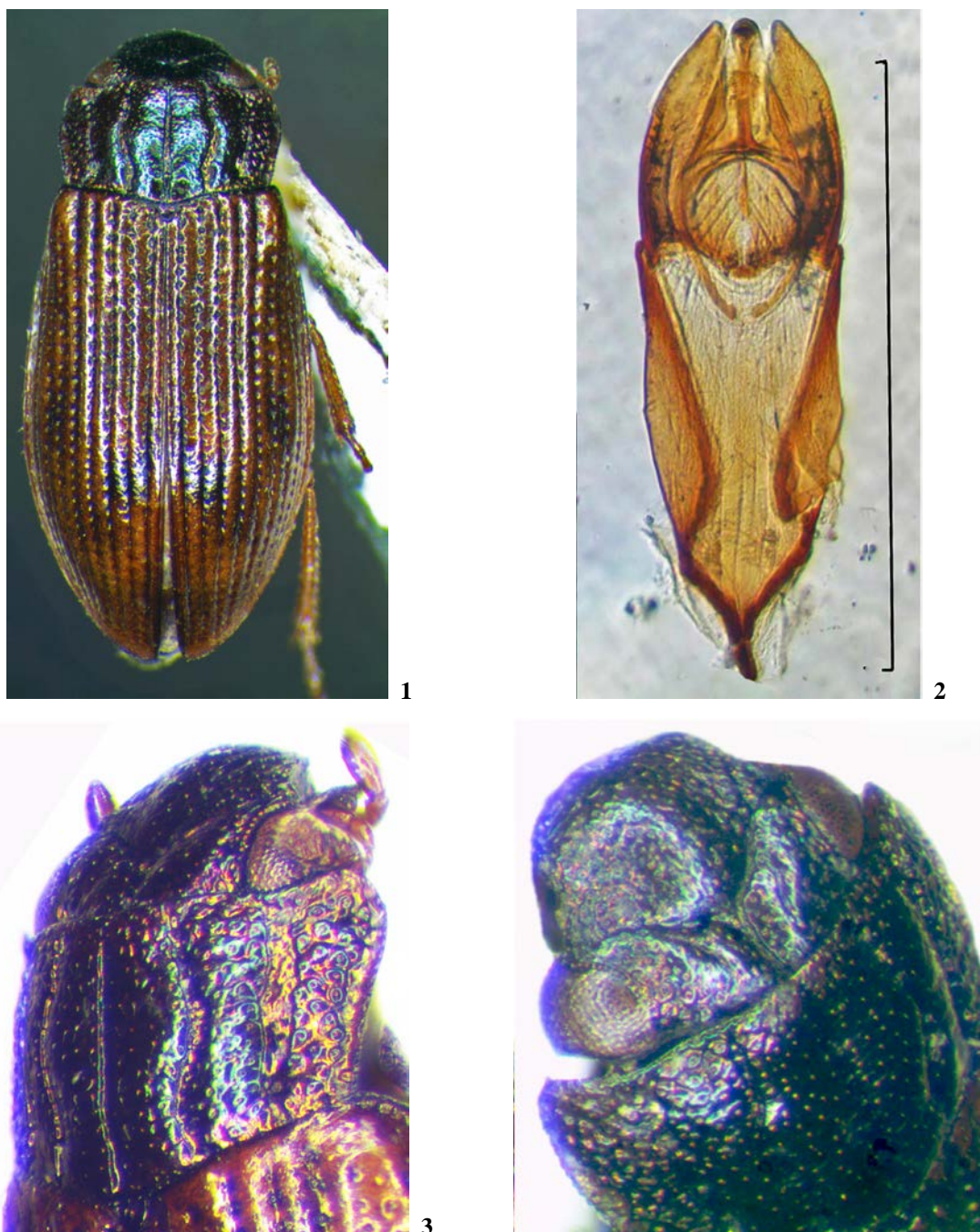
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inhabit terrestrial coastal biotopes. Therefore, methods of terrestrial collecting were dominated rather than aquatic insects. However, in shallow well-viewed bodies of water, aquatic beetles also trapped whenever possible.

The specimens were mounted in accordance with generally accepted methods. If necessary, beetles were prepared to study the aedeagophore. The material is stored in the collection of the Museum of Nature of the Vasyl Karazin Kharkiv National University.

When defining and for macrophotography (Figs. 1–3), the MBS-9 binocular microscope was used with illumination in the form of an adjustable ring of light from a lamp illuminator (6500k 144 LED). The micrograph (Fig. 4) was taken using a Levenhuk D320L microscope with a C310T NG camera, followed by overlaying images in Helicon Focus Pro 5.3.11.3 software.



**Figs. 1–4.** *Helophorus pitcheri* (Norsky Nature Reserve, 08.08.2004): 1 — general view, ♂; 2 — aedeagophore; 3 — pronotum laterally, ♀, individual hairs visible on internal intervals; 4 — head, ♂.

**Results and discussion.** *H. pitcheri* was placed to the section of species with 9-segmented antennae and characteristic pronotum: strongly or moderately convex, without yellow edges, with distinct grooves (Angus, 1970). Currently, R. Angus offers a different approach to the formation of species groups. In particular, he replaced two species from the above section to the *frater-praenanus* group, named after two defining representatives: *H. frater* Orchymont, 1926 and *H. praenanus* Łomnicki, 1894 (= *H. jacutus* Poppius, 1907). *H. pitcheri* was not included in this group (Angus, Jia, Chen, 2014).

## Family HELOPHORIDAE Latreille, 1815

### Genus *Helophorus* Fabricius, 1775

#### Subgenus *Rhopalohelophorus* Kuwert, 1886

#### *Helophorus pitcheri* Angus, 1970

**References.** Angus, 1970; Shatrovskiy, 1989; Angus, 1995; Kirejtshuk, Shatrovskiy, 2001; Angus, 2011; Angus, Jia, Chen, 2014; Angus, 2016.

Body length: 2.7–3.0 mm. Width: 1.2–1.3 mm. Body elongated irregularly shaped (Fig. 1).

Head (Fig. 3) black, with a greenish reflection and a maroon-bronze tint. Clypeus with longitudinal swelling, trunk and branches of the Y-shaped impression lie in the recess, sometimes of a triangular form depression with reduced grooves along the lateral edges. The surface of the head on the middle part in rare small points passing to the edges in large, and then to rugose points. Large dots carry thin hairs. Stem of Y-shaped impression is narrow, parallel-sided, slightly widened at the site of lateral branch discharge. The maxillary palpi brown; their apical segment asymmetric. Antennae 9-segmented, tawny, club darker.

Pronotum uniformly moderately convex, maximal width in the anterior third, the ratio of width to length 1.6–1.7; the sides to the posterior edges straightened. The main color of the intervals as the head; grooves and marginal grooves — golden-bronze. A surface with a maroon-bronze anterior border, sometimes distributed along the sides, the disc is only with a greenish reflection. Intervals (except the lateral), as well as the median and median grooves, are in rarefied small punctures, passing to the anterior margin and at the lateral intervals into granularity. Puncture points carry thin hairs (Fig. 2). Submarginal and marginal grooves are mainly smooth, can carry small points along the inner edge. Median and submedian grooves narrow, the submarginal and marginal are widened. Internal intervals convex on the base and in the middle part. The middle groove is straight, narrowed to both apices. Submedian grooves curved inward — at the base, outward — in the middle, and straightened to the apex. The submarginal grooves have an expansion in the middle part and a depression in front of the base (Fig. 2). Marginal grooves with an inner uneven edge delimited by grains of external spaces.

Elytra yellowish-brown, with a dark spot in the apical third and on the sides of it — with small dark spots in the 6<sup>th</sup> intervals. There are also pale spots forming two oblique bands as a ‘herringbone’ pattern together with a  $\Lambda$ -mark spot, and apical spot (Fig. 1). Sides convex, widely rounded, tapered to the apex. The ratio of the length to width of the elytra is about 1.6–1.7; their maximal width is beyond the middle. Rows of punctures deepened, intervals convex, twice as wide as the diameter of the punctures. The points in the rows are connected by longitudinal grooves, deepened at the base of the elytra in 2–5 rows. Flanks invisible from the below.

Legs: yellowish-brown, tarsi with well-developed swimming hairs.

♂. Aedeagophore (Fig. 4): length — 0.54 mm, width — 0.17 mm; phallobase about 2 times longer than the paramers; penis of a conical shape (length — 0.25 mm, width — 0.13 mm), struts short (length — 0.13 mm).

**Diagnosis.** The species is distinguished by a combination of structures present in the description. A distinctive characteristic is the structure of the aedeagophore.

**Material**<sup>1</sup>. (Fig. 5). Russia, Amur Region, Selezdzhinsky District, Norsky Nature Reserve: the Selezdzhia River basin near Dvadsatikh cordons, leaf litter and plant debris by margin of flood-plain swamp with *Carex* spp., *Calamagrostis* sp., *Rosa* sp., *Filipendula palmata*, *Spiraea* sp., *Thalictrum* sp., *Plagiomnium* sp., *Equisetum* sp. (edge of burnt larch low ridge with bush and Poaceae), 02.08.2004 (A. B. Ryvkin) — 1 sp.; *ibid.*, plant debris on small swamp with *Carex* spp., Poaceae, *Salix* spp., *Geranium* sp., *Spiraea* spp., *Filipendula palmata*, etc., 08.08.2004 (A. B. Ryvkin) — 1 sp.; the Nora River basin near Meunskiy cordon, mosses and plant debris at flood-plain of a rill: *Alnus* sp., *Carex* spp., Poaceae, *Trientalis europaea*, *Convallaria keiskei*, *Sphagnum squarrosum*, *Sph.* spp., *Hypnum* sp., etc., 18.08.2004 (A. B. Ryvkin) — 2 sp.; island on the Byssa River about 2 km up-stream of Kukuya Rill mouth, 310 m a. s. l., mosses and leaf litter among *Alnus* sp., *Salix* spp., *Spiraea* spp. with Poaceae gen. spp., *Carex* spp., *Sphagnum* spp., *Hylocomium splendens*, *Climacium* sp., *Plagiomnium* spp., etc. around small flood-plain pools., 06.06.2007 (E. M. Veselova, A. B. Ryvkin) — 3 sp. Khabarovsk Territory, Verkhnebureinsky District, Bureinsky Nature Reserve: flood-plain of right side of the Levaya Bureya River near mouth of the Lan River, 613 m a. s. l., moss and litter under *Salix* sp. and *Alnus* sp. with Poaceae gen. spp., *Carex* spp., *Linnaea borealis*, small undergrowth of *Sorbus* sp. and *Picea ajanensis* by low bank of old channel, 31.08.2010 (A. B. Ryvkin) — 1 sp.; the Levaya Bureya River cca 2 km up-stream of the Chapkhoz River mouth, 582 m a. s. l., in drift on shingle-sandy-argillaceous spit. 01.09.2010 (A. B. Ryvkin) — 1 sp.

<sup>1</sup> Toponyms are spelled according collectors' labels.

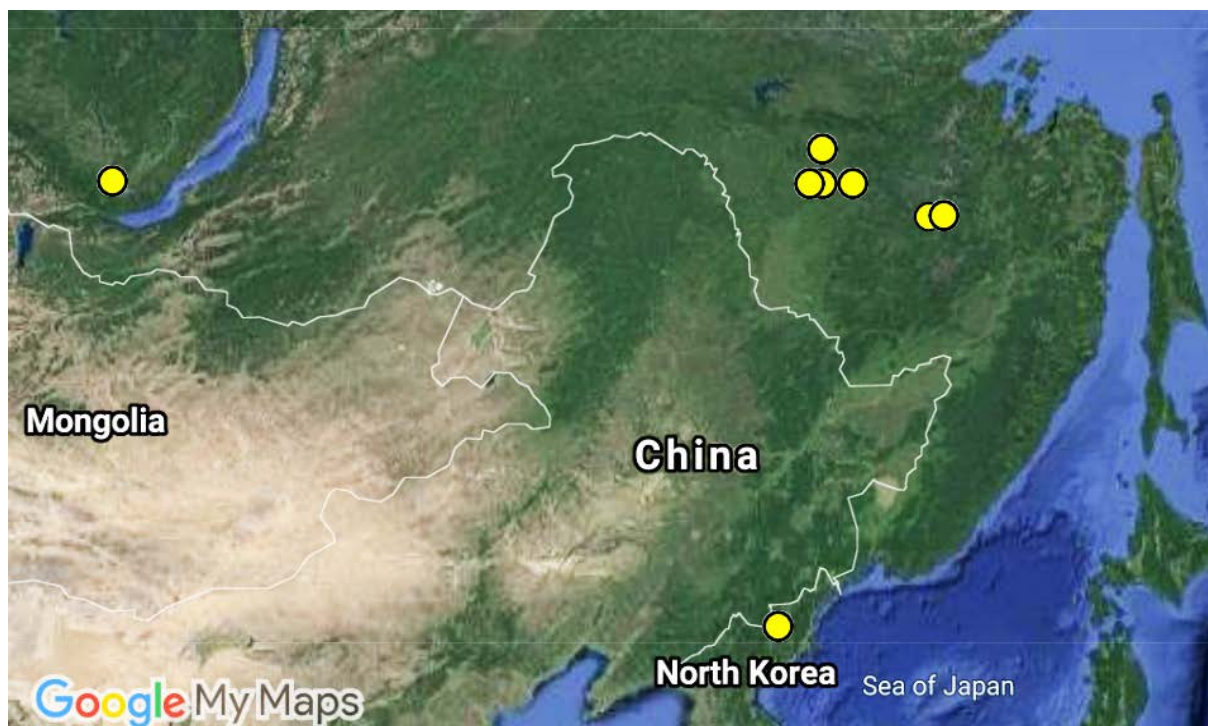


Fig. 5. Distribution of *Helophorus pitcheri*.

Thus, in the Russian Far East, the species was found in similar biotopes from six points. In the Table 1 are shown the names of the stations in chronological order of the collection points.

Table 1. Species of water scavenger beetles that were co-collected with *H. pitcheri*

Species of superfamily Hydrophiloidea	Stations**					
	Norsky Nature Reserve (Amur Region)				Bureinsky Nature Reserve (Khabarovsk Territory)	
	bottomland of the river	swamp	bottomland of the stream	pool in the bottomland	old channel in the bottomland	river shingle-sandy-argillaceous spit
	Dvadsatikhha cordon, 02.08.2004, detritus in	Dvadsatikhha cordon, 08.08.2004, detritus in	Meunsky cordon, 18.08.2004, detritus in	South of the reserve, 06.06.2007, mosses and litter near	31.08.2010, mosses and litter near	01.09.2010, detritus in
<i>Helophorus pitcheri</i> Angus, 1970	1	1	2	3	1	1
<i>H. tuberculatus</i> Gyllenhal, 1808	–	–	1	–	–	–
<i>H. nanus</i> Sturm, 1836	2	–	–	–	–	–
<i>H. poppii</i> Angus, 1970*	–	1	–	–	–	–
<i>H. orientalis</i> Motschulsky, 1860	–	–	–	4	1	–
<i>Cercyon korbianus</i> Knisch, 1912	7	3	1	–	–	–
<i>Hydrobius fuscipes</i> (Linnaeus, 1758)	–	–	1	1	–	–
<i>Crenitis apicalis</i> (Reitter, 1896)	–	–	1	–	–	–
<i>Anacaena lutescens</i> (Stephens, 1829)	1	–	–	–	–	–
<i>Laccobius cinereus</i> Motschulsky, 1860	–	1	–	–	–	–
Total of species	4	4	5	3	2	1

Notes: \* — a form with long struts (Angus, 2011, 2016); \*\* — in chronological order.

Among the species observed with *H. pitcheri* are one mesophyll-detritophile (*Cercyon korbianus*) and 8 hydrophiles: 2 eurytopic stagnophiles (*Hydrobius fuscipes* and *Helophorus poppii*) and 6 acidophilic stagnophiles (*Helophorus tuberculatus*, *H. nanus*, *H. orientalis*, *Crenitis apicalis*, *Anacaena lutescens*, and *Laccobius cinereus*). Based on this information, it can be assumed that *H. pitcheri* is also an acidophilic stagnophile.

The specimen from China (Angus, 1995) was collected in a puddle formed in spring by melting snow (unshaded springfed pools, cold water). In open landscapes, such puddles either dry up at the time of collection (August 19) or become brackish and are the habitat of halophilic species. However, the rainy climate at the collection point helps maintain a neutral reaction of the water, and the indication that the water in the puddles is cold indicates poor evaporation from the surface. Therefore, it is unlikely that the water in the puddles had an alkaline reaction.

From the reports of researchers, it is known that they collected material: in 2004 — from August 2 to October 8, and in 2007 — from May 31 to August 12. However, *H. pitcheri* adults were collected only in June and August. Based on these data, it can be assumed that the species at the adult stage occurs before the beginning of September. It is possible that in July it stays at the immature stages of development. In June, adults are also collected, but to determine the timing of the start of their release, additional material is required.

**Conclusions.** 1. New data were obtained on *Helophorus pitcheri*, previously known for three specimens of the type series from Southern Siberia and a single specimen from the China.

2. The species is mentioned for the first time from the Russian Far East in Amur Region and Khabarovsk Territory.

3. The species is redescribed with details of some morphological characteristics.

4. The habitat requirements of the species are noted. Presumably, it is an acidophilic stagnophile.

5. It has been established that in the Far East, the species at the adult stage occurs in June and August. It is possible that in July the species is at immature stages of development. The start time of the appearance of the imago remains undefined.

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## REFERENCES

- Angus, R. B. 1970. Revisional studies on east Palaearctic and some Nearctic species of *Helophorus* F. (Coleoptera: Hydrophilidae). *Acta Zoologica Hungarica*, **16**(3–4), 249–290. URL: [http://real-j.mtak.hu/4334/1/ActaZoologica\\_16.pdf#249](http://real-j.mtak.hu/4334/1/ActaZoologica_16.pdf#249).
- Angus, R. B. 1995. Helophoridae: The *Helophorus* species of China, with notes on the species from neighbouring areas (Coleoptera). In: Jäch, M. A., Ji, L., eds. *Water Beetles of China. Vol. I*. Zoologisch-Botanische Gesellschaft in Österreich and Wiener Coleopterologenverein, Wien, 185–206. ISBN: 3901606025. URL: [https://www.zobodat.at/pdf/WB-China\\_1\\_0185-0206.pdf](https://www.zobodat.at/pdf/WB-China_1_0185-0206.pdf).
- Angus, R. B. 2011. Remembering the dreamtime. *Latissimus*, **30**, 2–7. URL: [http://personal.rhul.ac.uk/uhba/010/REMEMBERING THE DREAMTIME by Robert Angus .pdf](http://personal.rhul.ac.uk/uhba/010/REMEMBERING%20THE%20DREAMTIME%20by%20Robert%20Angus.pdf).
- Angus, R. B. 2016. In the Land of the Great River. *Latissimus*, **37**, 8–13. URL: <http://www.waterbeetles.eu/documents/Latissimus37.pdf>.
- Angus, R. B., Jia, F.-L. 2019. Triploidy in Chinese parthenogenetic *Helophorus orientalis* Motschulsky, 1860, further data on parthenogenetic *H. brevipalpis* Bedel, 1881 and a brief discussion of parthenogenesis in Hydrophiloidea (Coleoptera). *Comparative Cytogenetics*, **14**(1), 1–10. DOI: <https://doi.org/10.3897/CompCytogen.v14i1.47656>.
- Angus, R. B., Jia, F.-L., Chen, Z.-N. 2014. A review of the *Helophorus frater-praenanus* group of species, with description of a new species and additional faunal records of *Helophorus* Fabricius from China and Bhutan (Coleoptera: Helophoridae). *Koleopterologische Rundschau*, **84**, 209–219. URL: [https://www.zobodat.at/pdf/KOR\\_84\\_2014\\_0209-0219.pdf](https://www.zobodat.at/pdf/KOR_84_2014_0209-0219.pdf).
- Kirejtshuk, A. G., Shatrovskiy, A. G., 2001. Family Helophoridae [Семейство Helophoridae (Морщинники)]. In: Tsalolikhin, S. Ya., ed. *Key to Freshwater Invertebrates of Russia and Adjacent Lands. Vol. 5. Higher Insects [Определитель пресноводных беспозвоночных России и сопредельных территорий. Т. 5. Высшие насекомые]*. Nauka, Saint Petersburg, 279–300, 676–695. ISBN: 5020261629. [in Russian].
- Shatrovskiy, A. G. 1989. *Helophorus* Ill. [*Helophorus* Ill. — Морщинник]. In: Lehr, P. A., ed. *A Key to Insects of the Far East of the USSR. Vol. III. Coleoptera or Beetles. Pt. 1 [Определитель насекомых Дальнего Востока СССР. Т. III. Жесткокрылые или жуки. Ч. 1]*. Nauka, Leningrad, 269–275. ISBN: 5020256234. [In Russian].
- Smetana, A. 1985. Revision of the subfamily Helophorinae of the Nearctic Region (Coleoptera: Hydrophilidae). *Memoirs of the Entomological Society of Canada*, **117**(S131), 3–154. DOI: <https://doi.org/10.4039/entm117131fv>.

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