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Description of a new East Palearctic species of *Ilybius* ERICHSON previously mixed up with *I. poppiusi* ZAITZEV (Coleoptera: Dytiscidae)

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Abstract

The East Palearctic *Ilybius poppiusi* ZAITZEV is recognized as a complex of two species, separated chiefly on penis shape, width of metasternal wing, and metatibial punctation. The true *I. poppiusi* is confined to north Mongolia and Yakutia, the Buryat territory and Chita district in Russia. Material from Japan (Hokkaido), China (Heilongjiang), Yakutia, the Irkutsk district and the Far East of Russia is assigned to *I. anjae* sp.n., described from Primorye and Sakhalin. The known records of both species are mapped.

Key words: Coleoptera, Dytiscidae, Colymbetinae, Agabini, *Ilybius*, new species, East Palearctic.

Introduction

The genus *Ilybius* ERICHSON currently includes 31 species of which 16 are Palearctic, ten Nearctic and five Holarctic (LARSON 1987, NILSSON 1998). The species occurring in North America were revised by LARSON (1987), and the West Palearctic species are more or less well-known (e.g. NILSSON & HOLMEN 1995). In contrast, many East Palearctic species remain poorly known, and a revision of these would be most welcome. NILSSON (1994) revised the so called *crassus*-complex, and I will here show that *I. poppiusi* ZAITZEV, as previously delimited, is also a species-complex.

Ilybius poppiusi was first described from two males, one from the Mongolian border south of Lake Baikal and one from Yakutia (ZAITZEV 1907). Later, ZAITZEV (1910) added two new localities and gave some characters for the separation of *I. poppiusi* from *I. obtusus* SHARP. GSCHWENDTNER (1935) provided the first description of the female of *I. poppiusi*, and BALFOUR-BROWNE (1947) published the first records from China. Two more Siberian records of *I. poppiusi* were provided by GUIGNOT (1956) who suggested that it was in fact identical with, and thus only a junior synonym of, *I. obtusus*. GUEORGUIEV (1968) illustrated the male genitalia of *I. poppiusi* for the first time and provided records from Mongolia. SATO & NILSSON (1988) published the first record from Japan (Hokkaido), and NILSSON & KHOLIN (1994) added Sakhalin to the range of *I. poppiusi*. Finally, NILSSON & KHOLIN (1997) described the larva of this species.

I will here document the morphological differences and the geographical distributions of the two species standing as *I. poppiusi*. The species that occurs in the Far East of Russia and Japan will be described as new.

Abbreviations and methods

Collections: (CAL) coll. R.B. Angus, London; (CALACAD) California Academy of Science, San Francisco; (CBB) coll. M. Balke, Berlin; (CHB) coll. L. Hendrich, Berlin; (CMV) coll. B.

Maier, Vandans; (CNU) coll. A.N. Nilsson, Umeå; (CWW) coll. G. Wewalka, Wien; (HNHB) Hungarian Natural History Museum, Budapest; (IBV) Institute of Biology, Vladivostok; (MZH) Zoological Museum, Helsinki; (NMW) Naturhistorisches Museum, Wien; (SMNH) Swedish Museum of Natural History, Stockholm; (SMTD) Staatliches Museum für Tierkunde, Dresden; (ZISP) Zoological Institute, St. Petersburg.

Width of metasternum (WS) was measured inside bead. Penis length was measured as in Fig. 15. The number given for each locality as "(#x)" under "Type material" and "Additional localities" is also used to identify the localities on the map.

Characterization of the *poppiusi*-complex

The *poppiusi*-complex is very similar to the *crassus*-complex as characterized by NILSSON (1994). The two main differences are found in the male sternum 6 that has a distinct posteromedial keel in the *poppiusi*-complex, and in the marginal bead on the outer angle of the medial emargination being distinct in the female.

Key to species of *poppiusi*-complex

1 Metasternal wing very narrow, WC/WS 3.0 - 3.2 (Fig. 1). Metatibia with ventral face more strongly punctate (Fig. 8). Penis long, 3.1 - 3.3 mm, and evenly narrowed to apex (Figs. 10 - 11). Female with anterior metatarsal claw more strongly curved apically (Fig. 6) ..... ***poppiusi***

\- Metasternal wing narrow, WC/WS 2.5 - 2.7 (Fig. 2). Metatibia with ventral face less strongly punctate (Fig. 9). Penis short, 2.3 - 2.5 mm, its apex swollen in lateral view and subapically constricted in dorsal view (Figs. 12 - 13). Female with anterior metatarsal claw less strongly curved apically (Fig. 7) ..... ***anjae***

Descriptions of the species

Ilybius poppiusi ZAITZEV

Ilybius poppiusi ZAITZEV, 1907:208 (orig. descr.), 1910:34 (faun.), 1953:278 (in part, descr., distr.); GSCHWENDTNER 1935:88 (descr. female); GUÉORGUIEV 1965:132 (faun.), 1968:28 (descr., faun), 1969:60 (faun.), 1972:39 (faun.); LAFER 1989:249 (in part, descr., distr.).

Type locality. Russia, Yakutia, Yana district, River Dulgalach (#28).

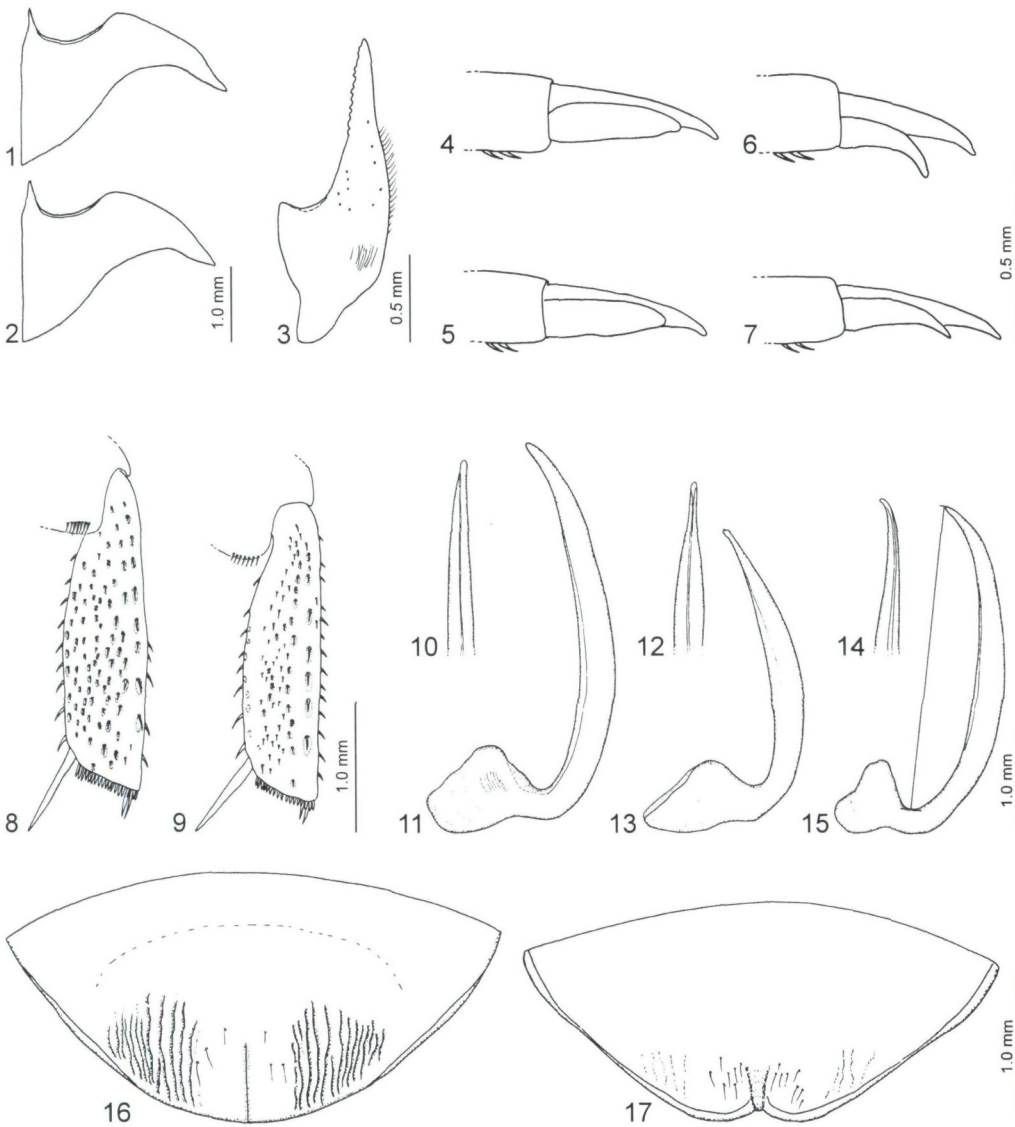
Type material. Lectotype ♂, here designated (ZISP), labelled: "R. Dulgalach, sistema Yany Bar. Toll. 7 VI 85", "Typ Ilybius poppiusi m. Zaicev det.", and my lectotype label. Paralectotype not found; according to original description labelled: Kyachta (#1), 1903, 1 ♂, leg. Michno.

Additional localities.

Mongolia: Central Aimak: (#2) Ulan-Bator, Tola meadows, 12.VII.1977, 1 ♂, leg. A. & M. Stubbe (HNHB); (#3) River Kerulen, 45 km E of Solmon Bajandelger, 1340 m, 27.VII.1965, 1 ♀, leg. Z. Kaszab (GUÉORGUIEV 1968:23); (#4) 50 km E Ulan-Bator, Ouboulan, 9.VI.1962, 1 ♀, leg. R. Bielawski & B. Pisarski (GUÉORGUIEV 1969:60). - Chenteij Aimak: (#5) 20 km SW of Somon Norovlin, 900 m, 9.VIII.1965, 6 ♂♂, 29 ♀♀, leg. Z. Kaszab (GUÉORGUIEV 1968:24; 4 ♂♂, 21 ♀♀ seen in HNHB). - Chojbalsan aimak: (#6) SW corner of Lake Bujr nur, 585 m, 11.VIII.1965, 1 ♂, 1 ♀, leg. Z. Kaszab (GUÉORGUIEV 1968:24). - Khubsugud Aimak: (#7) Lake Kossogol, 3.VI.1903, leg. V. Elpatjevskij (ZAITZEV 1910:34; 1 ♂ seen in MZH). - Uvs aimak: (#8) River Baruunturuun gol nr Somon Baruunturuun, 1280 m, 25.VI.1968, 1 ♂, leg. Z. Kaszab (No. 1012; seen in HNHB). - Province not identified: (#9) 15 km SW Chojr, 26.VII.1963 (GUÉORGUIEV 1969:60).

Russia: Buryat territory: (#10) Temnik Valley, near Tajoshnyi, 6.VI.1994, 1 ♂, leg. O. Jäger (SMTD). - Chita distr., (#13) E shore of Sun-Torey, 16-17.VI.1994, 4 ♂♂ 1 ♀, leg. R. Krause & O. Jäger (SMTD).

Description. Measurements and ratios as in Tab. 1. Metasternal wing very narrow (Fig. 1). Metatibia with punctation on ventral face very strong (Fig. 8). Anterior metatarsal claw in male with weak subapical dilation (Fig. 4); in female strongly curved apically (Fig. 6). Penis long and smoothly narrowed to apex, both in dorsal and lateral views (Figs. 10 - 11).



Figs. 1 - 3: metasternal wing (1 - 2) and female gonocoxa (3). 1) *Ilybius poppiusi*; 2 - 3) *I. anjae*. Scale bars for 1 - 2: 1.0 mm and for 3: 0.5 mm. Figs. 4 - 9: metatarsal claws in anterior view (4 - 7) and metatibia in ventral view (8 - 9). 4 - 5) male. 6 - 7) female. 4, 6, 8) *I. poppiusi*. 5, 7, 9) *I. anjae*. Scale bars 0.5 mm for 4 - 7, and 1.0 mm for 8 - 9. Figs. 10 - 15: penis in lateral view (11, 13, 15) and apex in dorsal view (10, 12, 14). 10 - 11) *I. poppiusi*. 12 - 13) *I. anjae*. 14 - 15) *I. obtusus*. Line in 15 shows measurement of penis length. Scale bar: 1.0 mm. Figs. 16 - 17: *I. anjae*, sternum 6, ventral view. 16) male. 17) female. Scale bar: 1.0 mm.

Species & sex		TL-h	MW	TL-h/MW	WC/WS	PL	PL/TL-h
anjae							
Both sexes	Mean	9.53	5.28	1.81	2.61		
	SD	0.34	0.18	0.02	0.13		
	N	42	42	42	39		
Females	Mean	9.37	5.22	1.80	2.58		
	SD	0.24	0.17	0.03	0.14		
	N	21	21	21	20		
Males	Mean	9.69	5.36	1.81	2.65	2.42	0.25
	SD	0.33	0.18	0.03	0.11	0.10	0.01
	N	21	21	21	19	8	8
poppiusi							
Both sexes	Mean	9.60	5.54	1.73	3.12		
	SD	0.34	0.27	0.03	0.17		
	N	15	15	15	14		
Females	Mean	9.50	5.45	1.74	3.10		
	SD	0.29	0.21	0.02	0.11		
	N	5	5	5	5		
Males	Mean	9.65	5.59	1.73	3.13	3.23	0.34
	SD	0.37	0.29	0.04	0.20	0.12	0.01
	N	10	10	10	9	5	5

Table 1: Selected measurements (mm) and ratios for the two sexes of the two species in the *Ilybius poppiusi*-complex: (TL-h) total body length without head, (MW) maximum body width, (WC/WS) ratio between width of metacoxa and width of metasternum, and (PL) penis length.

Distribution (Fig. 18). I have seen specimens from north Mongolia and the following Russian regions: Yakutia, Buryat territory, and Chita district. The geographical range of the specimens seen provides a strong indication that the paralectotype from Kyachta represents the species as here interpreted.

Natural history. Most of the records are from margins of lakes or rivers. In the Temnik Valley it was collected in a forest fen. As several specimens taken in the second half of June were teneral, the life cycle seemingly follows that of most other *Ilybius* species, i.e. semivoltine with overwintering first as third-instar larvae and then as adults.

Ilybius anjae sp.n.

Ilybius poppiusi ZAITZEV, 1907: BALFOUR-BROWNE 1947:445 (misident., faun.); ZAITZEV 1953:278 (in part, descr., distr.); GUIGNOT 1956:397 (misident., faun.); SATO & NILSSON 1988:126 (misident., faun.); LAFER 1989:249 (in part, descr., distr.); NAKANE 1989:29 (misident., faun.); MORI & KITAYAMA 1993:121 (misident., descr.); NILSSON & KHOLIN 1994:150 (misident., faun.), 1997:108 (misident., larval descr.); NILSSON 1995:65 (misident., faun.).

Type locality. Russia, Sakhalin, Kholmsk district, Kostromskoye.

Type material. Holotype ♂ (ZISP), labelled "Russia, Sakhalin, Kholmsk, Kostromskoye (#14), 18-26.vi.1993, Leg. S.Kholin/A.Nilsson" and my holotype label. Paratypes: 19 ♂♂, 21 ♀♀; 1 ♂, 3 ♀♀ with same locality label as holotype; 10 ♂♂, 12 ♀♀ "Russia, Sakhalin, Kostromskoye, 18/6-93, Leg. Kholin & Nilsson"; 4 ♂♂, 1 ♀ ditto "8/9-93 Leg. SK Kholin"; 1 ♀ ditto "24/6-93"; 2 ♂♂ "Russia, Sakhalin, Aniva (#15), 20/6-93, Leg. Kholin & Nilsson"; 2 ♀♀ "Russia, Primorskij Kr., 22 km N Vladivostok, Sputnik Stn. ponds (#16), 25/7-92 AN Nilsson"; 2 ♂♂, 1 ♀♀ "Russia, Primorye, V-vostok, Sputnik, 13-28.vi.93 Leg. S.Kholin/A.Nilsson"; 1 ♀ "Russia: Kamen-Rybolov (#17), L. Khanka, S. Primorye, 7aug94 light-trap, Morse, Vshivkovna & Kocharina"; 1 ♂ "Russia, Sakhalin #7, 10 km E Aniva 20.vi.1993 Leg. S.Kholin/A.Nilsson"; 1 ♂ "N. China: Charbin 2.x.1952 B.M. 1953-715"; 1 ♂ "Sib. or.

Ussuri"; 1 ♀ "Soviet Far East, Arsenev, leg. O. Sausa VII.1991". Paratypes deposited in CWW (2), NMW (2), IBV (4), SMNH (2), MZH (2), CNU (32).

Additional localities.

China: Heilongjiang: (#18) Lesser Khingan Mts, Cheng Chin, 1938, 1 ♂, leg. M. Weymarn; (#19) Hsiaoling, 3 ♀♀, leg. M. Weymarn (BALFOUR-BROWNE 1947:445).

Japan: Hokkaido: (#20) Kushiro, Kaya-numa, 22 & 24.VI.1967, 1 ♂, leg. I. Hiura; (#20) Kushiro, Betsuho, 28.VII.1987, 1 ♀, leg. R. Yakita; (#21) Memanbetsu, Lake Abashiri-ko, 3.VIII & 6.IX.1986, 2 ♂♂, 2 ♀♀, leg. H. Matsumoto (SATO & NILSSON 1988:126); (#22) Nemuro, Tanne-numa marsh, 31.VIII.1988, 2 ♀♀, leg. T. & Y. Abe (CHB).

Russia: Amur terr.: (#23) "Amur" (GUIGNOT 1956:397; 1 ♂ seen in HNHB). - Buryat terr.: (#24) source of "Irbut River" (GUIGNOT 1956:397; 1 ♂ seen in HNHB). - Irkutsk distr.: (#11) Kultuk, VII.1872, leg. Czekanowski (ZAITZEV 1910:34); (#12) Tibelti, Irkut valley 28 km W of Lake Baikal, 1 ♂, 1 ♀, leg. R.B. Angus (identity checked by Angus, CAL). - Khabarovsk terr. (LAFER 1989:249). - Primorye terr.: (#16) Vladivostok, Sputnik Station, 1 ♀, leg. B. Maier (CMV); (#25) Maiskoye, 6.IX.1994, 1 ♀, leg. B. Maier (CMV); (#26) Ussuriski Sapov., Kamenuschka, 1 ♀ (CBB). - Yakutia: (#27) Olenëk, 18.-19.VII.1970, 1 ♂, leg. R.B. Angus (CNU).

Etymology. The specific epithet is a noun in the genitive case, derived from the name of one of my daughters, as well as from Sergey Kholin's daughter, Anja.

Description. Measurements and ratios as in Tab. 1. Metasternal wing narrow (Fig. 2). Male and female sternum 6 as in Figs. 16 - 17. Metatibia with punctation on ventral face not so strong (Fig. 9). Anterior metatarsal claw in male with submedian dilation (Fig. 5); in female weakly curved apically (Fig. 7). Penis short with apical knob in lateral view and subapical constriction in dorsal view (Figs. 12 - 13). Gonocoxa as in Fig. 3. Sexual differences in body length and width are statistically significant (t-test, $p < 0.05$), whereas the differences in the ratios TL-h/MW and WC/WS are not.

Distribution (Fig. 18). I have seen specimens from Japan (Hokkaido) and from the following Russian regions: Irkutsk district, Yakutia, Primorye, and Sakhalin. I have also seen one male labelled "Amur" and one from the upper part of the Irkut River in Buryatia (given that the interpretation of Irbut as Irkut is correct). Uncontrolled records from China (Heilongjiang; specimens not found in CALACAD) and the Russian Khabarovsk territory probably refer to this species.

Natural history. In Sakhalin and near Vladivostok, *I. anjae* was common in ponds of varying size, most frequently encountered in bog ponds with surrounding moss. The data on larval phenology given by NILSSON & KHOLIN (1997) suggest that *I. anjae* follows the normal *Ilybius* life cycle. The single specimen taken at light shows that at least some individuals have the capacity of flight.

Discussion

The mean values of WC/WS, penis length and PL/TL-h given in Tab. 1 are all significantly higher in *I. poppiusi* than in *I. anjae* (t-test, $p < 0.001$). The body shape is significantly broader in *I. poppiusi* than in *I. anjae* (TL-h/MW, t-test, $p < 0.001$). This difference is chiefly due to the higher body width found in *I. poppiusi* (males, t-test, $p < 0.05$).

The combination of ridged metatarsomeres and a carinate and rugose sternum 6 in males is now found in seven *Ilybius* species. All of these, except the Nearctic *I. quadrimaculatus* AUBÉ, also have more or less strongly punctate metatibiae. The three species of the *angustior*-complex, viz. the Holarctic *I. angustior* (GYLLENHAL) and *I. picipes* (KIRBY) and the Nearctic *I. churchillensis* WALLIS, differ from the *poppiusi*-complex in their smaller body size and more or less infuscate apical antennomeres. The two first-mentioned species also have broader, more triangular, metasternal wings than *I. poppiusi* or *I. anjae*. Finally, the East Palearctic *I. obtusus* SHARP differs from the *poppiusi*-complex chiefly in its broader metasternal wings, thicker lateral beads of pronotum, and coarser elytral microsculpture. The penis of *I. obtusus* is long and narrow and has the apex bent to the left in dorsal view (Figs. 14 - 15).

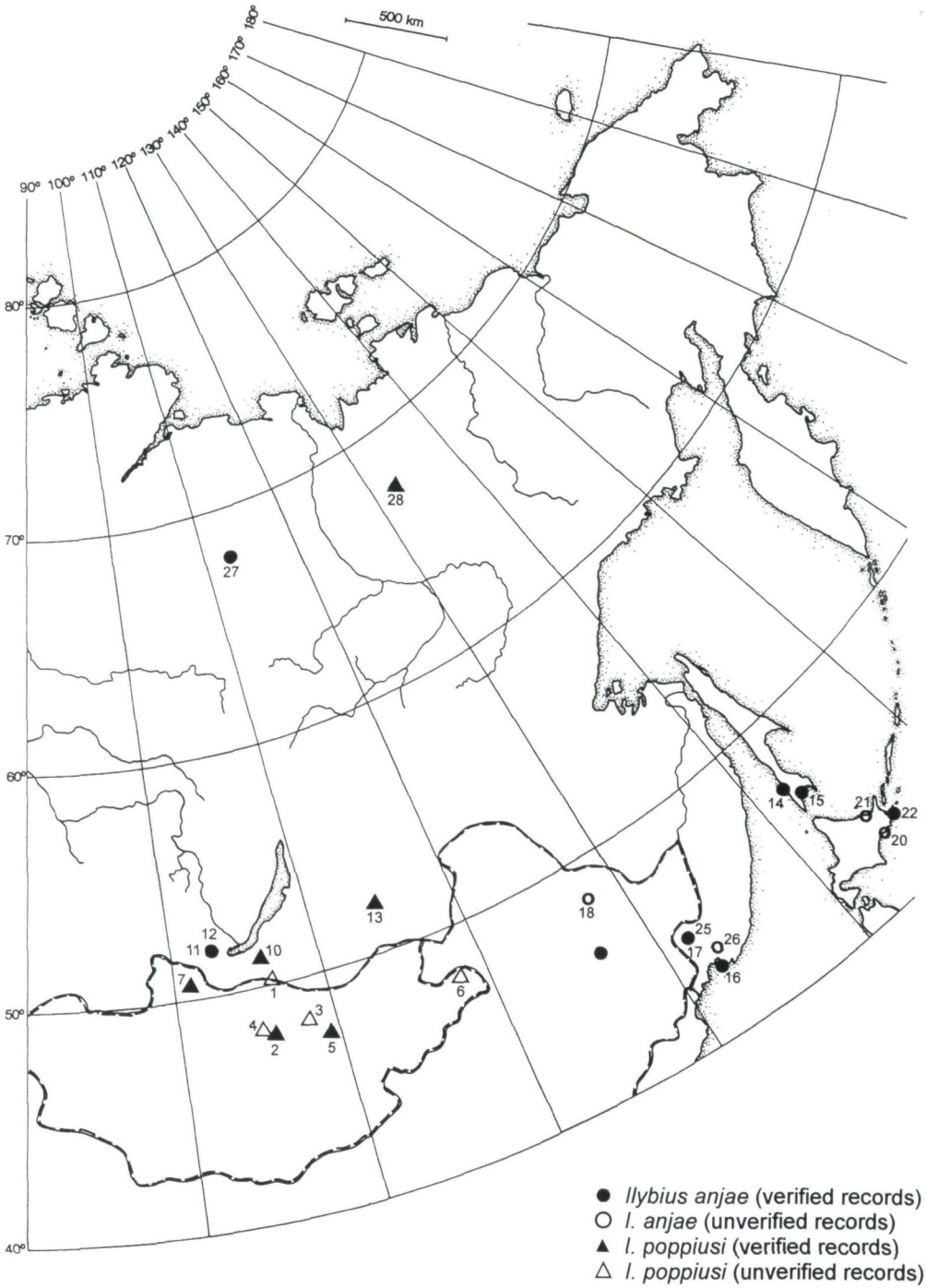


Fig. 18. Geographic position of records of *Ilybius anjae* and *I. poppiusi*. Numbers attached to symbols comply with numbers in the locality lists in the text. Localities 8, 9, 19, 23, and 24 are not shown on map due to ambiguity or difficulty in finding their exact positions.

Based on the specimens seen so far, *I. anjae* and *I. poppiusi* are at least partly allopatric (Fig. 18). All specimens seen from Mongolia and Russia south of Lake Baikal are true *I. poppiusi*, whereas those from the Far East of Russia and Hokkaido all represent *I. anjae*. An indication that the situation might be more complex is given by the verified record of *I. anjae* from the Irkutsk district plus the single male labelled "Quell. d Jrbut Reitter". Most likely this species was collected in westernmost Buryat territory, in the upper part of the Irkut River (known also as Irbut), in close vicinity to several localities of *I. poppiusi*. As the two males seen from Yakutia are not conspecific, the situation in East Siberia demands further study.

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References

BALFOUR-BROWNE J. 1947: The aquatic Coleoptera of Manchuria (Weymarn collection). - The Annals and Magazine of Natural History (11) 13(1946): 433-460.

GSCHWENDTNER L. 1935: Monographie der paläarktischen Dytiscidae. VI. Colymbetinae (2. Teil). - Koleopterologische Rundschau 21: 61-92.

GUÉORGUIEV, V.B. 1965: Haliplidae und Dytiscidae. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei (Coleoptera). - Reichenbachia 7: 127-134.

GUÉORGUIEV, V.B. 1968: Coleoptera: Haliplidae, Dytiscidae, Gyrinidae II. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei. - Izvestija na Zoologitjeskija Institut s Musei Sofia 27: 23-29.

GUÉORGUIEV, V.B. 1969: Dytiscidae et Gyrinidae (Coleoptera) de Mongolie. - Annales Zoologici Warszawa 27: 59-64.

GUÉORGUIEV, V.B. 1972: Haliplidae, Dytiscidae, Gyrinidae IV. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei (Coleoptera). - Faunistische Abhandlungen staatliches Museum für Tierkunde in Dresden 4: 31-44.

GUIGNOT F. 1956: Dytiscidae nouveaux ou intéressants du Musée National d'Histoire Natuelle de Budapest. - Annales Historico-Naturales Musei Nationalis Hungarici (N.S.) 7: 395-399.

LAFER, G.Sh. 1989: Sem. Dytiscidae - Plavuntji. - Opredelitel Nasekomich Dalnego Vostoka SSSR 3(1): 229-253.

LARSON, D.J. 1987: Revision of North American species of *Ilybius* Erichson (Coleoptera: Dytiscidae), with systematic notes on Palaearctic species. - Journal of the New York Entomological Society 95: 341-413.

MORI, M. & KITAYAMA, A. 1993: Dytiscoidea of Japan. Kankyo-Kagaku Ltd., Osaka. 217 pp.

NAKANE, T. 1989: The beetles of Japan (new series) 88. - Nature & Insects 24(11): 27-31.

NILSSON A.N. 1994: A revision of the Palearctic *Ilybius crassus*-complex (Coleoptera, Dytiscidae). - Entomologisk Tidskrift 115: 55-61.

NILSSON, A.N. 1995: Noteridae and Dytiscidae: Annotated check list of the Noteridae and Dytiscidae of China (Coleoptera), pp. 35-96. - In: Jäch, M.A. & Ji, L. (Eds.). Water beetles of China, Vol. 1. - Wien: Zoologisch-Botanische Gesellschaft in Österreich and Wiener Coleopterologenverein, 410 pp.

NILSSON A.N. 1998: Catalogue of Palearctic Dytiscidae. Colymbetinae. Internet http://www.big.umu.se/biginst/www/personal/hemsidor/AN_BIG/col_inae.htm.

NILSSON, A.N. & HOLMEN, M. 1995: The aquatic Adephaga (Coleoptera) of Fennoscandia and Denmark. II. Dytiscidae. - Fauna Entomologica Scandinavica 32: 1-192.

NILSSON, A.N. & KHOLIN, S.K. 1994: The diving beetles (Coleoptera, Dytiscidae) of Sakhalin - an annotated checklist. - Entomologisk Tidskrift 115: 143-156.

NILSSON, A.N. & KHOLIN, S. 1997: Larval morphology of four East Palearctic species of *Ilybius* Erichson (Coleoptera: Dytiscidae). - Koleopterologische Rundschau 67: 101-112.

SATO, M. & NILSSON, A.N. 1988: Notes on *Ilybius* (Coleoptera, Dytiscidae) from Japan and her neighbourhood. - Elytra, Tokyo 16: 126.

ZAITZEV Ph. 1907: Zwei neue Wasserkäfer (Coleoptera aquatica). - Russkoe Entomologicheskoe Obozrenie 6(1906): 208-210.

ZAITZEV Ph. 1910: Beiträge zur Kenntnis der Wasserkäfer des Ostens von Nordsibirien. Haliplidae, Dytiscidae, Gyrinidae, Hydrophilidae, Georyssidae, Dryopidae u. Heteroceridae. - Mémoires de l'Académie Impériale des Sciences de St.-Petersbourg, Classe Physico-Mathematique (8) 18(9): 11-52 + pl. 1B.

ZAITZEV F.A. 1953: Nasekomye zhestkokrylye. Plavuntsovye i vertyachki. - Fauna SSSR 58: 1-376.

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