

DISTRIBUTION OF PITVIPERS OF “*Gloydus blomhoffii*” COMPLEX IN RUSSIA WITH THE FIRST RECORDS OF *Gloydus blomhoffii blomhoffii* AT KUNASHIR ISLAND (KURIL ARCHIPELAGO, RUSSIAN FAR EAST)

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Only one species of “*Gloydus blomhoffii*” complex — *Gloydus ussuriensis* was earlier known on the territory of the Russian Federation. The present paper discuss important new records of *Gloydus blomhoffii blomhoffii* (Boie, 1826) in the Kuril islands and the new data on the distribution of the forms of “*Gloydus blomhoffii*” complex within the territory of Russian Federation.

Keywords: Viperidae; Crotalinae; *Gloydus*; distribution; *Gloydus blomhoffii* – complex” new record; Russian Far East; Kunashir island.

INTRODUCTION

Analysis of taxonomic position of the snakes of genus *Gloydus* inhabiting the territory of Palearctic Asia is rather complicated (Orlov and Barabanov, 1999, 2000). “*Gloydus halys*” complex includes the following forms: *G. halys halys*, *G. h. caraganus*, *G. h. caucasicus*, *G. h. cognatus*, and *G. h. stejnegeri*. To “*Gloydus blomhoffii*” complex they belong five following forms: *G. blomhoffii blomhoffii*, *G. b. siniticus*, *G. brevicaudus*, *G. tsushimaensis*, and *G. ussuriensis*. These two species complexes inhabiting the eastern part of distribution range of genus *Gloydus* are almost everywhere sympatric or parapatric. Closely overlapping species complexes are recorded in the Russian Far East, within China and the Korean Peninsula (Russian Far East and Eastern Transbaikalian Region, North-Eastern China and Korean Peninsula). The first new important record of *Gloydus blomhoffii blomhoffii* in Russia on Kunashir Island (Kuril Archipelago, Russian Far East) noted in summer of 2013 add one more form to the list of pitvipers of Russian Federation. We also discuss on the distribution of the forms of “*Gloydus blomhoffii*” complex.

MATERIAL AND METHODS

To analyze the distribution of Palearctic pitvipers in the Eastern part of range we use specimens from the

collection of the Zoological Institute (*Appendix 1*), Russian Academy of Science (ZISP) and literature data (Ananjeva et al., 1997, 2006; Adnagulov et al., 2000; David and Ineich, 1999; Orlov and Barabanov, 1999, 2000; Gumprecht et al., 2004). In addition, the observations and photographs made by the authors during field observations were used.

RESULTS AND DISCUSSION

List of species and subspecies of “*Gloydus blomhoffii*” complex

Below we provide synonyms of two species names (*Gloydus blomhoffii* and *Gloydus ussuriensis*), information about type localities and distribution of species and subspecies of “*Gloydus blomhoffii*” complex.

Gloydus blomhoffii blomhoffii (Boie, 1826)

- 1826 *Trigonocephalus blomhoffii* Boie: 214.
- 1837 *Trigonocephalus blomhoffii* — Schlegel: 552.
- 1849 *Trigonocephalus affinis* — Gray: 125
- 1860 *Trigonocephalus blomhoffii* var. *megaspilus* — Cope: 336.
- 1862 *Halys blomhoffii* — Peters: 671.
- 1896 *Ancistrodon blomhoffii* — Boulenger: 525 (part).
- 1907 *Agkistrodon blomhoffii* — Stejneger: 457.
- 1916 *Ancistrodon halys halys* — Nikolsky: 267 (part).
- 1916 *Ancistrodon halys intermedius* — Nikolsky: 276 (part).
- 1916 *Ancistrodon halys blomhoffii* — Nikolsky: 284 (part).
- 1916 *Agkistrodon blomhoffii blomhoffii* — Sternfeld: 170.
- 1922 *Ancistrodon blomhoffii blomhoffii* — Werner: 226.
- 1925 *Agkistrodon halys intermedius* — Stejneger: 96 (part).
- 1925 *Agkistrodon halys brevicaudus* — Stejneger: 97 1929
- 1929 *Agkistrodon halys blomhoffii* — Mell: 32.
- 1936 *Agkistrodon halys* — Bourret: 451 (part).

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1978/1979 *Gloydus blomhoffii* — Hoge et Romano-Hoge: 267.
 1981 *Gloydus blomhoffii blomhoffii* — Hoge et Romano-Hoge: 281.

Terra typica. “Japan.”

Distribution. Japan, including the entire main islands (Hokkaido, Honshu, Kyushu and Shikoku); sometimes erroneously noted on Sakhalin Island (Gloyd and Conant, 1990; Golay et al., 1993; David and Ineich, 1999; Orlov and Barabanov, 1999; Gumprecht et al., 2004), where it is totally absent and there is no reason to suppose its presence. In the summer of 2013 for the first time *Gloydus b. blomhoffii* was recorded on Kunashir Island (Kuril Archipelago, Russian Far East).

Gloydus blomhoffii siniticus (Gloyd, 1977)

Terra typica. “Ningkwō (= Ningguo Co.), Anhwei (= Anhui) Province, China.

Distribution. Yantze (= Chang Jiang) River Basin, China, from the coast of the East China Sea to the southeast of Sichuan Province in the west (Zhao and Adler, 1993; David and Ineich, 1999; Orlov and Barabanov, 1999, 2000; Gumprecht et al., 2004).

Note. Described from Hsinglungshan (= Mt. Xinglong), Eastern Tombs, Hopei (= Hebei) Prov., China. *Gloydus blomhoffii dubitatus*, Gloyd, 1977, we consider as the junior synonym of *A. brevicaudus* (Stejneger, 1907), in accordance with Zhao and Adler (1993) and David and Ineich (1999). There is a common point of view that the name *A. b. siniticus* is the junior synonym of *A. blomhoffii brevicaudus* (= *Gloydus brevicaudus*) (Zhao and Adler, 1993; Zhao et al., 1998; David and Ineich, 1999; Orlov and Barabanov, 1999, 2000). However, disjunction of their distribution ranges is considerable; we need to have additional materials to clarify the status of these forms that have close morphological similarity. Gloyd and Conant (1990) noted the cases of intergradated populations.

Gloydus brevicaudus (Stejneger, 1907)

Terra typica. Fusan (= Pusan), Korea.

Distribution. Korea and northeastern China. There exists an opinion about the subspecies status of this form — *G. blomhoffii brevicaudus* (Zhao and Adler, 1993; David and Ineich, 1999; Orlov and Barabanov, 1999, 2000; Gumprecht et al., 2004).

Gloydus ussuriensis (Emelianov, 1929)

1859 *Trigonocephalus blomhoffii* — Maack: 153 (part).
 1905 *Ancistrodon blomhoffii* — Nikolsky: 329 (part).
 1907 *Agkistrodon blomhoffii brevicaudus* — Stejneger: 463 (part).
 1907 *Agkistrodon blomhoffii intermedius* — Stejneger: 464 (part).
 1916 *Ancistrodon halys halys* — Nikolsky: 267 (part).
 1916 *Ancistrodon halys intermedius* — Nikolsky: 276 (part).
 1916 *Ancistrodon halys blomhoffii* — Nikolsky: 284 (part).

1925 *Agkistrodon halys intermedius* — Stejneger: 96 (part).
 1925 *Agkistrodon halys brevicaudus* — Stejneger: 97 (part).
 1926 *Ancistrodon halys blomhoffii* — Pavlov: 22 (part) (lapsus calami).
 1929 *Ancistrodon blomhoffii ussuriensis* — Emelianov: 123.
 1934 *Agkistrodon blomhoffii ussuriensis* — Chernov: 356.
 1935 *Agkistrodon halys* — Pope: 390 (part).
 1936 *Ancistrodon blomhoffii ussuriensis* — Mednikjan: 299 (lapsus calami).
 1963 *Agkistrodon halys ussuriensis* — Klemmer: 400.
 1972 *Agkistrodon caliginosus* — Gloyd: 563.
 1981 *Gloydus caliginosus* — Hoge, Romano-Hoge: 195.
 1981 *Gloydus halys ussuriensis* — Hoge, Romano-Hoge: 197.
 1981 *Agkistrodon blomhoffii* — Korotkov: 53.
 1986 *Agkistrodon ussuriensis* — Toriba: 62.

Terra typica. Terra typica designata of *Ancistrodon blomhoffii ussuriensis* Emelianov, 1929 [*Gloydus ussuriensis* (Emelianov, 1929)] Russian Far East, Primorskiy kray, Tetjukhe River valley, Vladimiro-Monomakhovo village (Orlov and Barabanov, 1999, 2000).

Distribution. Russian Far East: northwards to the lower Amur River, westwards to the Argun River (Chita oblast', Mogocha rayon), eastwards the distribution is limited by the coast of the Sea of Japan and Tatarskiy Strait; Korea and northeastern China (Terentiev and Chernov, 1949; Toriba, 1986; Zhao and Adler, 1993; Ananjeva et al., 1998, 2006; David and Ineich, 1999; Orlov and Barabanov, 1999, 2000; Gumprecht et al., 2004). This snake prefers very humid habitats on the banks of rivers, swamps, does not avoid rice fields. As a rule, it prefers open areas with grass or bushes of hazel and broom. In the forest regions of Sikhote Alin it usually lives in forest edges and warmed up stony screes on the slopes of the mountains, common on the coast of the Sea of Japan. In the mountains it goes up to 1300 m above sea level. *G. ussuriensis* is found in the Russian Far East northwards up to the lower Amur River, westwards up to the rivers Argun and Shilka (Chita oblast'); in the east the distribution is limited by the coast of the Sea of Japan and the Tatarskiy Strait. Outside of Russia it lives in Manchuria and in the north of Korea. Until recently it was referred to *Gloydus blomhoffii* (Boie, 1826), widely distributed in eastern Asia on the mainland and Japanese islands.

Gloydus tsushimaensis (Isogawa, Mori et Mitsui, 1994)

Terra typica. Yora-Naiin, Izuhara-cho, Shimoagata-gun, Nagasaki Prefecture, Japan.

Distribution. Tsushima Island, Nagasaki Prefecture, Japan (David and Ineich, 1999; Orlov and Barabanov, 1999, 2000; Gumprecht et al., 2004).



Fig. 1. *Gloydius ussuriensis* from south Primorye Khasan rayon of the Russian Federation (earlier preliminarily identified as *Gloydius brevicaudus*).

New records and distribution of pitvipers of “*Gloydius blomhoffii*” complex within the territory of Russian Federation

Within the territory of Russian Federation reliable records of only single species of “*Gloydius blomhoffii*” complex — i.e. *Gloydius ussuriensis* (Emelianov, 1929) [by Orlov and Barabanov, 1999, 2000 — as *Agkistrodon ussuriensis*] were known. The findings of *Gloydius brevicaudus* from the Russian Far East are in fact referred to *Gloydius ussuriensis* (Orlov and Barabanov, 1999). There were some indications (personal communication of the late Vladimir Kharin) to the records of the second species of this complex, i.e., *Gloydius brevicaudus*, on the border of southern Primorye (Russia) and North Korea (Democratic People’s Republic of Korea) but examination of these specimens did not confirm this identification (Fig. 1).

Distribution of *Gloydius ussuriensis* was shortly described above in the List of species and subspecies of “*Gloydius blomhoffii*” complex. We consider here the new data about 8 specimens from Chita oblast’ (localities: 1, lower Amur — Argun and Shilka rivers, Chita

oblast’, Mogocha district; 48 — Ingoda River, Karymskoye rayon, Chita oblast’ (Figs. 5 – 17). Disjunction was noted in Zeya-Bureya rivers area (Amur oblast’) and in the upper part of the Amur River to the confluence place of Shilka and Argun rivers with Ingoda River (Chita oblast’) (Fig. 2). Taxonomic position of the westernmost isolated population in Chita oblast’ still requires clarification.

The new record of *Gloydius blomhoffii blomhoffii* in Russia on Kunashir island (Kuril Archipelago, Russian Far East) (Figs. 18 – 21)

The new record of *Gloydius blomhoffii blomhoffii* (Boie, 1826) in the Kuril Islands is the reliable base to add one more species of pit vipers of “*Gloydius blomhoffii*” complex to the herpetofauna of Russia (Figs. 2 and 3).

Earlier reports on this species on Sakhalin Island (Gloyd and Conant, 1990) since 1945 not yet been confirmed despite many surveys. Moreover special search made by zoological expeditions were not successful. Gloyd and Conant (1990) noted two localities on Sakhalin Island: Kholmsk (Maoka) and Korsakov (Otomari),

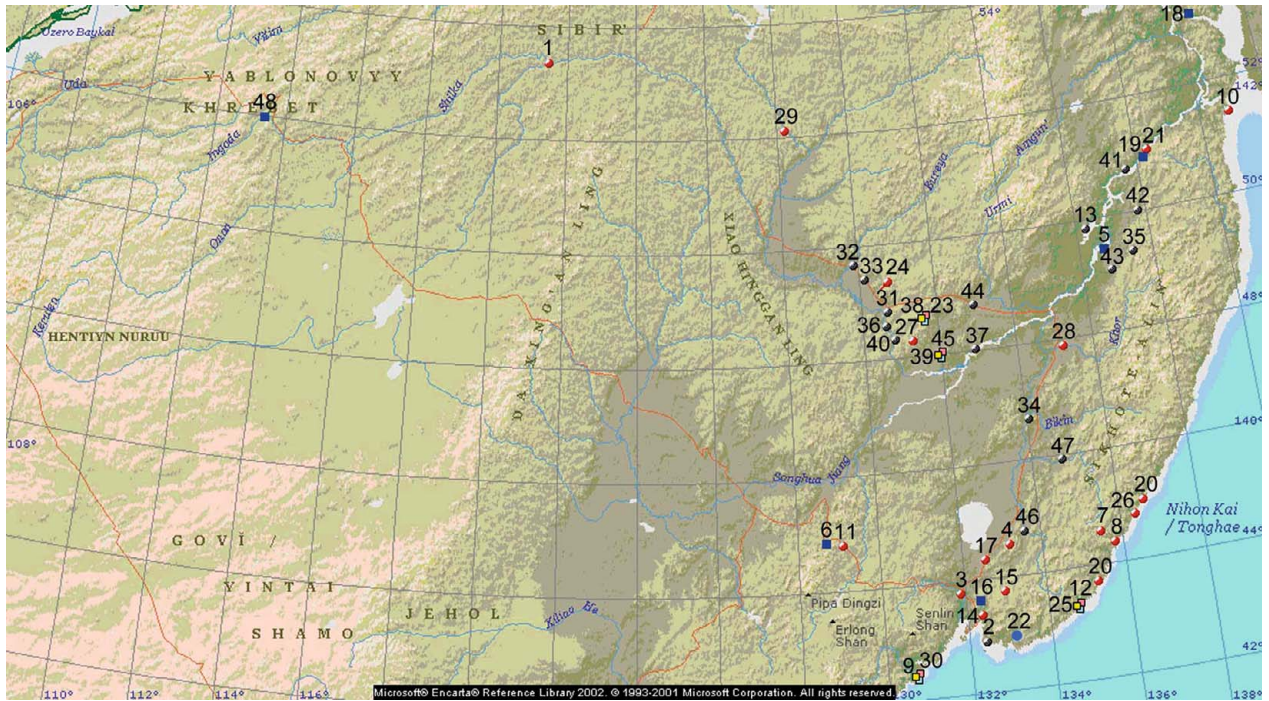


Fig. 2. Map of distribution of *Gloydus ussuriensis*: red circle, ZISP specimens; black circle, literature data; blue square, specimens examined for morphological characters.

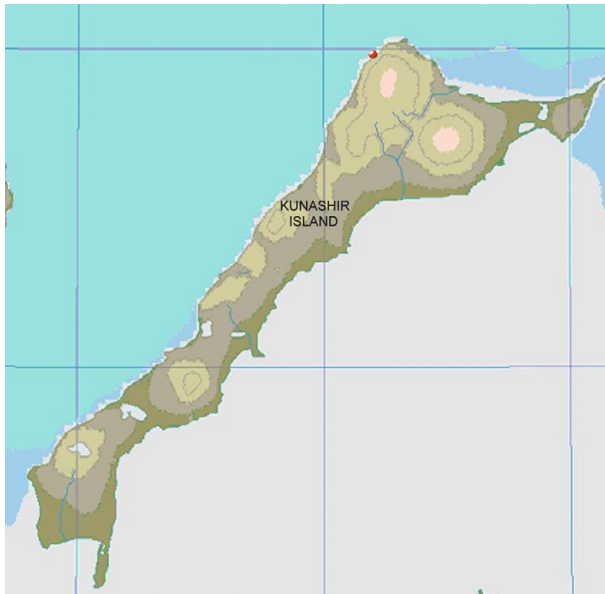


Fig. 3. The first important record of *Gloydus blomhoffii blomhoffii* on Kunashir Island, Russian Federation: red circle.



Fig. 4. *Gloydus ussuriensis* from the type locality.

referring to Boulenger (1907) and Maki (1940). Numerous reports on the findings of *Gloydus blomhoffii* on the territory of Russia, as it was noted in the introduction, were later referred to *Gloydus ussuriensis* (Fig. 4).

The first new important record of *Gloydus blomhoffii blomhoffii* in Russia on Kunashir island (Kuril Archipelago, Russian Far East) was noted in summer of 2013 (Fig. 3) by an entomologist of Kuril Reserve Y. N. Sundukov with a group of researchers working in frame of inventory program of the enthomofauna. During this field trip at low tide near numerous thermals they constantly observed Japanese Rat snake (*Elaphe climacophora*). Pit vipers were recorded only on the seaside terrace on the northwestern shore of Kunashir Island, ele-



Fig. 5. *Gloydus ussuriensis* from the River Ingoda, Karymskoye rayon, Chita oblast'. General view of live specimen.



Fig. 6. *Gloydus ussuriensis* ZISP No. 28004 from the River Ingoda, Karymskoye rayon, Chita oblast'. Dorsal view.

vating above sea level about 20 – 30 m in camping area between Dalny Creek and Neskuchensky Thermals (44°29'03.7" N 146°05'47.3" E) (Fig. 2). This area is situated on approximately midway between the thermal springs in the north (in 300 m) and the mouth of the



Fig. 7. *Gloydus ussuriensis* ZISP No. 28004 from the River Ingoda, Karymskoye rayon, Chita oblast'. Ventral view.



Fig. 9. *Gloydus ussuriensis* ZISP No. 28005 from the River Ingoda, Karymskoye rayon, Chita oblast'. Dorsal view.

Dalny Creek to the south (in about 200 m). The terrace has an average width of 40 – 50 m, it fall to the sea by cliffs or steep grassy slopes; from the east it is limited by very steep rocky slopes with height of about 200 – 300 m, overgrown with mixed forest. Eastwards from this area behind the rocks the volcano Ruruy is situated. The habitat where pitvipers were found is a sparse forest with dense undergrowth of bamboo (*Sasa* sp.), with a



Fig. 8. *Gloydus ussuriensis* ZISP No. 28004 from the River Ingoda, Karymskoye rayon, Chita oblast'. Lateral view.



Fig. 10. *Gloydius ussuriensis* ZISP No. 28005 from the River Ingoda, Karymskoye rayon, Chita oblast'. Ventral view.



Fig. 12. *Gloydius ussuriensis* ZISP No. 28006 from the River Ingoda, Karymskoye rayon, Chita oblast'. Dorsal view.



Fig. 11. *Gloydius ussuriensis* ZISP No. 28005 from the River Ingoda, Karymskoye rayon, Chita oblast'. Lateral view.

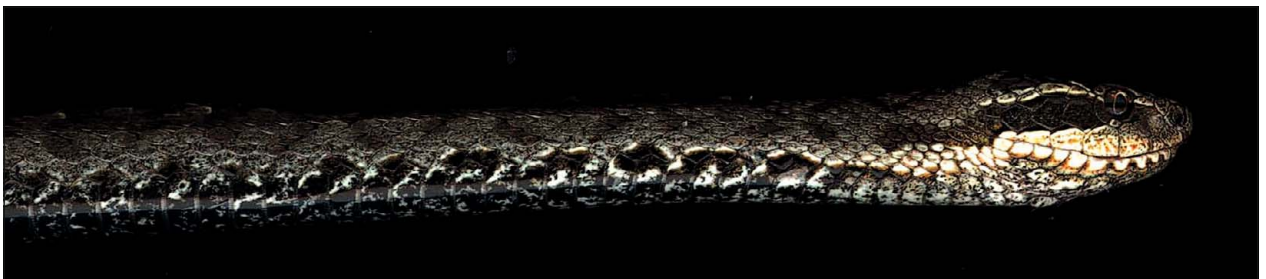


Fig. 14. *Gloydius ussuriensis* ZISP No. 28006 from the River Ingoda, Karymskoye rayon, Chita oblast'. Lateral view.



Fig. 13. *Gloydius ussuriensis* ZISP No. 28006 from the River Ingoda, Karymskoye rayon, Chita oblast'. Ventral view.

predominance of Mayr maple (*Acer mayrii*) and participation of stony birch (*Betula ermanii*), *Picea jezoensis*, Sakhalin fir (*Abies sachalinensis*), Amur cork (*Phellodendron amurense*), and *Kalopanax septemlobus*. In the undergrowth the bamboo thickets are dominated in dry parts of forest and *Rynoutria sachalinensis* — in its moist parts (Fig. 22). Weather during the visit of the expedition on the terrace was rainy and warm with 100% humidity, daytime temperatures around $+25 \div +27^{\circ}\text{C}$, night — about $+22 \div +25^{\circ}\text{C}$. In total five individuals were recorded. The first snake was met on August 7 in 23.05, in the darkness (Fig. 18). The pit viper, the male with body length of 640 mm crawled near a fire in a field camp and has been recorded by the cat. After catching and photographing the snake was released. On August 9,



Fig. 15. *Gloydius ussuriensis* ZISP No. 28007 from the River Ingoda, Karymskoye rayon, Chita oblast'. Dorsal view.



Fig. 16. *Gloydius ussuriensis* ZISP No. 28007 from the River Ingoda, Karymskoye rayon, Chita oblast'. Ventral view.

at 23.30, the second individual, a male with a length of about 550 mm was met near the spring. It crawled across the path to the spring and went to the thicket of buckwheat. On the August 10, at 18.15 – 18.20 (within 3 – 4 min at a distance of about 7 – 10 m from each other three more snakes were observed under the canopy of Sakhalin buckwheat near the creek: female, about 700 mm long and 2 males — about 550 and 450 mm). For recorded snakes clearly marked twilight-night activity was noted.

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Fig. 18. *Gloydius blomhoffii blomhoffii* from the Kunashir Island, Kuril Archipelago, Russian Far East. General view of live specimen.



Fig. 17. *Gloydius ussuriensis* ZISP No. 28007 from the River Ingoda, Karymskoye rayon, Chita oblast'. Lateral view.



Fig. 19. *Gloydius blomhoffii blomhoffii* from the Kunashir Island, Kuril Archipelago, Russian Far East. Dorsal view.



Fig. 20. *Gloydus blomhoffii blomhoffii* from the Kunashir Island, Kuril Archipelago, Russian Far East. Ventral view.



Fig. 21. *Gloydus blomhoffii blomhoffii* from the Kunashir Island, Kuril Archipelago, Russian Far East. Lateral view.



Fig. 22. Habitat of *Gloydus blomhoffii blomhoffii* from the Kunashir Island, Kuril Archipelago, Russian Far East.

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APPENDIX. Specimens examined and registered in the map of distribution (Fig. 2)

- ZISP 2235. [Chita oblast’], Argun River. 1854. 53°22’ N 121°27’ E ~500 m.
- ZISP 13326. [Primorsky kray], vicinity of Vladivostok. Bay “Razboinik” 08.1912. Coll.: Gajewski. 42°54’ N 132°23’ E ~10 m.
- ZISP 10389. [Primorsky kray] Nikolsk Ussuri [Ussurijsk]. 1905. Coll.: Syuzev. 43°47’ N 131°51’ E ~20 m.
- ZISP 13348. Primorsky kray, env. Village Novovladimirovka [upstream r. Odarka]. 08.1911. Coll.: Cherskii. 44°34’ N 133°10’ E ~125 m.
- ZISP 10859. [Khabarovsk kray], Amur River, 2 km above the village of Troitskoye. 06/22/1911. Coll.: Sidorov. 49°27’ N 136°41’ E ~20 m.
- ZISP 13324. Manchuria [China, Heilongjiang Province, Zhangguangcai mountain range], station Chitouhezi, East-China railway. 07.05.1912. Coll.: Baikov. 44°52’ N 128°41’ E ~320 m.
- ZISP 13345. Primorsky kray, the valley of the lower reaches of Tyutihe River [Rudnaya River, Dalnegorsk vicinity]. 04.06.1909. Coll.: S. Dyukin. (Paralectotype). 44°34’ N 135°28’ E ~300 m.
- ZISP 13327. [Primorsky kray], env. Vladimir Monomakh, village, river valley. Tetyukhe [Rudnaya River]. 20.06.1909. Coll.: S. Dyukin. 44°22’ N 135°47’ E ~10 m.
- ZISP 13330. Primorsky kray, Lake Hassan, the hills near the lake. 22.06.1913. Coll.: Cherskii. 44°27’ N 130°37’ E ~25 m.
- ZISP 13331. [Khabarovsk kray], Bay “Oprichnik” Sea of Japan. 08.19.1910. Coll.: Shostakovich. 51°24’ N 140°49’ E ~2 m.
- ZISP 13314. [Manchuria [China, Heilongjiang Province, Zhangguangcai mountain range]], station Hengdaohezi. East-China railway. 07.1907. Coll.: Baikov. 44°48’ N 129°05’ E ~425 m.
- ZISP 13339. Ussuri rayon, Pfusung village [Primorsky kray, settl. Moryak-Rybolov]. 07.08.1927. Coll.: Shulgin. 43°20’ N 134°47’ E ~4 m.
- Adnagulov, 2000 (ZISP 13341). Khabarovsk kray, Amur rayon, Lake Bolon, vicinity of Dzhen, 18 – 25.07.1995. 49°51’ N 136°15’ E ~20 m.
- ZISP 13343. Ussuri rayon [Primorsky kray], vicinity of village Mayhe [village Shtykovo]. 05.06.1927. Coll.: Rezvoy. 43°23’ N 132°21’ E ~10 m.
- ZISP 15335. Ussuri rayon [Primorsky kray], vicinity of Vinogradovka village. 06.1929. Coll.: Kirichenko. 43°45’ N 132°56’ E ~250 m.
- ZISP 21745. Primorye [Primorsky kray] Ussuri Reserve, settlement Kamenushka. 43°39’ N 132°20’ E ~90 m.
- ZISP 13344. Primorsky kray, vicinity of Chernigovka village. 06.1913. Coll.: Emelyanov. 44°20’ N 132°32’ E ~80 m.
- ZISP 13347. Nikolaevsk rayon [Khabarovsk kray], the lower reaches of Amur River. Coll.: Derbek. 53°12’ N 140°20’ E ~1 m.
- ZISP 13349. [Khabarovsk kray], village Nizhnee-Tambovskoye. 08.02.1928. Coll.: Obolensky. 55°55’ N 138°12’ E ~15 m.
- ZISP 13534. Primorsky kray, from Ol’ga Bay to the Bay of Terni. 10.07 – 09.07.1906. Coll.: Arsenyev. 43°43’ N 135°14’ E ~5 m and 45°01’ N 136°37’ E ~2 m.
- ZISP 16137. [Khabarovsk kray], Pisuy River, 1 – 1.5 km from the mouth. 07.24.1911. Coll.: V. K. Soldatov. 51°02’ N 138°19’ E ~30 m.
- ZISP 18011. [Primorsky kray] Suchan River valley. [Partizanskaya River]. Summer 1966. Coll.: N. K. Vereshchagin, N. D. Ovodov. 42°58’ N 133°06’ E ~5 m.
- ZISP 18634. Evreiskaya Autonomous oblast’, Obluch’ye rayon, settlement Kaylan, sphagnum bog in the floodplain of Kaylan River. 07.08.1975. Coll.: M. Yu. Maimin. 48°41’ N 131°37’ E ~230 m.
- ZISP 18636 (ZIN 18673). Amur oblast’, Arkhara rayon, 7 km east of the station Uril. 14.07.1975. Coll.: M. Yu. Maimin. 49°14’ N 130°34’ E ~190 m.
- ZISP 18722. Primorsky kray, Ol’ga rayon, vicinity of Milogradovo village. 20.07.1975. Coll.: N. L. Orlov. 43°18’ N 134°37’ E ~20 m.
- ZIN 18724. Primorsky kray, Terney rayon, Bay Dzhitig. 24.08.1975. Coll.: N. L. Orlov. 44°47’ N 136°21’ E ~1 m.
- ZISP 18826. Evreiskaya Autonomous oblast’, plain of Pompeevka River, 40 km upstream from the village Pompeevka. 08.1976. Coll.: M. Yu. Maimin. 48°17’ N 131°15’ E ~360 m.
- ZISP 18893. Khabarovsk kray, Lazo rayon. Khor River valley. 06.1974. Coll.: I. Gnetova. 47°54’ N 135°10’ E ~65 m.
- ZISP 19452. Amur oblast’, Shimanovsk rayon, pos. Chagoyan. 07.1980. Coll.: M. Yu. Maimin. 52°07’ N 128°12’ E ~190 m.
- ZISP 19827. Primorsky kray, vicinity of settlement Hassan. 9 – 10.1968. Coll.: Y. M. Korotkov. 42°22’ N 130°45’ E ~1 m.
- Adnagulov et al., 2000. Evreiskaya Autonomous oblast’, Obluch’ye rayon, 3 km from Pashkovo towards Radde, near rubbish heap. 24.05.1990. 48°50’ N 130°40’ E ~85 m.
- Adnagulov et al., 2000. Amur oblast’, Arkhara rayon, Bureya River, left bank, vicinity of Domikan, Zmeinaya hill. 2.05.1992. 49°41’ N 129°50’ E ~105 m.
- Adnagulov et al., 2000. Amur oblast’, Arkhara rayon, vicinity of Arkhara, quarry. 25.05.1994. 49°26’ N 130°06’ E ~190 m.
- Adnagulov et al., 2000. Khabarovsk kray, Bikin rayon, vicinity of Pokrovka, middle Uglevaya River, broad-leaved forest, apiary. 6.07.1994. 46°42’ N 134°01’ E ~55 m.
- Adnagulov et al., 2000. Khabarovsk kray, Nanaiskii rayon, lower Anui River, foot of Obryvistaya hill, cedar pine and broad-leaved forest 17.06.1996. 49°21’ N 137°25’ E ~150 m.
- Adnagulov et al., 2000. Evreiskaya Autonomous oblast’, Obluch’ye rayon, vicinity of Radde, Lagar River, left bank, forest road along the river valley. 24.07.1997. Kept in KhSNR, No. 610. 48°35’ N 130°37’ E ~110 m.
- Adnagulov et al., 2000. Evreiskaya Autonomous oblast’, Leninskoe rayon, vicinity of Voskresenovka, Gomel’ Mt., edge of light oak and birch forest, wet meadow on a gentle southeastern slope. 13.06.1998. 48°02’ N 132°53’ E ~50 m.

38. Adnagulov et al., 2006. Evreiskaya Autonomous oblast', Obluch'ye rayon, vicinity of Teplyye Klyuchi, mixed coniferous broad-leaved forest, bridge across Bidzhan River. 13 – 16.08.1998. 48°39' N 131°36' E ~150 m.

39. Adnagulov et al., 2006. Evreiskaya Autonomous oblast', Leninskoe rayon, vicinity of Bidzhan, Zmeinyy Utes. 24 – 25.08.1998. 47°58' N 131°58' E ~60 m.

40. Adnagulov et al., 2006. Evreiskaya Autonomous oblast', Obluch'ye rayon, lower Pompeyevka River, broadleaved forest with coniferous trees, 1 ad female. 18.07.1999. 48°20' N 130°48' E ~80 m.

41. Adnagulov et al., 2006. Khabarovsk kray, Komsomol'sk rayon, Komsomol'skiy State Nature Reserve, Gorin River valley, Bichi point (mouth of Gorin R.). 22.07.2000. 50°45' N 137°38' E ~15 m.

42. Adnagulov et al., 2006. Khabarovsk kray, Komsomol'sk rayon, Gur River basin, Yuli River valley, secondary fir-deciduous forest, edge of waste timber carrying road. 16.05.2002. 50°02' N 137°44' E ~90 m.

43. Adnagulov et al., 2006. Khabarovsk kray, Nanaiskii rayon, Lake Gassi basin, lower Kartanga River (Khar River tributary), mixed coniferous-deciduous forest, bank of a water-filled gravel quarry. 24.06.2003. 49°05' N 136°47' E ~50 m.

44. Adnagulov et al., 2006. Evreiskaya Autonomous oblast', Obluch'ye rayon, Bastak State Nature Reserve, Bira River basin, upper Ikura River area, edge of mixed coniferous-broad-leaved forest, sheds. 17.06.2004. 48°49' N 132°57' E ~5 m.

45. Adnagulov et al., 2006. Evreiskaya Autonomous oblast', Leninskoe rayon, Bidzhan River valley, ~6 km to North of Bidzhan village. 21.06.2004. 48°02' N 131°57' E ~65 m.

46. Primorskiy kray, Yakovlevka rayon, vicinity of Ozernoye, left bank of lower Arsen'yevka. 20.08.2004. 44°46' N 133°34' E ~100 m.

47. Gloyd and Conant 1990. Primorskiy kray, Kedrovka River (this locality is at latitude 45°57' N, longitude 133°45' E) [45°57' N 134°45' E], a tributary of the Ussuri River near Iman (USNM 81918). 45°56' N 134°45' E ~130 m.

48. ZISP 28004 – 28008. Ingoda River, Karymskoe rayon, Chita oblast'. Coll.: P. Yashan [51°37' N 114°20' E].

In brackets there are the author notes, specifying the localities of collection and modern names of administrative objects, given on the original labels.