

To the fauna of mosquitoes and horseflies (Diptera: Culicidae, Tabanidae) of natural and climatic zones of the Tyumen region

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Abstract. The article summarizes and analyzes the materials of literary sources and the results of our own research on the inventory of species diversity of mosquitoes and horseflies in the Tyumen region. The fauna of horseflies in the Yamalo-Nenets autonomous okrug is represented by 27 species and 6 subspecies, mosquitoes - 29 species, in the southern part of the region - 33 species, 4 subspecies of horseflies and 41 species of mosquitoes.

1 Introduction

The Tyumen region is one of the largest constituent entities of the Russian Federation, it includes 2 autonomous okrugs (Yamalo-Nenets (YNAO) and Khanty-Mansiysk (KMAO)) and, in fact, the Tyumen region itself. In this work, we call the territory of the region without autonomous okrugs the southern part of the Tyumen region. The YNAO occupies the northwestern part of the West Siberian lowland between the Baydaratskaya and Obskaya bays of the Kara Sea.



Fig. 1. Abundance of breeding biotopes of Diptera hematophagous in the tundra of YNAO.

The natural conditions of the district combine the main factors that provide conditions for high species diversity and abundance of Diptera hematophagous: the abundance of habitats

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of all development phases (Figure 1), as well as the presence of a sufficient population of homoiothermic animals – hosts.

The territory of the southern part of the Tyumen region is characterized by an extensive river network, the presence of a large number of various lakes, swamps and swamps (Figure 2). The abundance of reservoirs of various types creates favorable conditions for the mass breeding of amphibious insects, which include the majority of Diptera hematophagous. The south of the region is an agricultural zone with well-developed cattle breeding, which provides female horseflies and blood-sucking mosquitoes with a large number of sources of blood saturation.



Fig. 2. A permanent reservoir in which blood-sucking Diptera develop.

2 Material and research methods

Field work was carried out on the territory of different districts of the YNAO in 2018 (Tazovsky, Yamalsky and Priuralsky districts), in the period from 2004 to 2021 - in the southern part of the region (Niznetavdinsky, Yarkovsky, Tobolsk, Tyumensky, Yalutorovsky, Aromashevsky, Golyshmanovsky, Isetsy, Abatsky, Kazansky, Ishimsky, Sladkovsky districts).

Collections of adult mosquitoes were carried out according to the methods generally accepted in domestic dipterology, and horseflies were also collected with the help of trap shaped like a whirligig [1]. Determination of the species of caught insects was carried out according to special key tables using microscope MSP-1.

3 Results and discussion

On the territory of YNAO, the fauna of the Tabanidae family were studied by N.G. Olsufiev [2], V.A. Shchepetkin [3], N.G. Olsufiev and V.A. Polyakov [4] and other researchers. According to these researchers, horseflies of 26 species have been registered in the region: *Chrysops nigripes* Zetterstedt, 1840, *C. relictus* Meigen, 1820, *C. divaricatus* Loew, 1858, *C. sepulcralis* (Fabricius, 1764), *C. caecutiens* (Linnaeus, 1758), *Hybomitra sexfasciata* (Hine, 1923), *H. muehlfeldi* (Brauer, 1880), *H. m. montana* Meigen, 1820, *H. nigricornis* Zetterstedt, 1842, *H. lurida* (Fallén, 1817), *H. astuta* (Osten-Sacken, 1876), *H. lapponica* (Wahlenberg, 1848), *H. tarandina* (Linnaeus, 1761), *H. ciureai* (Seguy, 1937), *H. arpadi* (Szilady, 1923), *H. l. hundbecki* Lyneborg, 1959, *H. bimaculata* (Macquart, 1826), *H. astuta* (Osten-Sacken, 1876), *H. n. confiformis* Chvala et Moucha, 1971, *H. aequetincta* (Becker, 1900), *Tabanus a. autumnalis* Linnaeus, 1761, *T. maculicornis* Zetterstedt, 1842, *Atylotus*

sublunaticornis (Zetterstedt, 1842), *A. fulvus* Meigen, 1820, *Haematopota p. pluvialis* Linnaeus, 1758 and *H. subcylindrica* Pandelle, 1883.

In 2018, in the Tazovsky district, we registered 1 species and 1 subspecies of horseflies for the first time not only for the okrug, but also for Western Siberia as a whole:

- *Hybomitra n. nitidifrons* Szilady, 1914;
- *Hybomitra astur* Erichson, 1851.

At present, the Tabanidae family in the district has 27 species.

The study of mosquitoes of the Culicidae family of the YNAO was carried out by E.F. Kiseleva [5], V.A. Shchepetkin [3], L.P. Kukharchuk [6], N.V. Nikolaeva [7]. According to literature data, 27 species of hematophagous mosquitoes are found in the region: *Anopheles beklemishevi* Stegnii et Kabanova, 1976, complex *A. maculipennis* Meigen, 1818, *Culiseta morsitans* (Theobald, 1901), *C. alaskaensis* (Ludlow, 1906), *C. bergrothi* (Edwards, 1921), *Aedes dorsalis* (Meigen, 1830), *A. punctor* (Kirby, 1837), *A. euedes* Howard, Dyar et Knab, 1913, *A. cyprius* (Ludlow, 1920), *A. flavescens* (Müller, 1764), *A. nigripes* (Zetterstedt, 1838), *A. communis* (De Geer, 1776), *A. hexodontus* (Dyar, 1916), *A. pullatus* (Coquillett, 1904), *A. churchillensis* Ellis et Brust, 1973, *A. intrudens* (Dyar, 1919), *A. impiger* (Walker, 1848), *A. punctodes* (Dyar, 1922), *A. implicatus* (Vockeroth, 1954), *A. diantaeus* (Howard, Dyar et Knab, 1913), *A. cinereus* Meigen, 1818, *A. riparius* (Dyar et Knab, 1907), *A. cataphylla* (Dyar, 1916), *A. cantans* (Meigen, 1818), *A. excrucians* (Walker, 1856), *Culex pipiens* Linnaeus, 1758, *Coquillettidia richiardii* (Ficalbi, 1889).

The studies we conducted in 2018 made it possible to replenish the fauna of parasitic mosquitoes in the district with 2 species:

- *Aedes behningi* (Martini, 1926). Registered in the Priuralsky district;
- *Aedes nigrinus* (Eckstein, 1918). Registered in the Tazovsky and Yamalsky districts.

Thus, the Culicidae family in the okrug is currently represented by 29 species.

In the southern part of the Tyumen region, according to the study of horseflies, K.P. Samko [8], N.G. Olsufiev [2], V.I. Bukshtynov [9], R.P. Pavlova [10]. According to literary sources, the fauna of the Tabanidae family of this territory includes 32 species: *Chrysops rufipes* Meigen, 1820, *C. divaricatus*, *C. sepulcralis* (Fabricius, 1764), *C. nigripes*, *C. caecutiens*, *C. relictus*, *Tabanus bromius* (Linnaeus, 1758), *T. glaucopsis* Meigen, 1820, *T. miki* Brauer, 1880, *T. maculicornis*, *T. bovinus* (Linnaeus, 1758), *T. autumnalis* Linnaeus, 1761, *Atylotus pallitarsis* (Olsoufjev, 1936), *A. fulvus*, *A. rusticus* (Linnaeus, 1767), *Hybomitra kaurii* Chvala et Lyneborg, 1970, *H. arpadi*, *H. lurida*, *H. tarandina*, *H. lapponica* (Wahlenberg, 1848), *H. n. confiformis*, *H. bimaculata*, *H. distinguenda* Verrall, 1909, *H. ciureai*, *H. nigricornis*, *H. muehlfeldi*, *H. montana* Meigen, 1820, *H. m. morgani* (Surcouf, 1912), *H. expollicata* (Pandell, 1883), *H. lundbecki* Lyneborg, 1959, *Heptatoma pellucens* Fabricius, 1776, *Haematopota turkestanica* Kröber, 1922, *H. pluvialis* Linné, 1758, *H. crassicornis* (Wahlberg, 1848) and *H. subcylindrica*.

As a result of our own research in 2004, one species, *Chrysops pictus* (Meigen, 1820), was found in the region, which was not previously indicated by other researchers. In 2021, the faunistic list of the Tabanidae family in the southern part of the region was replenished with 2 subspecies previously unknown for the region:

- *Chrysops c. caecutiens* Linnaeus, 1758. Registered in the Nizhnetavdinsky districts;
- *Hybomitra l. lundbecki* Lyneborg, 1959. Registered in the Tobolsk districts.

Currently, 33 Currently, 33 species of horseflies are known for the southern part of Tyumen region.

Literature data on the mosquitoes hematophagous in the southern part of the region are quite limited. The main contribution to the study of mosquitoes in the region was made by V.I. Bukshtynov [9], L.P. Kukharchuk [6], V.V. Popov and V.I. Taranov [11], according to the results of faunistic studies of these authors, 33 species were registered in the southern

part of the region: *Anopheles beklemishevi* Stegnii et Kabanova, 1976, *A. messae* Falleroni, 1926, *Culiseta bergrothi*, *C. alaskaensis*, *C. morsitans*, *Aedes vexans* (Meigen, 1830), *A. leucomelas* (Meigen, 1804), *A. caspius* (Pallas, 1771), *A. pionips* (Dyar, 1919), *A. sticticus* (Meigen, 1838), *A. cinereus*, *A. dorsalis*, *A. riparius*, *A. euedes*, *A. communis*, *A. cantans*, *A. impiger*, *A. cataphylla*, *A. cyprius*, *A. diantaeus*, *A. flavescens*, *A. excrucians*, *A. behningi*, *A. hexodontus*, *A. pullatus*, *A. punctor*, *A. nigrinus*, *A. intrudens*, *Culex modestus* Ficalbi, 1890, *C. territans* Walker, 1856, *C. vagans* Wiedemann, 1828, *C. pipiens*, *Coquillettidia richiardii*.

In the process of conducting our own research in 2004-2020, the faunistic list of blood-sucking mosquitoes in the south of the Tyumen region was expanded by 7 new species: *Aedes subdiversus* (Martini, 1926), *A. albescens* (Edwards, 1921), *A. rossicus* Dolbeskin, Gorickaja et Mitrofanova, 1930, *A. mercurator* (Dyar, 1920), *A. implicatus*, *Culiseta longiareolata* (Macquart, 1838) and *C. ochroptera* (Peus, 1935). In 2021, another species new to the region was added to the previously known list of species:

– *Aedes detritus* (Haliday, 1833). Registered in the Kazansky district.

Thus, to date, it has been established that in the south of region, the Culicidae family includes 41 species.

4 Conclusion

On the territory of the YNAO, according to the materials of literary sources, there are horseflies of 26 species and 5 subspecies, blood-sucking mosquitoes of 27 species. According to the results of summer studies conducted in 2018, the regional lists of horsefly fauna were supplemented by 1 species and 1 subspecies (*H. astur* and *H. n. nitidifrons*), mosquitoes - with 2 species (*A. behningi* and *A. nigrinus*). According to the literature data, in the south of the region there are 32 species and 2 subspecies of horseflies, and 33 species of mosquitoes. Our own studies on the inventory of the fauna of Diptera hematophagous, carried out in different parts of the region, made it possible to replenish the faunistic lists of horseflies with 1 species and 2 subspecies (*C. pictus*, *C. c. caecutiens*, *H. l. lundbecki*), mosquitoes - 8 species (*A. albescens*, *A. subdiversus*, *A. implicatus*, *A. rossicus*, *A. mercurator*, *A. detritus*, *C. longiareolata*, *C. ochroptera*). Generalization of the materials of our own research and literature data made it possible to establish that by now the fauna of horseflies in the YNAO is represented by 27 species and 6 subspecies, mosquitoes - 29 species, in the southern part of the region - 33 species, 4 subspecies of horseflies, and 41 species of blood-sucking mosquitoes.

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