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RESEARCH ARTICLE

Species composition and places of development of horseflies (Diptera, Tabanidae) in the middle taiga of Western Siberia

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For the first time, the place of brood in conditions of the middle taiga of Western Siberia have been identified for 6 horseflies species: *Chrysops relictus* Meigen, 1820, *Ch. nigripes* Zetterstedt, 1840*, Haematopota pluvialis* (Linnaeus, 1761), *Haematopota subcylindrica* Pandelle, 1883, *Tabanus bovinus* Linnaeus, 1758*, Hybomitra ciureai* (Seguy, 1937). The place of brood of the preimaginal developmental phases can be attributed to the following types: floodplain meadows, lowland marshes, and small reservoirs located near cattle grazing sites.
Key words: Diptera, Tabanidae, horseflies, middle taiga, Siberia**,** biotopes

Bites, caused by horseflies, cause great concern to both people and animals. With the massive attacks of horseflies, the productivity of farm animals decreases sharply (Violovich & Gomoyunova, 1965) and in some places, during the period of mass horseflies attack, the daily grazing of animals stops. They are of great epizootical significance, it has been experimentally proved that horseflies are involved in the mechanical transmission of pathogens of infectious, protozoal and helminth diseases (Olsufev N.G. 1977).

The majority of horsefly adults attack near their hatching sites, and their distance of flight depends on the terrain relief, vegetation character, wind direction and strength (Fiodorova et al., 2018). Therefore, for organizing the fight against them, a deeper and more detailed study of this family is required. The aim of our research was to study the main hatching sites of horseflies in the middle taiga of Western Siberia.

Materials and methods

The research to identify the horsefly larvae habitats was conducted in 2008 – 2009 from May 25 to June 15. In studying the horsefly hatching sites, systematic observations were made on the mass species laying and on the larvae localization.

The collection was performed according to the standard methods (Olsufev, 1937). The larvae were caught in ponds using rectangular sieves 30x25x6 cm with wooden frame and bottom, covered with large, medium and fine mesh. As the older larvae and pupae of many horsefly species inhabit the soil, standard soil samples were taken from the area of 1 m^2, or from the smaller ones – 0,25-0,5 m^2 with further conversion to 1 m^2. Thus, 248 horsefly larvae were collected. The determination of larvae species was carried out according to determinants of A.E. Terteryan (1979) and R.V. Andreeva (1990).

Results and Discussion

In 2009, from May 25 to June 15, we took 480 samples from total area of 60 m^2 and found 248 larvae of 6 horsefly species (*Chrysops relictus* Meigen, 1820, *Ch. nigripes* Zetterstedt, 1840*, Haematopota pluvialis* (Linnaeus, 1761), *Haematopota subcylindrica* Pandelle, 1883, *Tabanus bovinus* Linnaeus, 1758*, Hybomitra ciureai* (Seguy, 1937)).

The following biotopes have been studied:

1. Floodplain meadow located on the outskirts of the village Saigatina, 40 km from the city of Surgut. This biotope is constantly used as cattle grazing. In spring, it is flooded by the river waters. In total, 150 samples were taken, and 134 horsefly larvae were found, the average larval density was 7,15 spec/m^2 (Fig.1a)

2. Lowland swamp, located in 1 km from the village Saygatina of the Surgut region. In total, 150 samples were taken, and 91 horsefly larvae were found. The average larval density was 4,85 spec/m^2 (Fig.1b).
3. Channel of the river Ob in the env. of the village Saygatina. This biotope is regularly flooded by the river waters. The average larval density was 1,23 spec/m^2 (Fig.1c).
4. Mount bog located in 32 km from the city of Surgut. No larvae were found.
5. The river ob. The samples were taken using a sieve along the river banks in the env. of village Barsovo, Surgut region. There were no larvae in the samples.

Figure 1. The biotopes: a. Lowland swamp near the village Saygatina; b. Floodplain meadow on the outskirts of the village Saigatina; c. Channel of the river Ob in the env. of the village Saygatina.
Photo of V.V. Duhin

The results of collecting larvae are presented in Table 1.

Table 1. The duration of bumblebees flight periods in the Middle Ob lowland (2008–2010)

No. of biotope	Number of samples (0,25x0,5 m^2)	Larvae collected	Average density per 1 sample	Average density per 1 m^2
1	150	134	0,89	**7,15**
2	150	91	0,61	4,85
3	150	23	0,15	**1,23**
4	15	0	-	-
5	15	0	-	-
Total	480	248	0,55	4,41

As a result of the research conducted to identify the horsefly preimaginal development sites, we found that in the conditions of the middle taiga, the floodplain meadows, lowland swamps and small reservoirs located near cattle grazing sites are the main larvae habitats. In the bogs and large rivers, no horsefly larvae were found. The average density of larvae varied from 1,23 to 7,15 per 1 m^2.
The species composition of horsefly larvae collected in various biotopes is given in Table 2.
As can be seen from Table 2 and Figure 2 larvae of six horsefly species were found in the studied biotopes, wherein the larvae of *C. relictus, H. pluvialis, H. subcylindrica, T. bovinus* and *H. ciureai* were found in all the biotopes, and only in one biotope, the river Ob channel, we met the larvae of *C. nigripes*.

Table 2. Species composition of horsefly larvae found in the studied hatching biotopes

No.	Horsefly larvae species	Biotope: Floodplain meadow		Lowland swamp		River Ob channel	
		Number of specimens	ID, %	Number of specimens	ID, %	Number of specimens	ID, %
1	*Chrysops relictus*	28	20,9	21	23,1	3	13
2	*C. nigripes*	-	-	-	-	4	17,4
3	*Haematopota pluvialis*	9	6,7	10	11	3	13
4	*H. subcylindrica*	7	5,2	9	9,9	2	8,7
5	*Tabanus bovinus*	11	8,2	4	4,4	2	8,7
6	*Hybomitra ciureai*	79	59	47	51,6	9	39,2
Total		134	100	91	100	23	100

Note: ID - individual dominance.

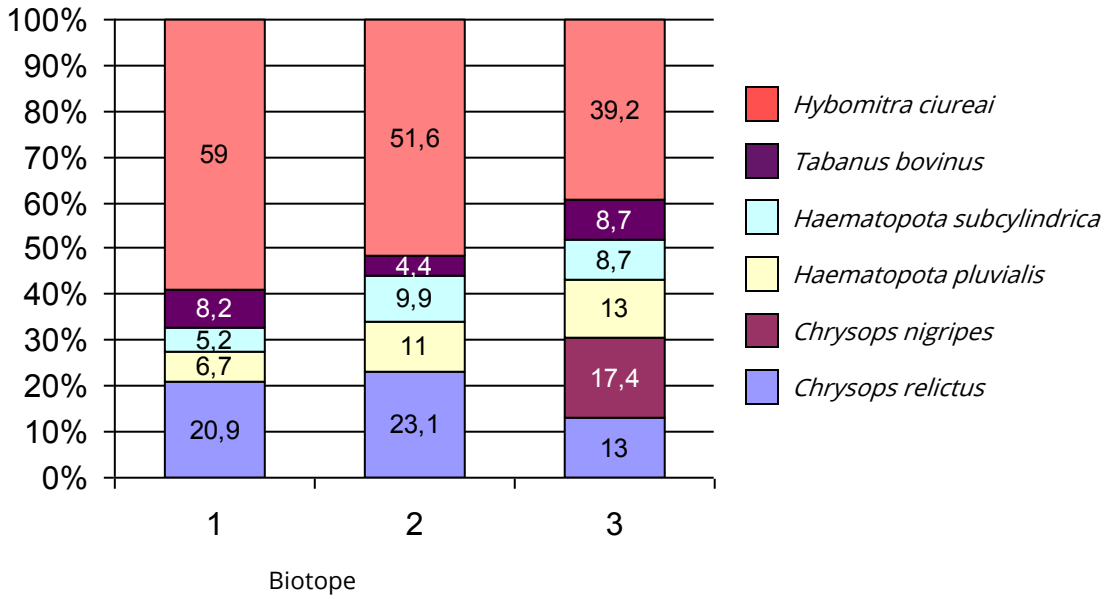

Figure 2. The ratio of horsefly larvae in the studied biotopes

The dominant species in all the studied biotopes was *H. ciureai*. The species *C. relictus* also had a high number, however, in the river Ob channel, his ID was only 13%. Larvae of the species *H. pluvialis*, *H. subcylindrica* and *T. bovinus* met in all the biotopes, however in a small number.

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