

SELECTED DIPTERA FROM BEER TRAPS IN THREE BIOTOPES AT KLYUCHARKY VILLAGE NEAR MUKACHEVO TOWN (WESTERN UKRAINE)

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ABSTRACT

Results of beer trapping of in three biotopes in Klyucharky village near Mukachevo town (Ukraine) are presented. More attention of some Diptera families (Limoniidae, Anisopodidae, Culicidae, Ulidiidae, Platystomatidae, Heleomyzidae, Drosophilidae) is paid. Three invasive species were recorded: Callopietromyia annulipes Macquart, 1855, Euxesta notata (Wiedemann, 1830) (both Ulidiidae), and Drosophila suzukii (Matsumura, 1931) (Drosophilidae). The most interesting species recorded is borealpine Suillia lineitergum (Heleomyzidae).

KEYWORDS

Diptera, Limoniidae, Anisopodidae, Culicidae, Ulidiidae, Platystomatidae, Heleomyzidae, Drosophilidae, beer traps, Ukraine, invasive species

INTRODUCTION

The bait trapping is a good method for capturing insects, which are attracted by the fermenting materials as a food source. The method is not expensive and using the trap is easy. Authors have large experience with this method (e.g. DVOŘÁK, 2014; DVOŘÁK & DVOŘÁKOVÁ, 2012, 2020; DVOŘÁK et al., 2017, 2019; DVOŘÁKOVÁ, 2008; MANKO et al., 2019).

The purpose of the study was to analyze the fauna of selected Diptera groups caught with the use of beer traps.

MATERIAL AND METHODS

Three biotopes in one small area (cca 2 km²) were studied by beer traps. A big transparent plastic bottle (1.5 liters, with a circular opening in the upper third of the bottle laterally) was filled with 0.3 liter of beer was hung 1–2 m above ground on a branch of a tree or a shrub (Fig. 1). Two traps were installed in each locality, one with a larger opening than the other. Traps were exposed in three periods: 9.-23.5.2020, 13.-28.7.2020, and 27.8.-11.9.2020. The material was collected by A. Kukanija, then sorted and sent to specialists. K. Dvořáková determined Heleomyzidae, L. Dvořák Anisopodidae, Platystomatidae, and Ulidiidae and J. Oboňa Culicidae, Drosophilidae, and Limoniidae. Some of the specimens studied are deposited in the collections of these authors (see Tab. 3).

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Figure 1. Beer trap at locality abandoned field (photo: A. Kukaniia).

Localities under study

Area: Ukraine. Klyucharky village. SW closely by Mukachevo town. 115 m a.s.l.

1. Garden – 48.415236, 22.642765, garden by family house, bordered with another gardens and with field (Fig. 2).
2. Abandoned field – 48.406433, 22.651504. Ruderal vegetation with grass and shrubs between village and forest (Fig. 3).
3. Forest – 48.406547, 22.661034. Small deciduous forest (ca. 2×6 km) between abandoned field and periphery of Mukachevo town (Fig. 4).



Figure 2. Locality garden (photo: A. Kukaniia).



Figure 3. Locality abandoned field
(photo: A. Kukaniia).



Figure 4. Locality forest
(photo: A. Kukaniia).

RESULTS AND DISCUSSION

Overall, it was captured throughout the research 3 208 insect samples (more detail see in Tab. 1).

Table 1. The overview of captured insect individuals in present study.

	forest	garden	abandoned field
9.5. - 23.5.	306	524	87
13.7. - 28.7.	345	1 003	577
27.8. - 11.9.	81	131	154
total amount	732	1 658	818

In the samples at all localities, Diptera dominated (total number 2 593 individuals, see Tab. 2) which represents approximately 81 % of all captured samples. The following groups followed Lepidoptera, Hymenoptera, Coleoptera, Mecoptera, Heteroptera, and Neuroptera. The most insect specimens were caught in the garden; in the first and second collection periods the most specimens were caught in the garden, in third period in abandoned field.

Table 2. The systematic overview of captured insect individuals in present study.

	forest	garden	abandoned field
Coleoptera	97	20	20
Diptera	477	1 560	556
Heteroptera	0	1	0
Hymenoptera	91	20	102
Lepidoptera	66	56	111
Mecoptera	1	0	29
Neuroptera	0	1	0

The closer attention was paid in present study only selected Diptera families (see Tab. 3 and text below). Sciaridae, Scatopsidae, Cecidomyiidae, Hybotidae, and more Brachycera groups were also recorded but undetermined. Coleoptera dominated in forest. Diptera, Heteroptera and Neuroptera in garden and Hymenoptera, Lepidoptera and Mecoptera in abandoned field.

Table 3. The detailed overview of closer determined Diptera taxa.

family	species	9. - 23.5.	9. - 23.5.	9. - 23.5.	13. - 28.7.	13. - 28.7.	13. - 28.7.	27.8. - 11.9.	27.8. - 11.9.	27.8. - 11.9.
		forest	garden	abandoned field	forest	garden	abandoned field	forest	garden	abandoned field
Limoniidae	<i>Metalimnobia (Metalimnobia) bifasciata</i> (Schrank, 1781)				6					
Limoniidae	<i>Metalimnobia (Metalimnobia) quadrimaculata</i> (Linnaeus, 1761)				3					
Anisopodidae	<i>Sylvicola cinctus</i> (Fabricius, 1787)		1		3	2	1			
Anisopodidae	<i>Sylvicola punctatus</i> (Fabricius, 1787)					2	2			
Culicidae	<i>Aedes (Aedimorphus) vexans</i> (Meigen, 1830)					6				
Culicidae	<i>Culex (Culex) pipiens pipiens</i> Linnaeus, 1758					3				
Ulidiidae	<i>Calloptromyia annulipes</i> Macquart, 1855		2			1				
Ulidiidae	<i>Euxesta notata</i> (Wiedemann, 1830)		1			1				
Ulidiidae	<i>Otites ruficeps</i> (Fabricius, 1805)			15						
Ulidiidae	<i>Physiphora alcea</i> (Preyßler, 1791)					2				
Platystomatidae	<i>Platystoma seminatione</i> (Fabricius, 1775)		6	2		1	2			
Heleomyzidae	<i>Suillia affinis</i> (Meigen, 1830)				1					
Heleomyzidae	<i>Suillia gigantea</i> (Meigen, 1830)				3					
Heleomyzidae	<i>Suillia lineitergum</i> (Pandelle, 1901)				1					
Heleomyzidae	<i>Suillia variegata</i> (Loew, 1862)				1					
Drosophilidae	<i>Drosophila suzukii</i> (Matsumura, 1931)							1	1	8

Limoniidae

A total of 243 species of the family Limoniidae were previously known to occur in Ukraine (OOSTERBROEK, 2020). We are captured two relatively common species in present research. All specimens were caught in forest.

***Metalimnobia (Metalimnobia) bifasciata* (Schrank, 1781)**

This is a Palaearctic and Oriental species, common in Europe and Asia, known from Ukraine (OOSTERBROEK, 2020).

***Metalimnobia (Metalimnobia) quadrimaculata* (Linnaeus, 1761)**

This is a Holarctic species, common in Europe, Asia and the USA, known from Ukraine (OOSTERBROEK, 2020).

Anisopodidae

Altogether three species of Anisopodidae are to be known from Ukraine (DVOŘÁK et al., 2019b; DE JONG, 2013). We are captured two of them in present research.

***Sylvicola cinctus* (Fabricius, 1787)**

Common species with large European distribution.

***Sylvicola punctatus* (Fabricius, 1787)**

Common species, widely distributed across Europe.

Culicidae

The mosquitoes (family Culicidae) are at the centre of worldwide entomological research because of their importance as vectors of a wide range of debilitating viral and parasitic diseases affecting both humans and animals (BECKER et al., 2010). In present study, only males were captured and only in garden. Males feed on plant juices as a source of carbohydrates. The presence of mosquitoes in beer traps is therefore interesting. We do not assume that they would be attracted to bait, they probably used a trap as a place of shelter.

***Aedes (Aedimorphus) vexans* (Meigen, 1830)**

Species distributed almost worldwide and can be found in nearly every country in Europe (BECKER et al., 2010).

***Culex (Culex) pipiens pipiens* Linnaeus, 1758**

Widespread species in the Holarctic region and found throughout Europe (BECKER et al., 2010).

Ulidiidae

Altogether 37 species of this family are known from Ukraine according to present knowledge (KAMENEVA et al., 2020), from which four species were captured in present research.

***Callopiromyia annulipes* Macquart, 1855**

Invasive North American species published from Ukraine by DVOŘÁK et al. (2019a). This is the second record from Ukraine. All specimens were caught in garden.

***Euxesta notata* (Wiedemann, 1830)**

Invasive North American species published from Ukraine by DVOŘÁK et al. (2019a). This is the second record from Ukraine. All specimens were caught in garden.

***Otitus ruficeps* (Fabricius, 1805)**

Common species in Europe, known from many parts of Ukraine (KAMENEVA et

al., 2020). All specimens were caught in abandoned field.

***Physiphora alceae* (Preyssl, 1781)**

Common species in Europe, known from Ukraine (KAMENEVA et al., 2020). All specimens were caught in garden.

Platystomatidae

According to present knowledge, five species of Platystomatidae are known from Ukraine (KAMENEVA et al., 2020). We have the single species in present research.

***Platystoma seminatione* (Fabricius, 1775)**

Common species in the Europe, known from Ukraine (KAMENEVA et al., 2020). All specimens were caught in garden and abandoned field.

Heleomyzidae

Only 41 species of Heleomyzidae are known from Ukraine (WOŹNICA, 2013). Four species were captured in present research, all of them in the forest. It is not surprising, because family Heleomyzidae includes predominantly forest species.

***Suillia affinis* (Meigen, 1830)**

Common West Palaearctic species, one of the most frequent species of Heleomyzidae captured by bait traps (e.g., DVOŘÁKOVÁ, 2008).

***Suillia gigantea* (Meigen, 1830)**

A generally rare submediterranean species.

***Suillia lineitergum* (Pandelle, 1901)**

According to WOŹNICA & KLASA (2009) it is a boreomontane species, known from single localities only. A single specimen was captured in our research, but in material from beer traps from Mordovia State nature reserve (Russia) are tens specimens from 13 localities (K. Dvořáková, unpubl. data), so probably this species is more frequent in suitable conditions than previously recognized.

***Suillia variegata* (Loew, 1862)**

A generally rare species. MARTINEK (2001) stated, that *S. variegata* is a thermophilous species, which expands towards north because of warming climate, but according to WOŹNICA (2015) is possible, that distribution of this species is Subatlantic.

Drosophilidae

About 51 valid species have been recorded in Ukraine (BÄCHLI, 2020). In present study 716 drosophilid individuals was captured in traps, what represents 22.3 % of all captured insects individuals in present study (or 27.6% of all dipteran samples). The closer attention was paid only for *D. suzukii*.

***Drosophila suzukii* (Matsumura, 1931)**

Ukraine is on the invasion front of spotted-wing *D. suzukii* spreading in Europe. It is globally important pest. Individuals of the species were recorded only at last trapping period (27.8. - 11.9), which corresponds with MARIYCHUK et al. (2020). The individuals were present at each of the collecting sites, most of them were caught in abandoned field.

CONCLUSIONS

In the present study, 16 selected Diptera species from 7 families were studied in detail: Limoniidae (2 spp.), Anisopodidae (2 spp.), Culicidae (2 spp.), Ulidiidae (4 spp.), Platystomatidae (1 sp.), Heleomyzidae (4 spp.), and Drosophilidae (1 sp.). *Callopistromyia annulipes* and *Euxesta notata* (Ulidiidae) were recorded second time from Ukraine. Three invasive species were recorded: *Callopistromyia annulipes* and *Euxesta notata* (Ulidiidae) and *Drosophila suzukii* (Drosophilidae), so that beer traps are usable for monitoring invasive species. In general, it seems that Klyucharky hosts Pannonian entomofauna (e.g., *Suillia gigantea*) with influence of the Carpathians (e.g., *Suillia lineitergum*).

The forest was preferred by families Limoniidae and Heleomyzidae. Only in the garden were caught Culicidae, and some species from family Ulidiidae (*E. notata*, *C. annulipes*). The species *O. ruficeps* was found only in abandoned field. The abandoned field and garden was preferred by family Platystomatidae. At each of the three examined sites were caught specimens from families Anisopodidae and Drosophilidae.

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