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GASTEROPHILIDAE, HYPODERMATIDAE, OESTRIDAE,  
HIPPOBOSCIDAE, AND NYCTERIBIIDAE (DIPTERA)  
OF WARSAW AND MAZOVIA

## ABSTRACT

In the Mazovian Lowland there have been recorded four species of *Gasterophilidae*, one species of *Hypodermatidae*, four species of *Oestridae*, six species of *Hippoboscidae*, and three species of *Nycteribiidae*. They account respectively for 100%, 25%, 66.7%, 60%, and 33% of the number of species occurring in Poland. In Warsaw there are two species of *Gasterophilidae*, one species of *Hypodermatidae*, four species of *Hippoboscidae*, and two species of *Nycteribiidae*. No flies of the family *Oestridae* have been recorded in Warsaw. In Mazovia and in the suburbs of Warsaw, cosmopolitan species predominate. Endoparasites of mammals are absent in Warsaw. In the centre of the town, one species has been recorded, the adults of which are ectoparasites of birds.

## INTRODUCTION

Data on the occurrence of the flies under study in the Mazovian Lowland are presented in several contributions. In the Mazovian Lowland nine species are known, the larvae of which are endoparasites of mammals, and nine species of the families *Hippoboscidae* and *Nycteribiidae*, the adults of which are exoparasites of mammals and birds. Seven species are listed by Sznabl [10], two by Skuratowicz [9], one by Dudziński [5], one by Krzemiński [6] and the other species by Draber-Mońko [2—4]. In this study, one species so far known only from Warsaw has been recorded from Mazovia.

From Warsaw, nine species are known, including two species of *Gasterophilidae*, one of *Hypodermatidae*, four of *Hippoboscidae*, and two species of *Nycteribiidae*. Of the five species recorded by Sznabl [10], two have not been recorded in recent study.

The objective of the paper is to present the species composition of *Gasterophilidae*, *Hypodermatidae*, *Oestridae*, *Hippoboscidae*, and *Nycteribiidae* of the Mazovian Lowland and Warsaw, and also to carry out a zoogeographical and ecological analysis of these flies.

The present paper is mostly based on materials collected in Mazovia and Warsaw from different hosts, mainly mammals and birds. Also non-

identified materials from the collection of the Institute of Zoology, PAS, are used. These flies did not fall into Moericke's traps.

The study area, methods, and underlying premisses of the work are described in detail elsewhere [1, 7, 8, 11].

#### SPECIES COMPOSITION

In the Mazovian Lowland there have been recorded four species of the family *Gasterophilidae*, one of *Hypodermatidae*, four of *Oestridae*, and six species of *Nycteribiidae*, which account for 100%, 25%, 66.7%, 60%, and 33.3% respectively of the fauna of these flies known from Poland.

In Warsaw there have been recorded two species of *Gasterophilidae*, one of *Hypodermatidae*, four of *Hippoboscidae*, and two species of *Nycteribiidae*, which respectively account for 50%, 100%, 66.7%, and 66.7% of these flies known from the Mazovian Lowland. In the suburbs of Warsaw, four species were caught, and in the centre of the town only one species (Table 2).

#### ZOOGEOGRAPHICAL ANALYSIS

The Mazovian Lowland is mostly inhabited by cosmopolitan species and a smaller number of Euro-Siberian and European species, the other geographical elements being represented by one species each (Table 1).

In the suburbs of Warsaw, the number of cosmopolitan species is smaller but their proportion is maintained at the same level. Also one Holarctic and one European species were caught there. In the centre of the town, only single specimens of an European species were caught.

#### ECOLOGICAL ANALYSIS

Most adults of these flies are associated with wooded habitats. They also predominate in the suburbs of Warsaw.

Adult flies of the families *Gasterophilidae*, *Hypodermatidae*, and *Oestridae* are aphagous, while those of the families *Hippoboscidae* and *Nycteribiidae* are ectoparasites on mammals and birds (hemophages).

Larval *Gasterophilidae*, *Hypodermatidae*, and *Oestridae* are endoparasites of mammals, while the larvae of the other families develop almost completely in female's body; they are born as pupae.

In the Mazovian Lowland, there occur equal numbers of the two trophic groups: nine endoparasites of mammals and nine ectoparasites of mammals and birds. In the suburbs of Warsaw the endoparasites of mammals predominate. They are represented there by three species (75%). In the centre

Table 1. Proportions of zoogeographical elements in *Gasterophilidae*, *Hypodermatidae*, *Oestridae*, *Hippoboscidae* and *Nycteribiidae* of Warsaw and non-urban habitats of Mazovia (N — number of species)

| Zoogeographical element | Mazovia |      | Warsaw  |      |                   |       |                 |   |             |   |   |       |
|-------------------------|---------|------|---------|------|-------------------|-------|-----------------|---|-------------|---|---|-------|
|                         |         |      | Suburbs |      | Urban green areas |       |                 |   |             |   |   |       |
|                         | Total   |      |         |      | Parks             |       | Housing estates |   | Town centre |   |   |       |
|                         | N       | %    | N       | %    | N                 | %     | N               | % | N           | % | N | %     |
| Cosmopolitan            | 9       | 50.0 | 2       | 50.0 | —                 | —     | —               | — | —           | — | — | —     |
| Holarctic               | 1       | 5.6  | 1       | 25.0 | —                 | —     | —               | — | —           | — | — | —     |
| Palaearctic             | 1       | 5.6  | —       | —    | —                 | —     | —               | — | —           | — | — | —     |
| Euro-Siberian           | 3       | 16.7 | —       | —    | —                 | —     | —               | — | —           | — | — | —     |
| European                | 3       | 16.7 | 1       | 25.0 | 1                 | 100.0 | —               | — | —           | — | 1 | 100.0 |
| Submediterranean        | 1       | 5.6  | —       | —    | —                 | —     | —               | — | —           | — | — | —     |

Table 2. Check-list of *Gasterophilidae*, *Hypodermatidae*, *Oestridae*, *Hippoboscidae* and *Nycteribiidae* (Diptera) species occurring in Warsaw and Mazovia

| No.                    | Species                                     | Mazovia | Warsaw         |       |                                |             |                      |
|------------------------|---|---------|----------------|-------|--------------------------------|-------------|----------------------|
|                        |   |         | Suburban areas | Parks | Green areas in housing estates | Town centre | Other sampling areas |
| 1                      | 2   | 3       | 4              | 5     | 6                              | 7           | 8                    |
| <i>Gasterophilidae</i> |   |         |                |       |                                |             |                      |
| 1                      | <i>Gasterophilus haemorrhoidalis</i> (L.)   | ●       | —              | —     | —                              | —           | —                    |
| 2                      | <i>Gasterophilus intestinalis</i> (De Geer) | ●       | ●              | —     | —                              | —           | ●                    |
| 3                      | <i>Gasterophilus nasalis</i> (L.)           | ●       | ●              | —     | —                              | —           | —                    |
| 4                      | <i>Gasterophilus pecorum</i> (Fabr.)        | ●       | —              | —     | —                              | —           | —                    |
| <i>Hypodermatidae</i>  |   |         |                |       |                                |             |                      |
| 5                      | <i>Hypoderma bovis</i> (L.)                 | ●       | ●              | —     | —                              | —           | ●                    |
| <i>Oestridae</i>       |   |         |                |       |                                |             |                      |
| 6                      | <i>Cephenomyia stimulator</i> (Cl.)         | ●       | —              | —     | —                              | —           | —                    |
| 7                      | <i>Pharyngomyia picta</i> (Meig.)           | ●       | —              | —     | —                              | —           | —                    |
| 8                      | <i>Oestrus ovīs</i> L.                      | ●       | —              | —     | —                              | —           | —                    |
| 9                      | <i>Rhinoestrus purpureus</i> (Br.)          | ○       | —              | —     | —                              | —           | —                    |
| <i>Hippoboscidae</i>   |   |         |                |       |                                |             |                      |
| 10                     | <i>Ornithomyia avicularia</i> (L.)          | +       | —              | —     | —                              | —           | ○                    |
| 11                     | <i>Hippobosca equina</i> L.                 | ●       | —              | —     | —                              | —           | ○                    |
| 12                     | <i>Crataerina pallida</i> (Latr.)           | —       | ●              | —     | —                              | +           | ●                    |
| 13                     | <i>Stenopteryx hirundinis</i> (L.)          | —       | —              | —     | —                              | —           | ○                    |
| 14                     | <i>Lipoptena cervi</i> (L.)                 | ●       | —              | —     | —                              | —           | —                    |
| 15                     | <i>Melophagus ovinus</i> (L.)               | ○       | —              | —     | —                              | —           | —                    |
| <i>Nycteribiidae</i>   |   |         |                |       |                                |             |                      |
| 16                     | <i>Penicilidia monoceros</i> Speiser        | ●       | —              | —     | —                              | —           | —                    |
| 17                     | <i>Nycteribidia kolenati</i> Theodor        | ●       | —              | —     | —                              | —           | ○                    |
| 18                     | <i>Nycteribidia schmidlii</i> Schiner       | —       | —              | —     | —                              | —           | ○                    |

of the town only one species of the ectoparasites of birds was caught. Endoparasites are absent in the town since they have no hosts there.

Adult flies of the families *Gasterophilidae*, *Hypodermatidae*, and *Oestridae* are rather little abundant, while their larvae usually occur in masses. Larvae of the flies of the family *Gasterophilidae* and of some *Hypodermatidae* and *Oestridae* have been collected in masses from animals raised in the Mazovian Lowland, but adults have not been recorded there.

The Mazovian Lowland is abundantly inhabited by some species of the family *Hippoboscidae*, such as *Melophagus ovinus*, *Lipoptena cervi*, and *Hippobosca equina*. In the suburbs of Warsaw these species are less abundant.

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GASTEROPHILIDAE, HYPODERMATIDAE, OESTRIDAE, HIPPOBOSCIDAE  
I NYCTERIBIIDAE (DIPTERA) WARSZAWY I MAZOWSZA

## STRESZCZENIE

Na Nizinie Mazowieckiej występują cztery gatunki z rodziny *Gasterophilidae*, jeden gatunek *Hypodermatidae*, cztery gatunki *Oestridae*, oraz sześć gatunków *Hippoboscidae* i trzy gatunki *Nycteribiidae*, co stanowi odpowiednio 100%, 25%, 66,7%, 60% i 33,3% fauny tych muchówek znanych z Polski.

W Warszawie złowiono dwa gatunki *Gasterophilidae*, jeden gatunek *Hypodermatidae*, cztery gatunki *Hippoboscidae* i dwa gatunki *Nycteribiidae*, co stanowi odpowiednio 50%, 100%, 66,7% i 66,7% fauny tych muchówek znanych z Mazowsza. Muchówek z rodziny *Oestridae* w Warszawie nie złowiono. W suburbium Warszawy występują cztery gatunki, w tym dwa z rodziny

*Gasterophilidae*, jeden gatunek *Hypodermatidae* oraz jeden *Hippoboscidae*. W centrum złowiono tylko jeden gatunek z rodziny *Hippoboscidae*.

Na Nizinie Mazowieckiej i w suburbium Warszawy przeważają pod względem liczby gatunki kosmopolityczne. W suburbium występują elementy: kosmopolityczny, holarktyczny i europejski; w zieleni miejskiej Warszawy stwierdzono tylko jeden gatunek europejski.

Muchówki, których larwy są endopasożytami ssaków, nie wnikają do zieleni miejskiej, natomiast w centrum Warszawy występuje jeden gatunek, którego formy dorosłe są pasożytami zewnętrznymi ptaków.

Większość omawianych muchówek związana jest z terenami zadrzewionymi.

#### GASTEROPHILIDAE, HYPODERMATIDAE, OESTRIDAE, HIPPOBOSCIDAE, NYCTERIBIIDAE (DIPTERA) WARSZAWY I MAZOWII

##### РЕЗЮМЕ

В Мазовии найдены 4 вида *Gasterophilidae*, один вид *Hypodermatidae*, 4 вида *Oestridae*, 6 видов *Hippoboscidae* и 3 вида *Nycteribiidae*, что составляет соответственно 100%, 25%, 66,7%, 60% и 33% числа видов встречающихся в Польше. В Варшаве найдено 2 вида *Gasterophilidae*, один вид *Hypodermatidae*, 4 вида *Hippoboscidae* и 2 вида *Nycteribiidae*. Не найдено в Варшаве видов из семейства *Oestridae*. На Мазовии и в субурбиях Варшавы встречаются преимущественно космополитические виды. Эндопаразиты млекопитающих в городскую зелень не проникают. В центре столицы констатирован один вид, имаго которого являются эктопаразитами птиц.