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SCATOPHAGIDAE (DIPTERA) OF WARSAW AND MAZOVIA

ABSTRACT

Scatophagidae of the Mazovian Lowland (22 species) account for 29.3% of the total number of species occurring in Poland. In Warsaw 12 species have been recorded, including seven in the suburbs, and 11 in urban green areas, the latter being subdivided into parks (seven species), green areas of housing estates (one species), and the centre of the town (two species).

In the Mazovian Lowland most species represent the European element, in the suburbs Holarctic species predominate, and green areas of housing estates are inhabited by only one, cosmopolitan species. In Mazovia most species represent flies mining leaves, while in the suburbs and urban green areas of Warsaw flies living in dung are richest in species.

INTRODUCTION

Scatophagidae are poorly known in both Poland and the whole Palaearctic. They have not been extensively studied in Mazovia and Warsaw.

From the Mazovian Lowland, 12 species were recorded in earlier studies [4]. At present 22 species are known, including one new to the fauna of Poland.

From Warsaw two species were recorded in earlier studies [4], and now 12 species are known.

The purpose of this contribution is to analyse the species composition of *Scatophagidae* living in Mazovian Lowland and Warsaw, and to present their zoogeographical and ecological characteristics.

The present paper is mostly based on the materials collected in Warsaw in 1974—1978 and in the Mazovian Lowland in 1976—1978, by means of Moericke's traps suspended in tree crowns. Five- and nine-day samples were taken continuously over the growing season. Also the materials are used collected for more than 20 years, mostly by the author, by means of traditional methods such as sweeping, light traps, and catching by entomological net. Materials obtained from laboratory cultures (conducted by J. T. Nowakowski) of mining insects are also included, as well as unpublished materials from the collection of Sznabl, collected in Mazovia and Warsaw almost 100 years ago.

In the Mazovian Lowland, the material was collected by Moericke's traps in such localities as Hamernia (oak-hornbeam forest and carr), Radziejowice (a park), Wola Mrokowska, Młochów and Kampinos forest (mixed coniferous forest and pine forest).

In Warsaw, the material was collected by the same method in the following habitats. The suburbs: Ursynów (a park), allotments near Okęcie, Bielany (oak-hornbeam forest), Jelonki and Białołęka Dworska (oak-hornbeam forest, mixed coniferous forest and pine forest); urban parks: Łazienki, Saxon Garden, Praga, and Cemetery of Soviet Soldiers; green areas of housing estates: Wierzbno and Stawki; the centre of the town: Konstytucji Square and green of the courtyards at Koszykowa street and at the Institute of Zoology, Wilcza street.

The study area, methods and underlying premises of the work are characterized in detail elsewhere [1—3, 5].

SPECIES COMPOSITION

In the Mazovian Lowland 22 species of *Scatophagidae* have been recorded, which account for 29.3% of these flies known from Poland. In Warsaw 12 species have been caught, or 54.5% of the species known from the Mazovian Lowland. Six of the species of *Scatophagidae* listed by Sznabl almost 100 years ago have not been recorded later in this area (Table 3). In the Mazovian Lowland and in all types of urban green areas there is only one species occurring in common — *Scatophaga stercoraria* (Table 3).

In the suburbs of Warsaw, seven species have been recorded. In urban green areas, 11 species have been caught, including seven in urban parks, one in green areas of housing estates, and two species in the centre of the town.

ZOOGEOGRAPHICAL ANALYSIS

Scatophagidae belong to widely distributed flies, mostly in the zones of tundra and taiga. The largest number of species was found in the northern part and in the mountains in the south of the Palaearctic region.

In the Mazovian Lowland, the highest number of species belong to the European element. Boreal, Euro-Siberian, and Holarctic species are represented by a smaller number of species, and the lowest number of species belong to the cosmopolitan and boreo-mountain elements (Table 1).

Table 1. Proportions of zoogeographical elements in *Scatophagidae* 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	1	4.5	1	14.3	1	8.3	1	14.3	1	100.0	1	50.0
Holarctic	3	13.7	3	42.9	3	25.0	2	28.6	—	—	—	—
Euro-Siberian	4	18.2	—	—	—	—	—	—	—	—	—	—
Boreal	5	22.7	—	—	1	2	1	14.3	—	—	—	—
European	8	36.4	2	28.6	5	41.7	2	28.6	—	—	1	50.0
Boreo-mountain	1	4.5	1	14.3	1	16.7	1	14.3	—	—	—	—

Table 2. Proportions of trophic groups in *Scatophagidae* of Warsaw and non-urban habitats of Mazovia
(N — number of species)

Larvae	Mazovia		Warsaw									
			Suburbs		Urban green areas							
	Total				Parks		Housing estates		Town centre			
	N	%	N	%	N	%	N	%	N	%	N	%
mining leaves	14	63.6	2	28.6	6	50.0	2	28.6	—	—	—	—
living in dung	8	36.4	5	71.4	6	50.0	5	71.4	1	100.0	2	100.0

ECOLOGICAL ANALYSIS

The Mazovian Lowland is dominated by oligo- and polytopic *Scatophagidae*. In green areas of housing estates in Warsaw there are only ubiquitous and polytopic species.

Adults of some species are melliphages. Their main food consists of the nectar of plants of the families *Alismatacae*, *Compositae*, *Rhamnaceae*, and *Umbelliferae* (as well as more than ten other families), and also of the honeydew produced by aphids and scale insects. Adults of some species can be pantophages or zoophages. Larvae are phyto- zoo- and saprophagous. In the Mazovian Lowland there are some species the larvae of which mine leaves of various plants or live in dung. In Mazovia phytophages are represented by the highest number of species, while in the suburbs and urban parks of Warsaw saprophages. No mining species were recorded from green areas of housing estates and the centre of Warsaw (Table 2).

Table 3. Check-list of *Scatophagidae* (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
	○ — literature data ● — proved literature data + — unpublished data						
1	<i>Cordylura picipes</i> Meig.	+	—	—	—	—	+
2	<i>Cordylura pudica</i> Meig.	+	—	—	—	—	—
3	<i>Cordylura pubera</i> (L.)	●	—	—	—	—	—
4	<i>Paralleloma albipes</i> (Fall.)	○	—	—	—	—	—
5	<i>Chylizosoma paridis</i> Her.	+	—	—	—	—	—
6	<i>Phrosia albilabris</i> (Fabr.)	●	—	—	—	—	—
7	<i>Cnemopogon apicalis</i> (Wied.)	○	—	—	—	—	—
8	<i>Amaurosoma armillatum</i> (Zett.)	+	+	—	—	—	—
9	<i>Amaurosoma flavipes</i> Fall.	○	—	—	—	—	—
10	<i>Amaurosoma inerme</i> Beck.	+	—	—	—	—	—
11	<i>Scatophaga furcata</i> (Say)	+	+	+	—	—	—
12	<i>Scatophaga inquinata</i> (Meig.)	●	+	+	—	+	—
13	<i>Scatophaga lutaria</i> (Fabr.)	●	+	+	—	—	+
14	<i>Scatophaga scybalaria</i> (L.)	○	—	—	—	—	—
15	<i>Scatophaga stercoraria</i> (L.)	●	+	+	+	+	●
16	<i>Scatophaga suillum</i> (Fabr.)	●	+	+	—	—	—
17	<i>Scatophaga taeniopa</i> (Rond.)	—	—	—	—	—	+
18	<i>Norellisoma lituratum</i> (Meig.)	+	—	+	—	—	—
19	<i>Norellisoma spinimanum</i> (Fall.)	○	—	—	—	—	—
20	<i>Acrocnema macrocera</i> (Meig.)	—	—	+	—	—	—
21	<i>Hydromyza livens</i> (Fabr.)	—	—	—	—	—	○
22	<i>Trichopalpus punctipes</i> Meig.	○	+	—	—	—	+

In the Mazovian Lowland and in urban areas, saprophagous *Scatophagidae* are most abundant. The highest number of these flies was recorded in a mixed coniferous forest of Kampinos.

The saprophagous species *Scatophaga tercoraria* is most abundant in Mazovia and urban parks, while in green areas of housing estates and in the centre of the town only single specimens of this species were recorded.

The number of mining species and their abundance are lower in urban green areas of Warsaw as compared with Mazovia.

SPECIES NEW TO-POLAND

Acrocnema macrocera (Meigen, 1826)

One specimen: Mazovian Lowland. Warsaw-Saxon Garden, 26 August — 11 September, 1974.

Larval development not known. The species so far recorded from northern and central Europe.

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SCATOPHAGIDAE (DIPTERA) WARSZAWY I MAZOWSZA

STRESZCZENIE

Na Nizinie Mazowieckiej stwierdzono występowanie 22 gatunków *Scatophagidae*, co stanowi 29,3% fauny tych muchówek znanych z Polski. W Warszawie złowiono 11 gatunków czyli 54,5% *Scatophagidae* znanych z Mazowsza. Z Warszawy znane dotychczas były dwa gatunki, obecnie wykazano 12 gatunków, w tym jeden *Acrocnema macrocera* nowy dla fauny Polski.

W suburbium Warszawy występuje 7 gatunków *Scatophagidae*, w zieleni miejskiej 11 gatunków — w tym w parkach 7 gatunków, w zieleni osiedlowej 1 gatunek, a w centrum 2 gatunki.

Najwięcej gatunków występujących na Mazowszu należy do elementu europejskiego. W suburbium Warszawy przeważają gatunki holarktyczne. Element eurosyberyjski nie wnika do Warszawy.

Na terenach pozamiejskich Mazowsza przeważają gatunki, których larwy minują w liściach roślin. We wszystkich typach zieleni miejskiej natomiast, gatunki *Scatophagidae*, które w stadium larwalnym rozwijają się w nawozie różnych ssaków. W zieleni osiedlowej i w centrum Warszawy nie stwierdzono gatunków minujących.

Na Nizinie Mazowieckiej oraz w zieleni miejskiej najliczniejsze były gatunki saprofagiczne *Scatophagidae*. Ich przedstawicielem jest *Scatophaga stercoraria*, który był wyraźnym dominantem na Mazowszu oraz w środowiskach zurbanizowanych.

SCATOPHAGIDAE (DIPTERA) ВАРШАВЫ И МАЗОВИИ

РЕЗЮМЕ

Scatophagidae Мазовии составляют 29,3% числа видов, известных из Польши. В Варшаве встречается всего 12 видов: в субурбиях — 7, в городской зелени — 11, в парках — 7, в зеленых насаждениях жилых микрорайонов — один вид, а в центре города 2 вида. На Мазовии большинство видов составляли европейские виды в субурбиях имели преимущество голарктические, а в городскую зелень проникает только один космополитический вид. В Мазовии преобладали с точки зрения количества видов формы минирующие листья, в то время, как в городской зелени виды, развивающиеся в навозе.