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Heleomyzid flies of the Ojców National Park, with notes on *Suillia lineitergum* (Pandellé, 1901) – a species new to the fauna of Poland (Diptera: Heleomyzidae)

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Abstract. There is a faunistic review of 28 species of Heleomyzidae reported in the Ojców National Park (S. Poland). Most heleomyzids were collected at carrion of a fox and in caves. In the Ojców National Park 35% of Polish heleomyzids occur including *Suilla lineitergum* (Pandellé, 1901) recorded for the first time in Poland.

Key words: *Suillia lineitergum*, faunistics, Heleomyzidae, carrion, caves, Ojców National Park, Poland

INTRODUCTION

The Heleomyzidae are medium-sized flies (from 3 to 12 mm), often with grayish-brown to black or orange to yellowish-brown body colour (most *Suillia* species). Adults occur mainly in forested areas (mostly *Suillia* species), while representatives of other genera are associated with bird nests, mammal burrows, or caves and can also be found in humid areas in association with the range of larval habitats. Larvae of some species are necrophagous (mostly species of the genus *Neoleria* Malloch 1919).

Polish Heleomyzidae are well known, with 80 species recorded up to date. However, their distribution in our country is unsatisfactory known. Most of the distribution data come from the end of the nineteenth century and beginning of the twentieth. In most cases, the heleomyzid biology is unknown or the data are incomplete. This is caused by the specific mode of life of many species (i.e. in nests, burrows and caves), and the lack of comprehensive studies with specified sampling methods. The only known summary of the biology and distribution of the Polish Heleomyzidae is the work of Woźnica (2007) in the Fauna of Poland. Information on the Heleomyzidae from the Ojców National Park area is in three publications only. Fourteen heleomyzid species are listed by Klasa & Palaczyk (2005).

Palaczyk (2008) cites five already known heleomyzid species, characterising the caves fauna.

This paper is a summary and supplement to the data concerning the Ojców National Park, recently published by Klasa & Palaczyk (2005) and Palaczyk (2008).

MATERIAL AND METHODS

The material was collected for ten years (1989–2009), using sweep and scoop net, and "by eye", mainly from the undergrowth of Carpathian beech forest and oak-hornbeam forest. The collecting localities are shown in Fig. 1.

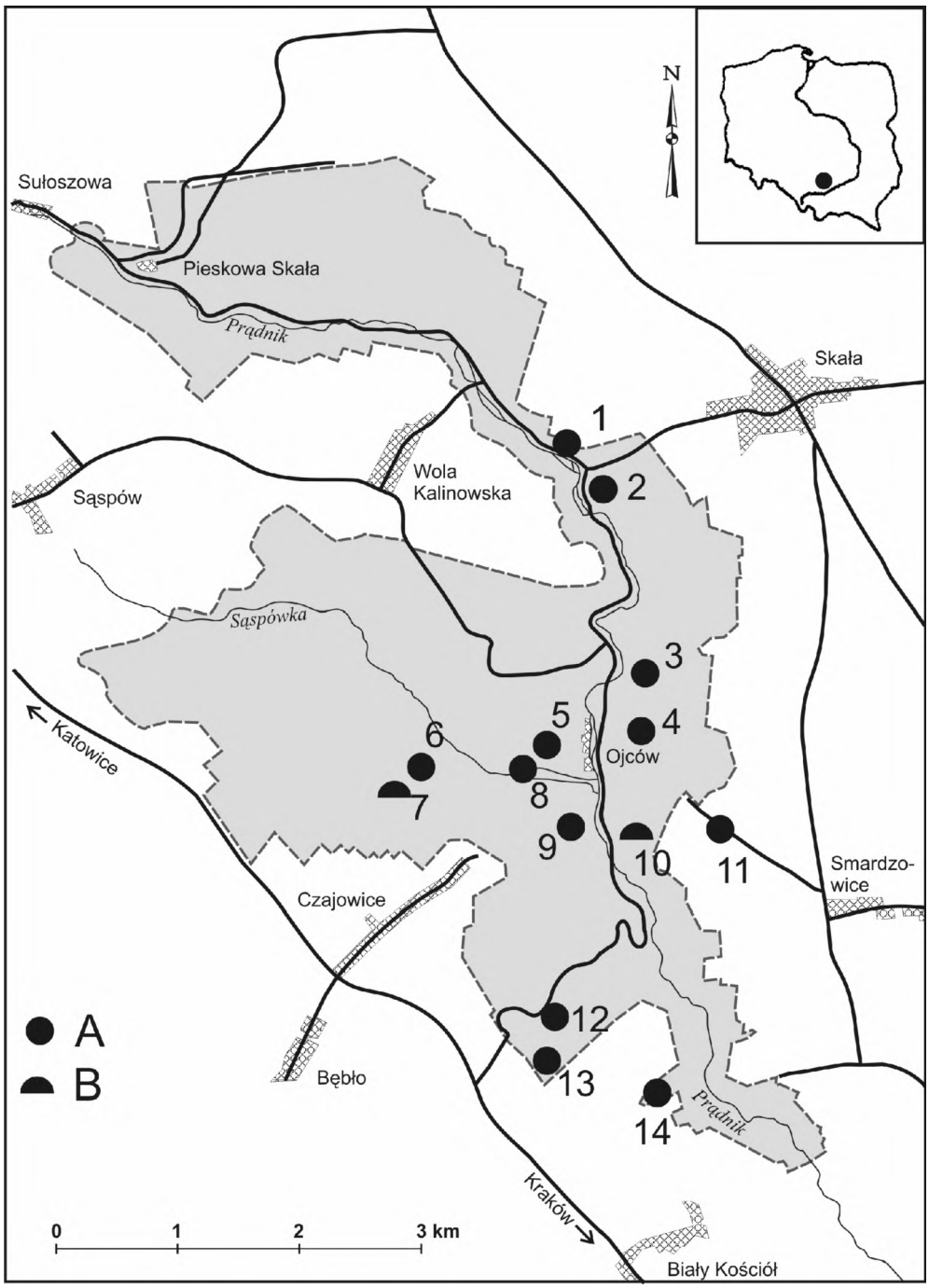

Fig. 1. Map of the study area with collecting sites indicated. A – collecting sites out of the caves, B – collecting sites inside the caves. 1 – Grodzisko; 2 – Skały Ciche; 3 Drewniana Droga; 4 – Czyżówki; 5 – Błotny Dół; 6 – Wąwóz Jamki; 7 – Jaskinia Krakowska; 8 – Dolina Sąspowska; 9 – Wąwóz Ciasne Skałki; 10 – Jaskinia Ciemna; 11 – Peperówka (protected zone of Ojców NP); 12 – Wąwóz Korytania; 13 – Murownia; 14 – Wąwóz Stodoliska.

Most of the material was obtained from the Barber traps set around a fox dead in the winter, in the Wąwóz Korytania (Fig. 2). The traps were emptied every 6–8 days. Out of the total 970 of collected heleomyzid specimens, 853 were caught in the Barber traps, the remaining were caught in the sweep net and on the walls of caves.

The following abbreviations are used in the text when referring to collectors: AK – Anna Klasa (Ojców National Park, Ojców); AP – Andrzej Palaczyk (ISEA, PAS, Kraków); BW – Bogdan Wiśniowski (Ojców National Park, Ojców). New records for the Ojców NP are marked by one asterisk (*); the species new to Poland by two asterisks (**).

Study area

The Ojców National Park is situated in the southern part of the Kraków-Częstochowa Upland. It was established in 1956. Its total area is less than 2146 ha and it is the smallest national park in Poland. It contains middle part of the Prądnik stream valley, as well as the upper and lower part of the Sąspów valley. The geological formations in the Ojców NP are Upper-Jurrassic limestones. The surface features are very various: there are deep gorges, steep slopes and isolated, single rocks. The area holds more than 600 caves. The floristic list of the Park includes about 1050 species of native and synanthropic plants. About 35 plant associations have been identified in the Ojców NP. Of all the plant communities, forests occupy the largest area (about 1200 ha). The prevailing forest associations are patches of *Pino-Quercetum* on the ridges, *Dentario glandulosae-Fagetum* on the northern slopes, and *Tilio-Carpinetum* on the southern slopes. Fresh meadows occur on the valley bottoms near Prądnik and Sąspówka streams. The rock outcrops are occupied by xerothermic grasslands.So far, 976 species of flies have been reported from the Ojców NP (13.5% of the Diptera recorded from Poland).

Faunistic review of species

1. *Eccoptomera longiseta* (Meigen, 1830) *

Material examined: Wąwóz Jamki (gorge), 3.06.2005, 1 ♂; Jaskinia Ciemna (cave), 23.07.2009, 2 ♀♀ (AK).

Distribution: European species, known from Southern Poland, especially from mammal's burrows.

2. *Eccoptomera pallescens* (Meigen, 1830)

Material examined: Skały Ciche, 14.06.2002, 1 ♀; Dolina Sąspowska (valley), *Tilio-Carpinetum*, 14.06.2005, 1 ♂ (AK).

Distribution: European species, known from cave of Ojców National Park (Klasa & Palaczyk 2005; Palaczyk 2008).

3. *Gymnomus amplicornis* (Czerny, 1924)

Material examined: Jaskinia Krakowska , 3.03.2005, 2 ♂♂, 3 ♀♀; Wąwóz Korytania, on fox carrion, 27.04.–08.05., and 08.–15.05.2006, 2 ♂♂, 1 ♀ (AK).

Distribution : European, mountain species, recorded from cave of Ojców National Park as *Scoliocentra amplicornis* (Klasa & Palaczyk 2005).

4. *Gymnomus caesius* (Meigen, 1830)*

Material examined: Peperówka, overgrow hill, 5–10.10.2000, 1 ♂ (BW)

Distribution: Common European species, known from caves and mammal's burrows.

Fig. 2. Barber traps near the fox carrion in the Wąwóz Korytania (photo A. Palaczyk).

Fig. 3. *Suillia lineitergum* (Pandellé) – habitus in lateral view (photo M. Wanat).

5. *Heleomyza captiosa* (Gorodkov, 1962)

Material examined: Jaskinia Ciemna, 11.02.2005, 1 ♀; ibidem, 23.07.2009, 3 ♂♂, 5 ♀♀; Jaskinia Krakowska, 3.03.2005, 1 ♀ (AK).

Distribution: The most common species of the genus in Central Europe, known from cave of Ojców National Park (Klasa & Palaczyk 2005; Palaczyk 2008).

6. *Heleomyza modesta* (Meigen, 1838)

Material examined: Wąwóz Jamki, 4.06.1990, 1 ♂, forest (AK).

Distribution: European, boreo-montane species, known from caves of Ojców National Park (Klasa & Palaczyk 2005).

7. *Heleomyza serrata* (Linnaeus, 1758)*

Material examined: Wąwóz Korytania, on fox carrion, 09–16. 04, 16–21.04., 21–27.04., 27.04.–08.05, and 08.–15.05.2006, 8 ♂♂, 21 ♀♀ (AK).

Distribution: Holarctic species, hitherto recorded from Poland from Pomeranian Lake District, Lower Silesia and Sudety Mts.

8. *Heteromyza rotundicornis* (Zetterstedt, 1846)*

Material examined: Dolina Sąspowska, 8.09.2005, 1 ♀ (AK).

Distribution: European species, known from Poland from few localities only.

9. *Morpholeria ruficornis* (Meigen, 1830)

Material examined: Wąwóz Jamki, *Dentario glandulosae-Fagetum,* 20.07, and 3.08.2006, 3 ♂♂, 4 ♀♀; Wąwóz Ciasne Skałki, 29.09.2008, 2 ♀♀; Czyżówki, 30.09.2008, 1 ♀; Dolina Sąspowska, 1.08.2002, 1 ♀; Chełmowa Góra, 21.08.2009, 2 ♂♂, 2 ♀♀, (AK).

Distribution: Common European and boreo montane species, recorded from Ojców National Park (Klasa & Palaczyk 2005).

10. *Morpholeria variabilis* (Loew, 1862)*

Material examined: Wąwóz Jamki, 7.06.1990, 1 ♂ (AK).

Distribution: Common European species, known from Southern Poland.

11. *Neoleria inscripta* (Meigen, 1830)*

Material examined: Wąwóz Korytania, on fox carrion, 08–15.05., and 15–23.05.2006, 15 ♂♂, 13 ♀♀ (AK).

Distribution: Holarctic species, common in Poland. Larvae are necrophagous.

12. *Neoleria ruficauda* (Zetterstedt, 1847)

Material examined: Wąwóz Korytania, on fox carrion, 1–9.04, 9–16.04, 16–21.04, 21–27.04, 08–15.05., and 23–30.05.2006, 328 ♂♂, 181 ♀♀ (AK).

Distribution: European species, recorded from Ojców National Park (Klasa & Palaczyk 2005).

13. *Scoliocentra (Leriola) brachypterna* (Loew, 1873)

Material examined: Jaskinia Ciemna, 23.07.2009, 1 ♂, 1 ♀ (AK).

Distribution: West Palaearctic species, local and but numerous species in Poland, known from Ojców National Park, also from caves (Woźnica 2004; Klasa & Palaczyk 2005; Palaczyk 2008).

14. *Scoliocentra dupliciseta* (Strobl, 1894)

Material examined: Wąwóz Jamki, *Dentario glandulosae-Fagetum*, 16.05.2002, 2 ♂♂; Dolina Sąspowska, on dead trunk of fir tree, 17.04.1989, 1 ♂ (AK).

Distribution: West Palaearctic and montain species, recorded from Ojców National Park (Klasa & Palaczyk 2005).

15. *Scoliocentra villosa* (Meigen, 1830)

Material examined: Jaskinia Krakowska, 3.03.2005, 1 ♂, 4 ♀♀; Jaskinia Ciemna, 11.02.2006, 26.02.2006, 5 ♂♂, 6 ♀♀; Wąwóz Korytania, on fox carrion, 1–9.04., 9–16.04, 16–21.04, 21–27.04, 27.04–8.05, 8–15.05, 15–23.05., and 23–30.05.2006, 86 ♂♂, 191 ♀♀ (AK).

Distribution: Common European species, recorded from Ojców National Park (Klasa & Palaczyk 2005; Palaczyk 2008).

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

Material examined: Wąwóz Korytania, 9.04.2006, 1 ♂ (AP); Dolina Sąspowska, 26.06.2009, 1 ♂ (AK).

Distribution: West Palaearctic species, very common in Poland.

17. *Suillia atricornis* (Meigen, 1830)*

Material examined: Wąwóz Jamki, 22.07.1996, 1 ♀; ibidem, 4.06.2002, 2 ♂♂, 1 ♀; ibidem, 1.08.2002, 1 ♀; ibidem, 3.06.2006, 1 ♀; ibidem, 2 ♂♂; Murownia section 40, on mushrooms, 1 ♂, 09.11.2008; Wąwóz Korytania, *Dentario glandulosae-Fagetum*, 23.08.1996, 1 ♀; ibidem, 21.09.2003, 1 ♀ (AK).

Distribution: Holarctic species, locally common in Poland.

18. *Suillia bicolor* (Zetterstedt, 1838)*

Material examined: Wąwóz Jamki, 27.02. and 4.06.2002, 2 ♀♀ (AK); Wąwóz Błotny Dół, *Tilio-Carpinetum*, 27.08.2003, 3 ♂♂, 1 ♀, ibidem 16.07.2007, 1 ♀; Dolina Sąspowska, 14.06.2005, 1 ♂; Drewniana Droga, 30.05.2008, 1 ♂; Wąwóz Ciasne Skałki, 29.09.2008, 2 ♀♀; Czyżówki, 30.09.2008, 1 ♂, 1 ♀; Murownia section 40, on mushrooms, 09.11.2008, 7 ♂♂, 2 ♀♀; Dolina Sąspowska, 4 ♀♀, 22.04.2009, *Tilio-Carpinetum* (AK).

Distribution: Common Palaearctic species, known from several localities in Poland.

19. *Suillia flava* (Meigen, 1830)*

Material examined: Grodzisko, 2–25.06.2003, 1 ♂, 1 ♀ (BW); ONP, xerothermic area, 21.06.1989, 1 ♂ (AK).

Distribution: West Palaearctic and rather *xerophilous* species. Common in Mazovian Lowland.

20. *Suillia fuscicornis* (Zetterstedt, 1847)*

Material examined: Wąwóz Jamki, 4.06.2002, 1 ♀; Wąwóz Błotny Dół, *Tilio-Carpinetum*, 27.08.2003, 1 ♂; Czyżówki, 30.09.2008, 1 ♂; Murownia, section. 40, on mushrooms, 09.11.2008, 4 ♂♂; Chełmowa Góra, 1 ♀, 21.08.2009, *Dentario glandulosae-Fagetum*; Dolina Sąspowska, 26.06.2009, 1 ♂ (AK).

Distribution: West Palaearctic species, common in Poland.

21. *Suillia laevifrons* (Loew, 1862)

Distribution: West Palaearctic species widely distributed in southern part of Poland and recorded from Ojców National Park by Sznabl (1881) only.

22. *Suillia lineitergum* (Pandellé, 1901)**

Material examined: Wąwóz Stodoliska, on asp trunk (*Populus tremula*), 1.04.2007, 1 ♂ (AK).

Diagnosis: Head with long plumose arista. One strong vibrissa, often with one distinct additional setula below it. Thoracic pleura with a thin but distinct dark brown band, and with bare anepisternum and anepimeron. Wing with a typical regular dark and ovoid spot in the apical part of first longitudinal vein (Fig. 3).

Distribution: Palaearctic species new to the fauna of Poland. Boreo-montane species, known from single localities only. Hitherto recorded from Austria, Hungary, France, Japan, Norway, Russia, Slovakia, South Korea, Switzerland and Ukraine (Woźnica 2003), and recently from Italy (Woźnica 2008).

23. *Suillia nemorum* (Meigen, 1830)

Distribution: Widely distributed in the Holarctic Region and recorded from Ojców National Park, by Sznabl (1881) only.

24. *Suillia notata* (Meigen, 1830)*

Material examined: Murownia, section 40, on mushrooms, 9.11.2008, 1 ♂ (AK).

Distribution: West Palaearctic species, recorded from southern part of Poland.

25. *Suillia pallida* (Fallén, 1820)

Material examined: Dolina Sąspowska, 3.06.1996, 1 ♀; ibidem, 12.02.2004, 1 ♀; ibidem, 23.04.2009, 1 ♀, 22.04.2009, Tilio-Carpinetum; Drewniana Droga, 15.05.2007, 1 ♀ (AK).

Distribution: Palaearctic species, common in Poland, and hitherto recorded in Ojców National Park from one locality only (Klasa & Palaczyk 2005).

26. *Tephrochlamys flavipes* (Zetterstedt, 1838)

Material examined: Wąwóz Korytania, near fox carrion, 08–15.05, 15–23.05, and 23–30.05.2006, 2 ♂♂, 2 ♀♀ (AK).

Distribution: West Palaearctic species, common in Poland, and recorded from Ojców National Park (Klasa & Palaczyk 2005).

27. *Tephrochlamys rufiventris* (Meigen, 1830)

Material examined: Wąwóz Korytania, near fox carrion, 21–27.04,2006, 1 ♀ (AK).

Distribution: Common Palaearctic and synanthropic species, recorded from Ojców NP (Klasa & Palaczyk 2005).

28. *Tephrochlamys tarsalis* (Zetterstedt, 1847)*

Material examined: Wąwóz Korytania, near fox carrion, 23–30.05.2006, 1 ♂, 1 ♀ (AK).

Distribution: European and synanthropic species, common in Poland.

SUMMARY AND DISCUSSION

As a result of recent studies, 14 new species new to the fauna of the Ojców National Park are recorded, including one – *Suillia lineitergum* – new to the fauna of Poland. The presence of a further 12 species has been confirmed. Totally, 28 heleomyzid species have been noted, which amounts to 1/3 of the species listed from Poland, and a further dozen or more can be expected. All heleomyzid flies found in the National Park, are cold- and humidity-adapted.

Imagines occur on the bottoms of the ravines, undergrowth of beech and oak-hornbeam forests and herb communities; they are also found in caves.

The following six species of heleomyzids have been recorded from the caves of the Ojców National Park: *Eccoptomera pallescens, Gymnomus amplicornis, Heleomyza captiosa, Heleomyza modesta, Scoliocentra (Leriola) brachypterna and Scoliocentra villosa.* Previously, only three species of the family were known from the Jura caves: *Gymnomus europaeus* Papp & Woźnica 1993 (Olkusz, see Papp & Woźnica 1993), *Heleomyza serrata* (in Nietoperzowa, Racławicka and Studnisko caves) and *Scoliocentra villosa* (under Sokola, the Studnisko and Dzwonnica caves) (Skalski 1973). Some species, not yet recorded from Ojców, but are well known from the caves of the Tatra Mts: *Gymnomus ceianui* (Martinek 1985), *Gymnomus czernyi* (Papp & Woźnica 1993) or *Gymnomus sabroskyi* (Gill 1962).

Table. Heleomyzidae collected near the fox carrion in the Wąwóz Korytania in 2006.

Species	Number of specimens in the interval periods								Total
	1–9.04	9–16.04	16–21.04	21–27.04	27.04–8.05	8–15.05	15–23.05.	23–30.05	
Scoliocentra villosa	8 ♂♂ 7 ♀♀	19 ♂♂ 11 ♀♀	25 ♂♂ 21 ♀♀	7 ♂♂ 31 ♀♀	9 ♂♂ 73 ♀♀	10 ♂♂ 26 ♀♀	8 ♂♂ 21 ♀♀	1 ♀	277
Neoleria ruficauda	2 ♀♀	3 ♂♂	40 ♀♀ 92 ♂♂	132 ♀♀ 231 ♂♂	-	5 ♀♀ 2 ♂♂	-	2 ♀♀	509
Heleomyza serrata	-	1 ♀	1 ♀ 2 ♂♂	6 ♀♀ 2 ♂♂	10 ♀♀ 2 ♂♂	3 ♀♀ 2 ♂♂	-	-	29
Tephrochlamys rufiventris	-	-	-	1 ♀	-	-	-	-	1
Gymnomus amplicornis	-	-	-	-	1 ♂	1 ♀ 1 ♂	-	-	3
Neoleria inscripta	-	-	-	-	-	6 ♀♀ 5 ♂♂	7 ♀♀ 10 ♂♂	-	28
Tephrochlamys flavipes	-	-	-	-	-	1 ♂	1 ♀	1 ♀ 1 ♂	4
Tephrochlamys tarsalis	-	-	-	-	-	-	-	1 ♀ 1 ♂	2
Total	17	34	181	410	95	62	47	7	853

Some species occur in large numbers on carrion and rotting mushrooms, where their larvae develop. Eight species of sunflies were caught in the Barber traps near the fox carrion. The number of species and specimens are summarized in the table. The wet traps yielded a total of 853 specimens of Heleomyzidae representing 8 species, mostly *Neoleria ruficauda* – 509 specimens (59.6% of all heleomyzids) and *Scoliocentra villosa* – 277 specimens (32.4%).

The remaining species were less abundantly represented: *Heleomyza serrata* (3.4%), *Neoleria inscripta* (3.3%), *Tephrochlamys flavipes* (0.7%), *Gymnomus amplicornis* (0.3%), *Tephrochlamys tarsalis* (0.2%) and *Tephrochlamys rufiventris* (0.1%) (Fig. 4).

Neoleria ruficauda was also collected on a cow carrion (Klasa & Palaczyk 2005). It is unknown which species actually took part in the decomposition of the fox carrion, since some species could be only attracted by smell or their larvae could develop in the soil near the carrion.

The eudominant was *Neoleria ruficauda*, whose larvae are necrophagous and *Scoliocentra villosa*, with larvae regarded as saprophagous (developing most often in animal dung). Larvae of species of the genus *Neoleria* are used in forensic entomology to determine the time of death, but they are not listed as key species in the decomposition of carrion (Szpila et al. 2006).

The Heleomyzidae were the dominant group collected at the fox carrion and the first flies that appeared there in early April. The reason for this unusual phenomenon was the time of appearance of the carrion – winter, and the place of its appearance – a slope of a shaded gorge with Carpathian beech forest. Heleomyzids prefer cool habitats and are the most numerous in the spring and autumn; some species are active on snow in the winter (Hågvar & Greve 2003).

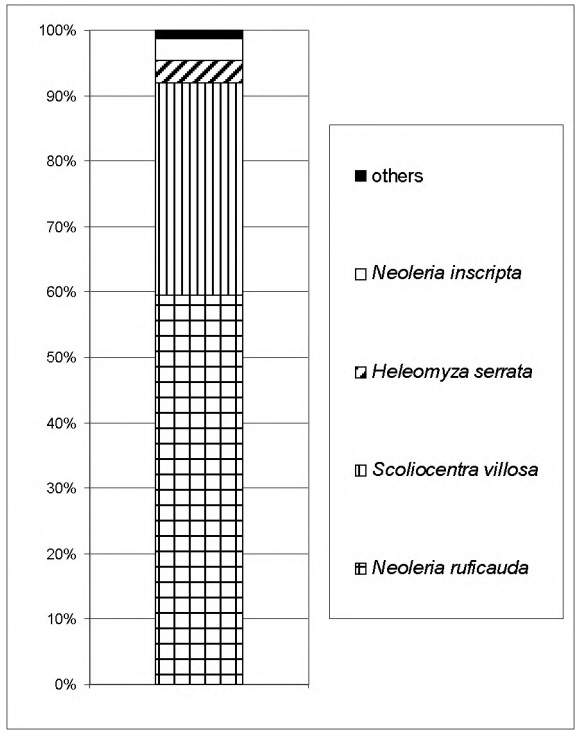

Fig. 4. Percentage of particular species of Heleomyzidae caught near the fox carrion, from April 1st till May 30th; other species – *Tephrochlamys flavipes, Gymnomus amplicornis, Tephrochlamys tarsalis, Tephrochlamys rufiventris.*

Suillia lineitergum – a species new to the Polish fauna – deserves a special attention; it is a boreo-montane species, with only single localities in Europe. Flies with this distribution type are few in the Ojców National Park and thus valuable from the scientific point of view.

Aside from the Ojców NP – the best known restricted area in Poland concerning the knowledge of Heleomyzidae, six species of heleomyzid have been recorded from the Babia Góra NP (Palaczyk & Klasa 2003, Woźnica 2006 b), four species from Białowieża Primeval Forest (Palaczyk 2001), one species from the Bieszczady NP (Klasa et al. 2000) and 21 species from the Tatra Mts (Loew 1870; Kowalski 1955; Nowicki 1873; Papp & Woźnica 1993; Woźnica 2004, 2006 a, 2006 b). Heleomyzids of the other national parks have not been studied.

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Streszczenie

[Błotniszkowate Ojcowskiego Parku Narodowego wraz z danymi na temat *Suillia lineitergum* (Pandellé, 1901) – gatunku nowego dla fauny Polski (Diptera: Heleomyzidae)]

Stan zbadania rozmieszczenia fauny Heleomyzidae w Polsce jest stosunkowo słaby i nierównomierny. W wyniku badań faunistycznych przeprowadzonych w Ojcowskim Parku Narodowym wykazano 26 gatunków błotniszek. Spośród nich *Suillia lineitergum* (Pandellé) jest nowym dla fauny Polski. Natomiast, czternaście dalszych gatunków stwierdzono po raz pierwszy w Ojcowskim Parku Narodowym.

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