



## Small mammals in the diet of the barn owl *Tyto alba* in selected localities in north-eastern Poland

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**Abstract:** An analysis of the pellets of *Tyto alba* in three sites in NE Poland revealed 1,091 individuals of small mammals. Fifteen species were found, including three Soricomorpha, two Chiroptera and ten Rodentia. *Arvicola amphibius* and *Microtus agrestis* were found in the valleys of the Biebrza and Narew Rivers, and *Sorex araneus* and *Microtus oeconomus* were relatively frequent there. In Jedwabne a remarkable share of *S. araneus*, *Mus musculus* and *Microtus arvalis* was noted.

**Key words:** Mammal fauna, owls' pellets, Soricomorpha, Chiroptera, Rodentia, Podlasie region

### INTRODUCTION

The analysis of owl pellets provided a large amount of information on small mammals in NE Poland (Kowalski 1961, Pucek & Raczyński 1983, Ruprecht & SzwaGrzak 1987, Kowalski & Lesiński 1988, Rode 1993, Jędrzejewski et al. 1994, Żmihorski & Osojca 2006, Zawadzka & Zawadzki 2007, Lesiński & Gryz 2008, Lesiński 2009, Lesiński et al. 2009, Gryz et al. 2011, 2012, Lesiński et al. 2016, 2021, Lesiński 2022, Lesiński & Błachowski 2023a, 2023b). In particular, the species composition of terrestrial mammals belonging to Soricomorpha and Rodentia is well known. The share of particular species in a community is also known for some areas. Several species have range limits or are present in discontinued ranges in NE Poland. Therefore, it is important to undertake studies across many sites to determine these ranges more precisely.

The aim of this study was to complement data on the mammal fauna of NE Poland based on sites that had not been studied before.

### MATERIAL AND METHODS

Research was carried out in the years 1991–2024 in three localities of *Tyto alba* (Scopoli, 1769) in NE Poland (Figure). Jedwabne is situated in the Kolno Upland, about 10 km west of the Biebrza River valley. Łoje-Awissa is situated at the edge of the Biebrza River valley and Kurowo – at the edge of the Narew River valley. Study material in the site Jedwabne was collected in the attic and church steeples, while that in in Kurowo and Łoje Awissa – in abandoned buildings. The bone elements of prey (mainly skulls, less often other bones) were prepared after soaking the pellets in water. Species were determined based mainly on a key edited by Pucek (1984) and using a comparative collection of skulls of small mammals. In the case of difficult-to-determine rodents of the genus *Apodemus*, the features proposed by Ruprecht (1979b) were considered. An analysis of the collected material showed the presence of 1,091 small mammals.

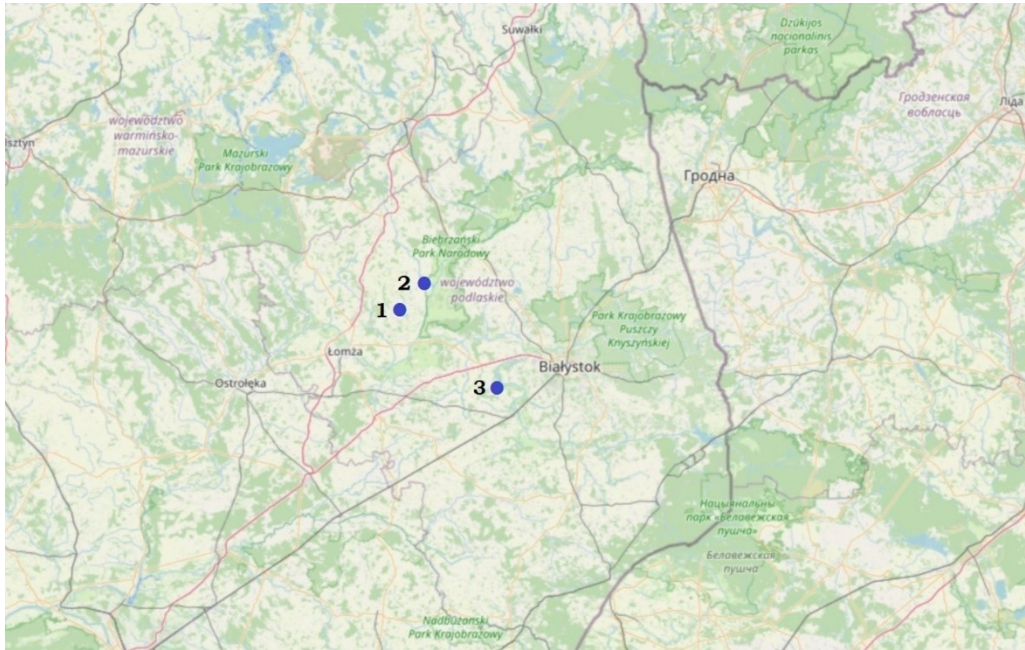


Fig. Study sites in NE Poland: 1 – Jedwabne, 2 – Łoje Awissa, 3 – Kurowo.

## RESULTS

Fifteen species of small mammals were found in three study sites. *Sorex araneus* was dominant in all sites within the Soricomorpha, represented by four species. Two species of Chiroptera, namely *Myotis nattereri* and *Eptesicus serotinus*, were found in Łoje Awissa. The order Rodentia showed the highest species richness (10 species) with a dominance of *Mus musculus* and *Microtus arvalis*. Notably, *Microtus oeconomus* was observed frequently. *Arvicola amphibius* was present in two sites, and *Microtus agrestis* – in only one. *A. sylvaticus* and *A. agrarius* were caught the most often from among the genus *Apodemus* (Table).

## DISCUSSION

*T. alba* is an owl characteristic of the agricultural landscape. Its main hunting areas are open croplands and grasslands, but also developed zones, where it finds resting and breeding sites in the buildings (Mikkola 1983). Therefore, its diet is composed of mammals typical of such habitats (Ruprecht 1979a).

Species dominating in the diet of *T. alba* (*S. araneus*, *M. arvalis* and *M. musculus*) in the site Jedwabne are typical for many regions of the country (Ruprecht 1979a, Kowalski & Lesiński 1986, Ruprecht 1990, Lesiński 1991, Bekasiński et al. 1996, Lesiński 2022). Wetlands of large rivers occurred in Kurowo and Łoje-Awissa. Therefore, the dominance of Soricomorpha was more emphasised in the two sites. The representatives of this group of mammals were frequently trapped in wetland habitats of the Biebrza River valley (Raczyński et al. 1983). The share of *M. oeconomus*, a species typical for wetlands (Tast 1982), was also remarkable there. *Arvicola amphibius* has still been relatively abundant in the Biebrza River valley in recent years (see Łoje Awissa locality), though in some lowlands of central Poland close to the study area, it has become scarce (Lesiński et al. 2017), primarily because of the increasing population of *Neogale vison*

(Schreber, 1777) (Zalewski & Brzeziński 2014). *Microtus agrestis* was present in the diet of *T. alba* in only one site under our study. This owl species hunts it rarely, since the vole is more closely associated with forested areas than the other species of the genus *Microtus* in this part of Poland. Conversely, in the diet of another owl species – *Strix aluco*, the vole is noted regularly and fairly often in NE Poland (Zawadzka & Zawadzki 2007, Lesiński et al. 2009, Gryz et al. 2011, 2012, Lesiński & Błachowski 2023b). Within its full range, *M. agrestis* also prefers wet meadow areas or riverside habitats (Mathias et al. 2017).

Table. Small mammals as prey items of barn owls in three localities in north-eastern Poland

No.	Species	Jedwabne	Kurowo	Łoje Awissa		Total
		27 Nov 1991	14 Mar 2001	24 Mar 2023	2 May 2024	
1.	<i>Sorex araneus</i> Linnaeus, 1758	64	122	146	65	211
2.	<i>Sorex minutus</i> Linnaeus, 1766	5	8	17	19	36
3.	<i>Neomys fodiens</i> (Pennant, 1771)	8	15	71	9	80
4.	<i>Myotis nattereri</i> (Kuhl, 1818)	0	0	0	1	1
5.	<i>Eptesicus serotinus</i> (Schreber, 1774)	0	0	1	0	1
6.	<i>Clethrionomys glareolus</i> (Schreber, 1780)	0	1	7	1	8
7.	<i>Arvicola amphibius</i> (Linnaeus, 1758)	0	3	11	6	17
8.	<i>Microtus arvalis</i> (Pallas, 1779)	44	13	44	17	61
9.	<i>Microtus agrestis</i> (Linnaeus, 1761)	0	4	0	0	0
10.	<i>Microtus oeconomus</i> (Pallas, 1766)	18	59	64	13	77
–.	<i>Microtus</i> spp.	3	7	19	7	26
11.	<i>Mus musculus</i> Linnaeus, 1758	67	35	21	6	27
12.	<i>Apodemus agrarius</i> (Pallas, 1771)	5	2	3	0	3
13.	<i>Apodemus sylvaticus</i> (Linnaeus, 1758)	2	1	6	2	8
14.	<i>Apodemus flavicollis</i> (Melchior, 1834)	0	0	1	2	3
–.	<i>Apodemus</i> spp.	2	2	8	2	10
15.	<i>Micromys minutus</i> (Pallas, 1771)	3	3	19	7	26
	Total	221	275	438	157	595

Bats are rare components of the diet of *T. alba* in NE Poland (Ruprecht & Szwagrzak 1987, Rode 1993, Lesiński & Błachowski 2023a). *M. nattereri* and *E. serotinus*, bat species found in site Łoje-Awissa, are common and numerous species in the Biebrza River valley (Lesiński 2001).

Species composition and the share in prey of *T. alba* in other sites of the Biebrza and Narew valleys (Lesiński et al. 2009, Lesiński & Błachowski 2023a) were similar to those noted in Kurowo and Łoje Awissa. Remarkably, species such as: *Sicista betulina* (Pallas, 1779) and *Muscardinus avellanarius* (Linnaeus, 1758) were not found in Kurowo and Łoje-Awissa, but were present in the lower basin of the Biebrza River valley (Raczyński et al. 1983, Lesiński et al. 2009, Lesiński & Błachowski 2023a).

The localities under study are situated close to the northern range limit of *Crocidura leucodon* (Hermann, 1780). Taking into account the data collected by Pucek and Michalak (1983) and Lesiński (2022), the limit in this part of Poland runs between localities: Zaręby Kościelne, Czyżew, Rosochate Kościelne, Jabłonka Kościelna, Kołaki Kościelne, Łapy, Zabłudów. The presence of this species could be expected in Kurowo but not confirmed, which indicates that localities under our study lie outside its range.

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## STRESZCZENIE

**[Małe ssaki w diecie płomykówki *Tyto alba* na wybranych stanowiskach w północno-wschodniej Polsce]**

W latach 1991–2024 zbadano dietę *Tyto alba* na trzech stanowiskach w północno-wschodniej Polsce: Jedwabne, Kurowo i Łoje-Awissa. Analiza wypluwek wykazała 1091 osobników drobnych ssaków, należących do 15 gatunków, w tym trzech Soricomorpha, dwóch Chiroptera oraz 10 Rodentia (Tab.). W rejonie doliny Biebrzy i Narwi stwierdzono *Arvicola amphibius* i *Microtus agrestis*, a stosunkowo częste były: *Sorex araneus* i *Microtus oeconomus*. W Jedwabnem, położonym w oddaleniu od podmokłej doliny rzecznej, znaczny był udział *S. araneus*, *Mus musculus* i *Microtus arvalis*. Stwierdzone nietoperze – *Myotis nattereri* i *Eptesicus serotinus* – należą do pospolitych i licznych w tej części Polski. Objęte badaniem stanowiska prawdopodobnie leżą poza północną granicą zasięgu *Crocidura leucodon*.

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