

## Short notes

## Occurrence of internal parasites in stone martens (*Martes foina*) from Cracow and suburbs<sup>1</sup>

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**ABSTRACT.** The pine marten *Martes martes* and the stone marten *Martes foina* are the only representatives of the genus *Martes* in Poland. During the last few decades, an intensive synurbanisation of stone martens has been recorded. The aim of the study was to assess the level of infection by internal parasites of *Martes foina* in the Cracow urban area. Eleven necropsies were performed of stone martens killed during animal-vehicle collisions. Additionally, coprological examination of 129 stone marten scats was included. For further analysis, two standard methods, i.e. flotation and decantation, were used. The intensity of infection by parasites was low. *Taenia martis* was found to be present in one marten individual by necropsy, while Taeniidae helminths and two genera of nematodes, *Capillaria* and *Toxocara*, were identified during coprodiagnosis. The diet analysis of stone marten scats revealed a high proportion of two food categories. Percentage frequency of occurrence for plant material and anthropogenic was calculated as 42.3% and 15.4%, respectively. This type of food composition might suggest lower infection by internal parasites in particular species, especially with an indirect life cycle.

**Key words:** *Martes foina*, parasites, necropsy, coproscopic examination

### Introduction

For several decades, an intense synurbanization of a wide range of different species has been observed. The stone marten (*Martes foina*) is an example of a carnivore which has successfully occupied cities and adapted to this new, man-made environment.

The main aims of the study were to examine the prevalence and intensity of internal parasites of stone martens from the Cracow metropolitan area and also to assess the potential risk of their transmission to humans.

### Materials and Methods

The study area comprises the Cracow metropolitan area and its neighbouring districts, all lying within 50°03'41"N and 19°56'8"E in southern

Poland. The total study area is 1556 km<sup>2</sup>, and the core area (city centre) is 327 km<sup>2</sup>. The human population density varies between 197.88 ind./km<sup>2</sup> in suburban areas and 2314 ind./km<sup>2</sup> in the city centre ([www.bip.krakow.pl](http://www.bip.krakow.pl)).

From 2008 to 2009, 11 individual stone martens were collected as road kills and examined in the laboratory. If available, the age and sex were recorded: 9 adults and 2 young animals, 6 males and 5 females. The obtained digestive tracts were frozen at –80°C for 10 days in order to destroy the parasites in developmental stages [1–2]. The digestive tracts were dissected, as were the lung, kidney, heart and liver, according to Eckert et al. [3–4]. The parasitological examination of the digestive tract and organs of stone martens was performed by cutting the small intestine lengthwise into small pieces. After removal of the content, the intestinal mucosa was examined macroscopically. The organs

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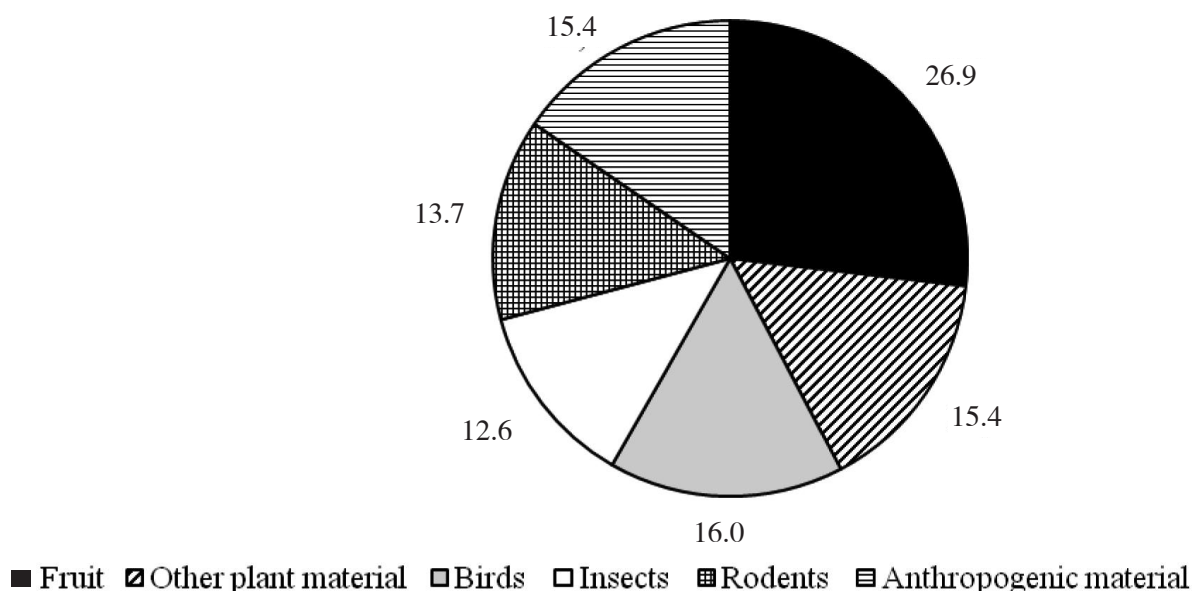


Fig. 1. Diet of stone marten based on scat analysis (%)

were rinsed and squeezed in saline to search for any other parasites. All parasite specimens found were preserved in 70% alcohol with 5% glycerol for clarification. In addition, smears were prepared from the individual parts of the intestinal mucosa.

Additionally, 129 faecal samples from stone martens collected in the Cracow area were examined with standard flotation and decantation methods [5]. On the basis of the obtained results, the prevalence (%) and intensity of infection (EPG – eggs per gram) were evaluated.

A randomly chosen, small piece (ca 2 g) of each scat was examined with standard procedure for diet analysis. Percentage frequency of occurrence was calculated for each food category [6].

## Results

The results of the coproscopic examination indicate that eggs of tapeworms from the Taeniidae family were present in three samples (Table 1). The unidentified tapeworm eggs could be produced by

*Taenia martis*, *T. hydatigena* or *Hydatigera taeniaeformis*, which have been reported previously from stone martens [7]. The most commonly found nematode eggs were from the genus *Capillaria* (11.6%). In two samples, ascaris eggs were found, whereas dead ascarid nematode specimens were present in one sample. *Taenia martis*, a typical tapeworm for martens, was found in the intestine of only one of the eleven dissected animals.

The eggs of *Capillaria*, were probably eggs of *C. mustelorum*, which is known to infect stone martens in Poland [8]. Unfortunately, one ascarid nematode specimen could not be identified to a species because of the decayed and dried condition of the material. However, it may have belonged to *Ascaris devosi* or *Toxocara cati*, as reported previously from *Martes foina* [7].

The analysis of the diet of the stone martens based on scat content revealed a significant proportion of plant (fruit and other plant material) and anthropogenic fractions, comprising 42.3 % and 15.4%, respectively (Fig. 1).

Table 1. Prevalence (%) and range (EPG) of parasite infection of examined stone martens

Methods/parasites	Taeniidae	<i>Capillaria</i> sp.	Ascaridida
coproscopic examination n scats = 129	2.3	11.6 (1–21 EPG)	2.3 (3–10 EPG)
Necropsy n = 11	9.1	0	0

## Discussion

The prevalence of parasite infections identified by both coproscopic methods and dissections, was found to be rather low. It is typical of stone martens to be much less intensively infected by parasites than other mustelids, such as the pine marten – *Martes martes* [9]. This difference is probably based on the feeding habits of the two marten species. The stone marten is more of a herbivore than the pine marten, and so has fewer opportunities to consume the potential intermediate hosts of parasites [10]. This is confirmed by the analysis of the stone marten diet in the present study, where plant material was found to be the most common component.

Investigations carried out in other European countries revealed more diverse parasite compositions in the assessed material. In Italy, Millán and Ferroglio [11] confirmed the presence of *Taenia martis*, *Molineus patens* and *Capillaria* sp. in ten dissected stone martens. In Spain, Ribas et al. [12] found 10 different parasite species in only one investigated individual (Platyhelminthes: *Brachylaima* sp., *Taenia martis*, *Mesocostoides* sp., *Oochoristica* sp.; Nematoda: *Personema* (*Capillaria*) *plica*, *Eucoleus aerophilus*, *Aonchotheca putorii*, *Molineus patens*, *Crenosoma petrowi* and *Sobolevingylus petrowi*).

The results of our research are comparable with those of studies carried out in northern Poland between 2003–2004 [9]. In this study, based on faecal examination only, nematodes from the genus *Capillaria* were found in stone martens. In comparison, the parasitic fauna of pine marten faeces in the same investigation was much richer and included Coccidia, Trematoda and Nematoda from the genera *Toxocara*, *Trichuris*, *Uncinaria* and *Capillaria*.

In the present study, species of parasites dangerous to humans were not found in stone martens, and the prevalence and intensity of infection seen in the examined animals were low. However, as the numbers of stone and pine martens are increasing [13], this area requires further study.

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