

Diet composition of a hand-reared stone marten (*Martes foina*) after its release and independence in a Hungarian village

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LANSZKI, J., SÁRDI, B., L. SZÉLES, G.: *Diet composition of a hand-reared stone marten (Martes foina) after its release and independence in a Hungarian village.*

Abstract: Diet composition and feeding habits of a hand-reared stone marten after release in a village was examined and compared to other martens which had lived earlier in or around the same village (Fonó, Somogy county, Hungary). The food habits were investigated indirectly by analysis of stone marten scats (n = 34 individual samples) using standard wet procedure. Studies in the autumn-winter period showed that the trophic niche of the hand-reared stone marten was relatively narrow. Plants (mainly grapes, apple and blackthorn) formed the dominant component of the diet and small mammals (mainly brown rat, house mouse and wood mice species) were the primary prey type, as in the other local studies. Contrary to other stone martens from Somogy county, predation upon birds was low (%B: 2.4%), and no domestic animal remains were found in the scat samples. The hand-reared marten preyed on mainly small sized and terrestrial prey species, and used garbage as a food source.

Keywords: food habits, predation, prey size, trophic niche

Introduction

The stone marten (*Martes foina* Erxleben, 1777) is Palearctic, being widely distributed in the European broad-leaved forest zone and Asian steppe zone (BROEKHUIZEN 1999), and common in Hungary (TÓTH et al. 2007). The species is a habitat opportunist, and can be found from natural or nearly-natural areas to different human settlements.

The success of release of orphaned and rescued young stone martens, after hand-rearing, is doubtful. Tracking the animal during the period of becoming independent is difficult if there is no radio-tracking (HERRMANN 1994, GENOVESI et al. 1996) available. The release of the animal may be problematic for instance, 1) if it does not know threat factors adequately (dogs, cats, other stone martens, SEILER et al. 1994, TÓTH et al. 2007), 2) if it is tame and used to human contact as in this case it is not afraid of or avoid humans and may in fact seek food from them, 3) it may lack the vital knowledge of hunting techniques and 4) it may cause damage due to its false strong relationship with the human environment (LANSZKINÉ and LANSZKI 2005).

The young female stone marten in this case study arrived with us in April 2004. During its rehabilitation, it was allowed to spend some hours freely in the yard and to play with our puli type dogs which were taking care of some orphaned carnivores. In the following

summer (which is the mating season of stone martens), when it reached full size, it spent increasingly long periods of time out of our sight; then occasionally it went away from home for the night. Eventually, it did not return for food, but we still recognized its presence afterwards. It chose the attic of our house as the place for its nest and deposited its scat at typical places in our yard.

The goal of this study was to analyze the diet composition of this hand-reared stone marten after release.

Material and methods

The study was performed in Fonó (village in Somogy county, Hungary). Samples (n=34 individual scats) were collected from the pavement by the house, from the rock garden and in the attic of the house between September 2005 and February 2006.

The diet composition of the released stone marten was investigated by analysis of scats, using standard wet procedure. Prey determination was performed by microscope on the basis of feather, bone, dentition and hair characteristics. Protocols for food determination from scats have been described in detail elsewhere (e.g. JĘDRZEJEWSKA and JĘDRZEJEWSKI 1998, LANSZKI 2003). For expressing diet composition, two measures were used: the relative frequency of occurrence (%O, number of occurrences of a certain food type divided by total number of occurrences of all food types) and percentage of biomass consumed (%B). To estimate the fresh mass of food ingested (REYNOLDS and AEBISCHER 1991), all dry food remains were weighed separately and the mass data were multiplied by an appropriate conversion factor, as summarised by JĘDRZEJEWSKA and JĘDRZEJEWSKI (1998) for the marten.

Trophic niche breadth was calculated in accordance with Levins (1968 in Krebs 1989): $B = 1/\sum p_i^2$, where p_i = the percentage relative frequency, or percentage biomass consumed of the i^{th} taxon; and standardized across food taxa: $B_A = (B-1)/(n-1)$, rating from 0 (specialized food habits) to 1 (generalist food habits). The following four or five main food taxa (types) were used in the calculations related to trophic niche for the purpose of comparing it to the earlier analysis from here (Fonó, village): 1 - small mammals, 2 - domestic animals and household food (plain cooking and pet food), 3 - birds, 4 - invertebrates (arthropods and molluscs) and alternatively 5 - plants. Classification of prey species on the basis of their weight and habitat association have been detailed e.g. in LANSZKI et al. (2009). SPSS 10.0 (1999) statistics program was used for processing data.

Results and discussion

The 34 scat samples of the hand-reared stone marten contained 8 different animal and 8 plant food taxa. Easily available plant material – especially fruits – formed the dominant component of the diet in the autumn-winter period studied (O: 56.9% and B: 56.6%, Table 1), similar to reports in other studies (e.g. HOLISOVÁ and OBRTEL 1982, TESTER 1986, LODÉ 1994, GENOVESI et al. 1996, PRIGIONI et al. 2008) and in the earlier village study (LANSZKI 2003). Main fruits eaten were grape, apple and blackthorn, but the marten consumed seeds and probably also fed from garbage (e.g. cherry). The hand-reared stone marten was fed wet and dry catfood and various seasonally available garden fruits.

Table 1: Diet composition of a hand-reared stone marten after release in a village (Fonó) in Hungary

Data collected from September 2005 to February 2006. N – number of food elements, %O – percentage relative frequency of occurrence, %B – biomass consumed, ¹within the overall food, ²within the animal food, + – less than 0.05%, B_A – standardized trophic niche breadth. Empty cells mean that the given taxon was not detected.

Food item	N	%O ¹	%O ²	%B ¹	%B ²
Common vole <i>Microtus arvalis</i>	2	3.1	7.1	4.5	10.2
<i>Apodemus</i> spp.	6	9.2	21.4	9.5	21.8
Brown rat <i>Rattus norvegicus</i>	2	3.1	7.1	15.3	35.1
Eastern house mouse <i>Mus musculus</i>	5	7.7	17.9	10.1	23.2
Undetermined Rodentia	1	1.5	3.6	0.4	0.8
Pygmy shrew <i>Sorex minutus</i>	1	1.5	3.6	1.2	2.7
Singing birds Passeriformes	7	10.8	25	2.4	5.6
Harpalus spp.	1	1.5	3.6	+	+
Coleoptera spp.	1	1.5	3.6	+	+
Fly pupa	2	3.1	7.1	0.2	0.4
Grape	16	24.6		15	
Blackberry	2	3.1		4.8	
Cherry	2	3.1		10.4	
Blackthorn	4	6.2		16.6	
Plum	2	3.1		3.5	
Apple	7	10.8		4.4	
Barley	1	1.5		+	
Plant offal	3	4.6		1.7	
Number of spraints	34				
Number of items	65				
B _A		0.36	0.30	0.26	0.03

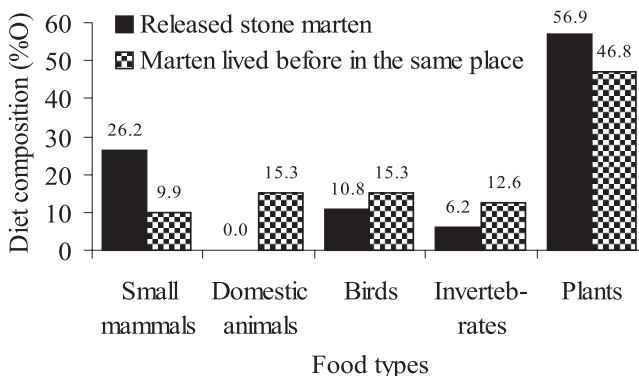


Fig. 1: Diet composition of a hand-reared, and wild-living stone martens in Fonó (Hungary)

%O – percentage relative frequency of occurrence. Sources: “Released stone marten” from the present study, “Marten which lived before in the same place” from LANSZKI (1993).



Fig. 2: Two weeks old stone marten (*Martes foina*) (photos: J. Lanszki)



Fig. 3: Young stone marten (ten-week-old)

Therefore some of these food taxa had been available for it even before release. Primary animal food type was small mammals (O: 26.2% and B: 40.8%, Table 1) as was also found in other studies (DELIBES 1978, RASMUSSEN and MADSEN 1985, TESTER 1986, GOSZCZYNSKI 1986, SERAFINI and LOVARI 1993, LODÉ 1994) and in the village study (LANSZKI 2003). From small mammals the human-linked or habitat generalist brown rat, house mouse and *Apodemus* spp. were found in the largest ratio of consumed biomass. The hand-reared stone marten preyed on wild rats before becoming independent (spontaneous preying), which it did not consume at that time. However, birds and invertebrates were relatively frequently consumed (25% within preys), but biomass ratio of these food types was low (B: 5.6%). Before becoming independent it already raided sparrow nests under the gutter (spontaneous preying but the young were not consumed). No domestic animal remains were found in scat samples, in spite of the fact that poultry is kept at neighbouring houses (in the whole village) and that it had consumed poultry eggs before becoming independent. In the scats, four originally indigestible materials occurred, such as pieces of brick scrap, salami husk, sponge and rag. The fly pupa indicates feeding on garbage, which makes the utilization of garbage as food source probable.

The hand-reared stone marten consumed mainly small-sized (< 50 g, O: 92.9% and B: 64.9%) and terrestrial prey species (O: 75% and B: 94.4%) compared to other martens examined in the region of South-Transdanubia (overview in LANSZKI et al. 2009).

The diet composition of the hand-reared and released stone marten differed significantly (Chi-square test: $\chi^2_4 = 19.87$, $P < 0.001$, Fig. 1) from those stone marten which had earlier used the loft of this same house in Fonó (autumn and winter period of 1991/1992, LANSZKI 1993), and also differed from those stone marten which lived inside the village or lived in the surrounding agricultural area (LANSZKI 2003) ($\chi^2_5 = 32.18$, $P < 0.001$ and $\chi^2_6 = 19.68$, $P < 0.001$, respectively). In the samples collected from these in the autumn and winter of 1991-1992 in the same area (n= 43 scats and 5 prey remains) the following food taxa were found: 11 small mammals (rodents and insectivores), 17 singing birds (16 *Passer* spp), 17 domestic animals (8 poultry, 2 rabbits, 7 poultry eggs), 14 insects (mainly carabid beetles) and 52 plants (mainly grapes). In addition originally indigestible materials (10 cases) occurred. The differences realised in the feeding habits mainly originated from the experience that the hand-reared and released stone marten did not consume domestic animals.

Standardized trophic niche breadth value (Table 1) was similar to those stone martens which lived in other villages in Somogy county (LANSZKI et al. 2009), but was narrower in comparison with martens which lived before on the same site (B_A : 0.40 and 0.58 on the basis of %O¹ and %O², LANSZKI 1993).

In conclusion, this hand-reared and released stone marten was capable of searching for food independently. Its trophic niche was relatively narrow, and its food consisted mainly of fruits and small mammals. We did not find any remains of domestic animals in the samples.

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