

Diet of the Stone marten (*Martes foina* Erxl.) in two large cities of the Upper Thracian Lowland, South Bulgaria

DILIAN GEORGIEV

Department of Ecology and Environmental Conservation, University of Plovdiv, Tzar Assen Str. 24, BG-4000 Plovdiv, Bulgaria, email: diliangeorgiev@abv.bg

Abstract. The fruits of domestic and wild plants comprise the main food of the urban Stone martens. The secondary food varied during seasons. Insects, birds and mammals (small and bone remains of large mammals) occurred in the feces. Amphibians and reptiles were eaten occasionally.

Key words: Mustelidae, urban areas, diet.

Introduction

The Stone marten (*Martes foina* Erxl.) is one of the most widespread mustelid in Europe having a high ecological plasticity and inhabiting even the big cities. In Bulgaria it is also the among the commonest carnivores at the whole territory of the country. The adult animals have a home range up to 80 ha which is marked by feces deposited on various well visible sites. They can be easily recognized by their smell, shape and position, especially at low altitude anthropogenic sites where the very similar species, the Pine marten (*Martes martes* L.) does not occur in Bulgaria (Macdonald & Barret 1993, Popov & Sedefchev 2003).

Even the diet of these small carnivores is well studied at the whole of the species range the papers concerning their diet at the urban areas are scarce (Sidorovich 1995).

Present paper provides some information on the food of the Stone Marten in the urban areas of South Bulgaria, which are unexplored till now.

Material and methods

The Stone marten diet was studied by analyzing feces content. Samples (N = 67) were collected at the two largest cities in the Upper Thracian Lowland: Plovdiv and Stara Zagora between 1.6.2005 and 14.12.2006 (Table 1). Food items were determined using a reference collection of bones, feathers and fruit remains, deposited/kept at the collection of the author. In this study the minimal number of preys was considered and their percentage among all preys in a particular season found in the diet was calculated. For the calculations the computer program Biodiversity Professional, Version 2, 1997 was used.

Results and Discussion

The fruits of domestic and wild plants varying from 65.8 to 94.0% in different seasons represent the main food of the urban Stone martens were (Table 2, Figure 1). Total of 9 species were used as a main food source. In spring cherries (*Cerasus sativa*) and mulberries (*Morus* sp.) were mainly taken, in summer – wild plums (*Prunus cerasifea*) and grapes (*Vitis vinifera*), in autumn – blackberries (*Rubus* sp.) and grapes (*Vitis vinifera*), and in winter – wild briars (*Rosa* sp.). The secondary food varied during seasons. In different proportions insects, birds and mammals (small and bones of large mammals) occurred in

the feces. As a whole the amphibians and reptiles were taken occasionally as it is typical for this species (Lode 1994, Vasileva *et al.* 2005, Georgiev 2009).

The species is largely frutivorous in some areas of its range (Macdonald & Barret 1993). Also its foot spectrum can be a result of individual preferences or opportunistic behavior (Sidorovich 1995). Knowing that in the cities a lot of garbage remains are easy to scavenge by the urban Stone Martens it is very possible that the fruit eating due to a preference neither to opportunistic behavior.

Table 1. Dates and areas of sample collections with number of feces studied.

Date	Locality	Samples
1.6.2005	Stara Zagora, Park Bedechka	6
30.8.2005	Stara Zagora, Park Bedechka	1
8.9.2005	Stara Zagora, Zora area	2
11.9.2005	Stara Zagora, Park Bedechka	1
15.9.2005	Plovdiv, vicinities, Trakia area	11
16.9.2005	Plovdiv, north vicinities, near Fishfarms	7
19.9.2005	Plovdiv, vicinities, west	1
12.12.2005	Plovdiv, near railway bridge, Maritza River	1
13.12.2005	Plovdiv, vicinities, Trakia area	15
31.1.2006	Plovdiv, north vicinities, near Fishfarms	2
16.2.2005	Plovdiv, vicinities, Trakia area	12
16.5.2006	Plovdiv, north vicinities, near Fishfarms	2
18.5.2006	Plovdiv, vicinities, Trakia area	4
2.12.2006	Stara Zagora, ZZU area	1
14.12.2006	Plovdiv, vicinities, Trakia area	1
Total number of samples		67

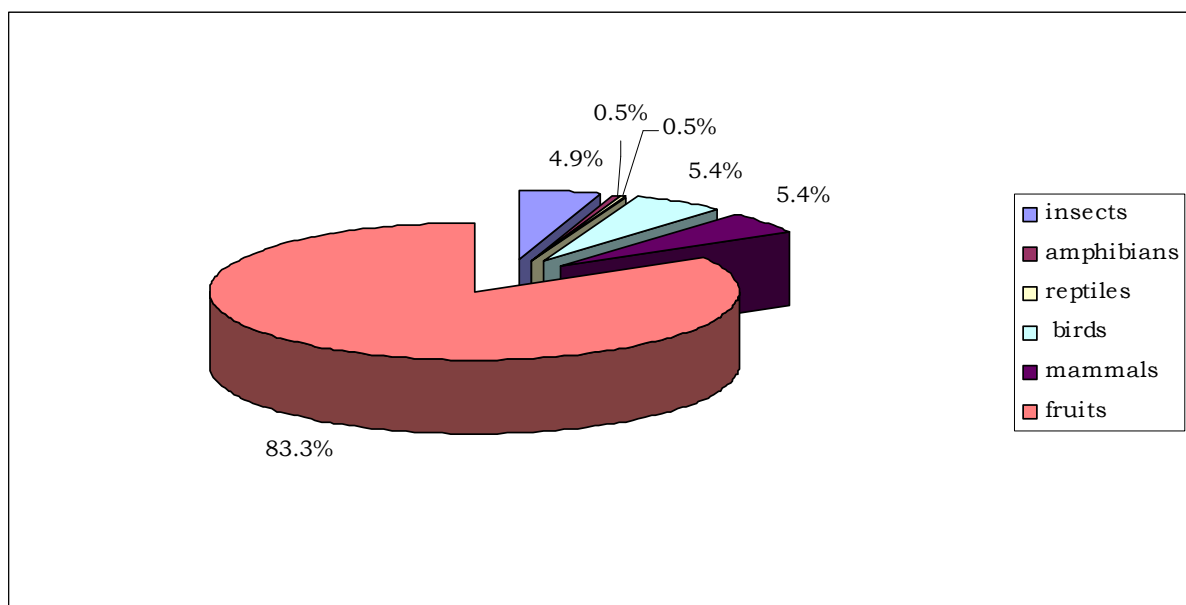


Fig. 1. Proportions of the different food items in the diet of the Stone marten in the two cities studied as a whole.

Table 2. Diet of the Stone marten in the study area during the seasons. Legend: N – minimal number of specimens or fruits taken.

Species	Spring		Summer		Autumn		Winter	
	N	%	N	%	N	%	N	%
Coleoptera indet.	4	10.5	1	1.0	0	0.0	0	0.0
Orthoptera indet.	0	0.0	1	1.0	0	0.0	0	0.0
Insecta indet.	2	5.3	1	1.0	0	0.0	1	5.6
Total insects	6	15.8	3	3.1	0	0.0	1	5.6
Anura indet.	0	0.0	1	1.0	0	0.0	0	0.0
Total amphibians	0	0.0	1	1.0	0	0.0	0	0.0
Lacertilia indet.	1	2.6	0	0.0	0	0.0	0	0.0
Total reptiles	1	2.6	0	0.0	0	0.0	0	0.0
<i>Sturnus vulgaris</i>	1	2.6	0	0.0	0	0.0	0	0.0
<i>Gallus gallus</i> f. <i>domestica</i> - egg	0	0.0	0	0.0	0	0.0	1	5.6
Passeriformes indet.	0	0.0	4	4.1	0	0.0	0	0.0
Aves indet.	2	5.3	1	1.0	1	2.0	1	5.6
Total birds	3	7.9	5	5.2	1	2.0	2	11.1
<i>Mus</i> sp.	1	2.6	0	0.0	0	0.0	0	0.0
Mammalia indet. - small	1	2.6	3	3.1	1	2.0	3	16.7
Mammalia indet. - large (carcass)	1	2.6	0	0.0	1	2.0	0	0.0
Total mammals	3	7.9	3	3.1	2	4.0	3	16.7
<i>Cerasus sativa</i>	12	31.6	0	0.0	0	0.0	0	0.0
<i>Malus</i> sp.	0	0.0	0	0.0	2	4.0	0	0.0
<i>Prunus cerasifera</i>	0	0.0	16	16.5	5	10.0	0	0.0
<i>Prunus domestica</i>	0	0.0	4	4.1	0	0.0	0	0.0
<i>Pyrus</i> sp.	0	0.0	5	5.2	3	6.0	0	0.0
<i>Rosa</i> sp.	0	0.0	0	0.0	17	34.0	12	66.7
<i>Rubus</i> sp.	0	0.0	9	9.3	6	12.0	0	0.0
<i>Vitis vinifera</i>	0	0.0	51	52.6	14	28.0	0	0.0
<i>Morus</i> sp.	13	34.2	0	0.0	0	0.0	0	0.0
Total fruits	25	65.8	85	87.6	47	94.0	12	66.7
Total specimens/fruits	38	100.0	97	100.0	50	100.0	18	100.0
Simpsons diversity	0.216		0.313		0.209		0.451	

References

- Georgiev, D. (2009) A record of Horned viper *Vipera ammodytes* (L.) in the diet of the Stone marten *Martes foina* (Erxl.) (Mammalia: Mustelidae) in Bulgaria. *ZooNotes*, 5: 1-2.
- Lode, T. (1994) Feeding habits of the Stone marten *Martes foina* and environmental factor in Western France. *Z. Säugetierkunde*, 59: 189-191.
- Macdonald, D. & Barret. P. (1993) *Mammals of Britain and Europe*. Harper Collins Publishers, 312 pp.

- Popov, V. & Sedefchev, A. (2003) *The Mammals of Bulgaria*. Sofia. Vitosha Publ., 291 pp. (In Bulgarian).
- Sidorovich, V. (1995) *Minks, otter, weasel and other Mustelids*. Uradzhay, Minsk, 191 pp. (In Russian).
- Vasileva, S., Zlatanova, D. & Racheva V. (2005) The food of the Red fox (*Vulpes vulpes* L.) and the Marten (*Martes foina*, Erxl) in the spring-summer period in Osogovo mountain. In: Gruev, B., M. Nikolova and A. Donev (Eds.), Proceedings of the Balkan Scientific Conference of Biology in Plovdiv (Bulgaria) from 19th till 21st of May 2005, pp. 481-488.