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## Stone marten (*Martes foina*, Erxl., 1777) and villagers: human-wildlife social conflict

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(Manuscript received 16 May 2016; accepted for publication 8 June 2016)

**Abstract.** The "Human-wildlife conflict" refers to the interaction between wild animals and humans and the negative impact on their resources or wildlife and their habitats. One of the reasons for its occurrence is the entry of wild animals in urban environment. Stone marten often enters into settlements and its activity provokes conflict with humans. To clarify the attitude towards coexistence with this species a survey among 132 residents of villages in the region of Sarnena Sredna Gora Mountain was conducted in the period 01.12.2015-31.03.2016. The opinion of people familiar with stone marten's biology (hunters) and other people (retired and active) was explored. The differences between men and women were examined. In settlements stone marten is considered to be a pest, attacking smaller livestock. Its presence disturbs humans by- displacing tiles on the roofs, noise, faeces etc., and consequently Human-wildlife conflict emerges. More than half of people are not convinced to take ultimate measures against martens. Human-stone marten conflict in Bulgarian villages is still at the tolerance level.

**Keywords:** negative impact, stone marten, disturbance

### Introduction

Many animal species are easily settled in anthropogenic environment and actively utilize both spatial and trophic niches. One of these species is the stone marten (*Martes foina*, Erxl., 1777). In our country it is ubiquitous in the mountains and plains. Stone marten is a hunting object. (Annex 1 of the PDPA). The species is neither included in the Biodiversity Act nor in the Red Book of Bulgaria.

Stone martens prefer to dwell in settlements (villages and towns) in different parts of its area. It is a curse for the villagers suffocating entire henhouses (Brem, 2004). According to Szöcs and Heltai (2007) in the past decades, the stone marten (*Martes foina*) often moves to inhabited areas in Europe and Hungary in quest for hiding places (attics) and food (garbage and pigeons). However, its presence incurs human-wildlife conflict. Human-wildlife conflict refers to the interaction between wild animals and people and the resultant negative impact on people or their resources, or wild animals or their habitat (<http://wwf.panda.org>). Urban stone martens live practically side by side with humans, using attics, roofs and suspended ceilings as den-sites (Tóth and Szenczi, 2004; Herr et al. 2009b). At the same time, they might cause significant financial and sanitary problems (Tóth et al., 2007a; Szöcs et al., 2008; Herr, 2008). The significance of the conflict between humans and wildlife rose the interest of authors from Europe to conduct research with the purpose to clarify its manifestations. One of the methods is by exploring people's opinion. On the basis of questionnaires, correspondence and phone-calls Tóth et al. (2009) obtained data providing detailed information regarding the stone marten's occurrence (date, place), habitat, behavior, potential food sources, progeny and conflict with human interest. So far, there is only one study based on interviews, aimed at clarifying the attitude of hunters to some protected birds and mammals in Bulgaria (Raichev et al., 2012).

The attitude of villagers to the presence of stone martens has

not been studied in Bulgaria. In parallel with another study concerning the food spectrum of the species in villages the negative attitude of the local people was acknowledged. This provokes us to elucidate the aspects of "human-wildlife" conflict in Bulgarian villages in respect of one of the most common synantropic species – the stone marten, to determine the frequency of its manifestations and the real attitude of people. Our aim was to define the conflict and to seek its expression in relation to the gender of respondents and the level of awareness about the biology of the species by means of anonymous questionnaires.

### Material and methods

Our study is based on the so called "LEK (local ecological knowledge)", which is an important resource for collecting data about conservation of species with socio-economic importance (Johannes et al., 2000; Jones et al., 2008; Turvey et al., 2014). To clarify the manifestations of conflict between local people and stone martens, a questionnaire with the following questions was composed:

Questionnaire

About you:

Sex:  male/  female

1-1. Do you have a hunting license?  Yes  No

2-1. Do you recognize the stone marten?  Yes  No

3-1. Have your poultry or their eggs ever been damaged by the stone marten?  Yes  No

3-2. What other animals in your farm does the stone marten attack?

3-3. What do you think about the damage?

I want to solve the problem.  I don't care about the problem.

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3-4. Have you ever tried to prevent poultry damage caused by the stone marten?  Yes  No

If you answered yes, in what way have you prevented them?

Has it worked?  Yes  No

3-5. How often are your poultry or eggs attacked by stone martens? They attack ..... times a month/year

3-6. Which season does the stone marten attack your poultry most frequently?

4-1. Do you have stone martens living in your roof, basement or barn?  Yes  No

4-2. What do you think about this?

Their noises annoy me.  Their faeces annoy me.

Other problems

5-1. What do you think about the existence of the stone marten in your village?

I hate them.  Neutral  I love them.

5-2. What do you think should happen to stone martens?

I want to exterminate them.  Neutral

I want them to increase more.

5-3. Please, tell us freely if you have any other problems related to stone martens?

The first part of the questions (1-1 to 2-1) aimed to establish whether people can recognize the species with regard to the proper performance of the survey. To all of respondents were shown pictures of stone martens and its related species from family *Mustelidae*. People who had not seen this animal so far and had no knowledge of it were excluded. Questions 3-1 to 3-6 aimed to establish the direct damages inflicted by martens on domestic animals. Questions 4-1 and 4-2 clarified other concerns caused by stone martens. The last three questions (5-1 to 5-3) aimed to clarify the attitude of the villagers to coexistence with stone martens.

The survey was conducted in the period 01.12.2015 – 31.03.2016 with 132 villagers (Bogomilovo, Kirilovo, Malka Vereya, Lyaskovo, Rakitnitsa, Yavorovo, Ostra Mogila, Kazanka, Sulitsa Pryaporets, Borilovo) from the region of Samena Sredna Gora mountain.

## Results and discussion

In terms of damage caused by stone martens on livestock and concerns from its presence data indicated that women were more excited with the problem (50% and 45.8% of women versus 45.2% and 34.5% of men)(Table 1). Probably the reason for these differences in opinions between the sexes was due to the greater emotionality of women and their greater involvement in caring for livestock. In both cases, however, the predominant response was

damage to livestock (45.2% versus 34.5% in men and 50% versus 45.8% of women). The most commonly identified victims among domestic animals were: hens and chicks, eggs, pigeons. Rarely stone martens attacked small rabbits, turkeys and ducks. In further conversation, most respondents said that the marten living in their attic attacked livestock from neighboring houses. In most cases, it killed all of the available birds. Stone martens consumed only the brain and drinks blood and left corpses intact. We think that this behavioral characteristic is due to the predatory instinct triggered by panic movements of frightened birds. The frequency of stone marten attacks ranged from 4 times per month to once per year. The most frequently cited season was spring, followed by summer, and least often- winter.

Among the concerns raised by coexistence with a marten, respondents first highlighted displacement of tiles on the roofs. Damage to roofs are not just an annoying phenomenon, but have economic impact as well. The opinions of men and women differed largely as the noise caused by the movement of stone marten was concerned – 50% of women were irritated against 8.3% of surveyed men. Due to the specifics of the marking activity of this species, faeces are deposited directly in front of the doors of the houses, on walls and on other visible places. This is a prerequisite for the negative attitude of property owners. A small percentage of respondents (4%) mentioned this problem.

There are reports about marten-related cars damage from Hungary. In these cases martens had chewed electrical wires and cables, damaged the body works or the insulation in the engine compartment to use it for food storage (Herr, 2008; Tóth et al., 2009). That kind of damage was not reported in our study.

As a result of damages and disturbance caused by stone martens, more than half of men (57.1%) and women (64.6%) were willing to solve the problem (Table 2). Most of the men wanting to solve the problem have undertaken appropriate activities for protection (51.2%). Among women, the percentage of those who undertook protection measures against stone martens was lower than these wanting to solve the problem (54.2% versus 64.6%). Women have fewer opportunities for undertaking protection activities. Approximately 2/3 or 67.7% of respondents hunters wanted to solve the problem and even a greater percentage (77.4%) of them took active steps in this direction. The difference is due to the fact that sometimes people can't protect their livestock and use the services of hunters. Slightly more than half of people without hunting license (57.4%) also wanted to solve the problem. Not all of them, however, (45.5%) were active in this. The most frequently mentioned protection activities were: trapping, use of dogs, chasing and shooting. Second came: nets for domestic animals and their maintenance, as well as raising more domestic cats. Tying strips of red cloth, hand clapping, additional lighting at night were also mentioned.

The damage and disturbance caused by stone martens and the

**Table1.** Distribution of people's opinion for damages and disturbance caused by stone martens, expressed by the different categories of respondents (in %)

Category of respondents	Number of respondents, n	Damage to livestock	Disturbance
Men	84	45.2	34.5
Women	48	50.0	45.8
Hunters	31	83.9	32.3
People without hunting license	101	35.6	40.6

\* The data exclude respondents that answered "no opinion"

**Table 2.** Distribution of people's opinion on solving the problem and preventing damages caused by stone martens, expressed by the different categories of respondents (in %)

Category of respondents	Number of respondents, n	Want to solve the problem	Neutral	Tried to prevent damages	Not tried to prevent damages
Men	84	57.1	42.9	51.2	48.8
Women	48	64.6	35.4	54.2	45.8
Hunters	31	67.7	32.3	77.4	22.6
People without hunting license	101	57.4	42.6	45.5	54.5

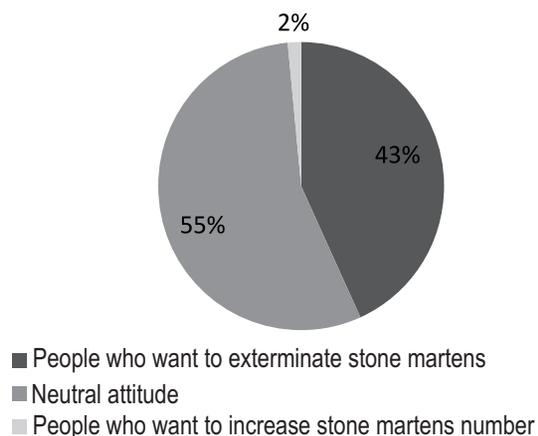
**Table 3.** Distribution of people's attitude towards stone martens expressed by different categories of respondents (in %)

Category of respondents	Number of respondents, n	Hate stone martens	Neutral	Love stone martens	Want to exterminate stone martens	Neutral	Want stone martens to increase more
Men	84	54.8	45.2	-	51.2	46.4	2.4
Women	48	35.4	60.4	4.2	29.2	70.8	-
Hunters	31	54.8	45.2	-	45.2	54.8	-
People without hunting license	101	45.5	52.5	2.0	43.6	54.5	2.0

possibilities to solve the problem by people from the villages raise the general attitude towards this species. Among of men 54.8% did not hide their negative attitude towards stone martens, while only 35.4% of women expressed this kind of attitude (Table 3). The desire for destruction of the species in the villages remained at approximately same levels (51.2% men and 29.2% for women) but at a lesser extent. The results for the other two groups were: 54.8% negative attitude of hunters vs. 45.5% for people without hunting license and 45.2% with a will for the destruction of stone martens in villages among hunters vs. 43.6% for the other category. Expressed positions are influenced by the general attitude of people in combination with the existing personal value system.

In Europe, the public opinion on the presence of this species is ambivalent, some trying to keep it as a pet, others fearing that the coexistence would result in economical and health problems (Szócs et al., 2007; Tóth et al., 2007a). Positive attitudes towards marten and expressed desire to increase its number are isolated cases in our study.

Ignoring the conditional separation of respondents into categories, summarized data of this survey indicated that slightly more than half of people had no opinion on the ultimate measure to solve the problem with stone martens – 55% (Figure 1). Forty-three percents of all respondents expressed their desire to exterminate stone martens in the settlements.



**Figure 1.** Distribution of respondents on the issue of extermination of stone martens (in %)

## Conclusion

In settlements the stone marten is considered to be a pest in owner farming, as it attacks smaller livestock. Its presence disturbs humans by displacing of tiles on the roofs, making noise, faeces etc., provoking "human-wildlife" conflict. In more than half of villagers, the "Human-stone marten" conflict evoked a desire to resolve it and to take appropriate protection activities. Women were more tolerant to the problem than men. Hunters were extreme in their attitude. More than half of people were determined to take ultimate measures against martens. The human-stone marten conflict in Bulgarian villages is at the level of mutual tolerance.

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