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Original Contribution

EFFECT OF SOME FACTORS ON THE MORTALITY OF THE WEASEL MUSTELA NIVALIS IN ROAD CASUALTIES

E. Raichev*

Faculty of Agriculture, Trakia University, Stara Zagora, Bulgaria

ABSTRACT

Carnivore victims of road accidents can be seen often on the road network in Bulgaria. The weasel Mustela nivalis is the smallest carnivore in this country. It is a strictly protected species under the Biological Diversity Act, Annex 3 (2002) and the Bern Convention, Annex III (1979). The effect of some characteristics of the habitat through which the road network passes on mortality has been studied: vegetation, distance to town/village, distance to animal farm and farm buildings, and the influence of season. The most common casualties were observed at a distance of 500-2000 m from the town/village and 500 m from farms, feed storage places or farmyards, which relates to the connection of the weasel to anthropogenic landscape. Higher is the percentage of casualties in open areas with low grass vegetation or farm crops compared to places with forest or shrub vegetation.

Key words: Mustelidae, Bulgaria, road accidents, vegetation, seasonality

INTRODUCTION

Often on the roads of Bulgaria carnivores such as jackal, fox, marten, badger can be seen to be the victims of road accidents. The populations of these animals are affected by the development of road network and traffic intensity. Usually it is assumed that road mortality cannot affect critically the survival of populations of small animals (1, 2). However, the barrier effect and mortality caused by road traffic have some impact on the number of mammals (3). In Bulgaria the weasel (Mustela nivalis) is the smallest carnivore. It is a strictly protected species in the (4) and in the (5). The weasel is tied to the cultural landscape and prefers open habitats (6, 7). It is distributed throughout the country from sea level to 2000 m altitude. It inhabits forests, bushes, tall grass, barns, gardens, hedges, cities (8).

The widespread occurrence and mostly nocturnal activity is a prerequisite for traffic accidents. Mortality data about the Mustelidae family are almost not available in this country. The weasel is mentioned in the study by (9), and the otter (10).

The factors influencing the number of road accidents involving weasels are probably similar to those of other mammals: level of traffic, speed of vehicles, field topography (11, 12). The probability of accidents can be due to specific interspecies features such as gender differences in activity, time of breeding, displacement of the younger generation, etc.

The aim of this study is to reveal some biological features affecting road mortality of this species: kind of vegetation, distance from town/village, from animal farms and to establish the effect of the season. The manifestation of such dependency will give direction for future more detailed studies.

MATERIAL AND METHODS

This study is based on 48 carcasses of run over weasels along the route: Stara Zagora-Nova Zagora-Sliven-Karnobat-Aytos-Provadiya-Varna-Obzor-Nessebar-Aytos-Karnobat-Sliven-

***Correspondence to**: *Evgeniy Raichev, Faculty of Agriculture, Trakia University, Stara Zagora, Bulgaria, eraichev@uni-sz.bg*

Tulovo-Stara Zagora- Sofia (**Figure 1**) with total length of 954 km. The route has been traveled once a month for the period from 2007 to 2011 (48 months) by the author and specialists at the Natural History Museum in Varna. In each road accident the following was recorded: distance from town/village (inside, 0-500 m, 500-2000 m and above 2000 m), from the animal farm, farm yard or feed production company (0-500 m and above 500 m). Vegetation around the location of accident venue was recorded in order to determine the biotope type (none i.e. the town/village itself, field vegetation, forest vegetation – trees and shrubs). The date of each registered road accident was recorded in a calendar in order to assess the monthly distribution.

The sex of animals studied was determined by establishing the presence or absence of penis bone (os penis).

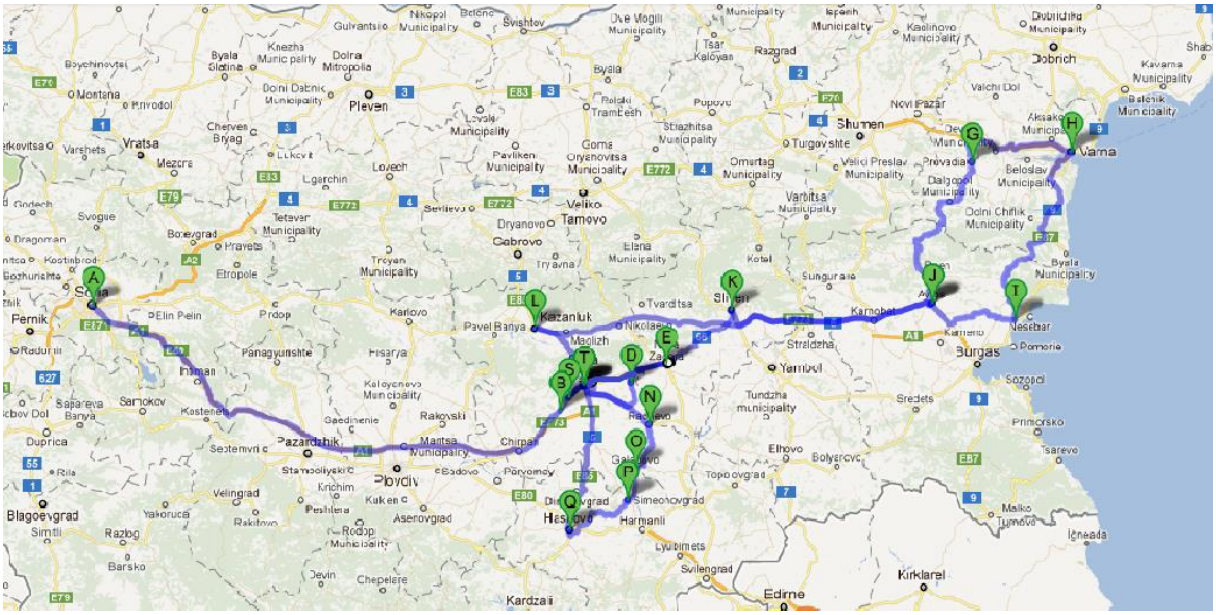

Figure 1. *Part* of the national road network – study area.

RESULTS AND DISCUSSION

The monthly distribution of the number of road accidents involving weasels tended to increase in spring and summer and decrease in winter. (**Figure 2**). In December, January and February not a single case was reported. The probable cause for high mortality in spring and summer is the onset of the breeding season from March to May (7). The later peak in autumn is probably due to the period of displacement of the young specimens. Due to the poor condition of many of the run over animals we were not able to assess their age by the wearing of the teeth and to determine the effect of that factor on mortality.

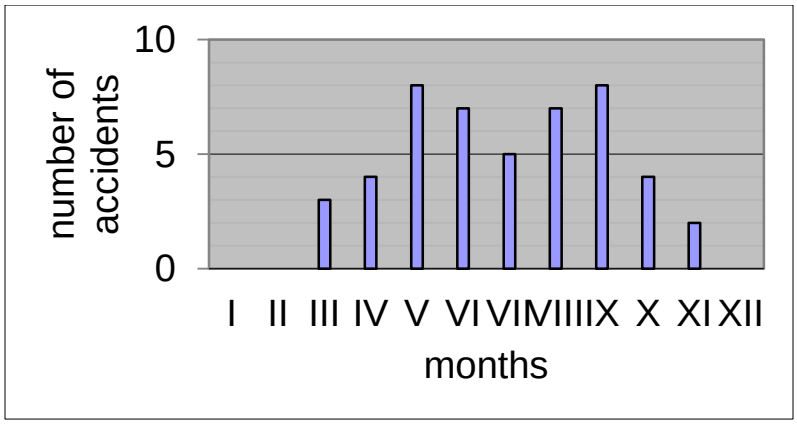

Figure 2. Monthly distribution of the number of road accidents involving weasels

The ratio between males and females in the total sample was 3.8 to 1 (38 ♂ / 10 ♀). The predominance of males may be due to two reasons: 1. This is the normal ratio in nature. 2. Males are more active and have larger individual areas (sectors) and therefore they are more frequently victims of road traffic (13, 14, 15).

The effect of season on this type of mortality in the weasel is reflected in (**Figure 3**). In the winter season was not a single fatal case was reported despite the regular traveling along the route. Summer mortality is the highest, followed by spring and autumn. At this stage of research it is difficult to comment on the reasons for this distribution. Perhaps the growing season and the presence of lush vegetation exert their influence, as well as the periods of breeding and displacement of the young generation.

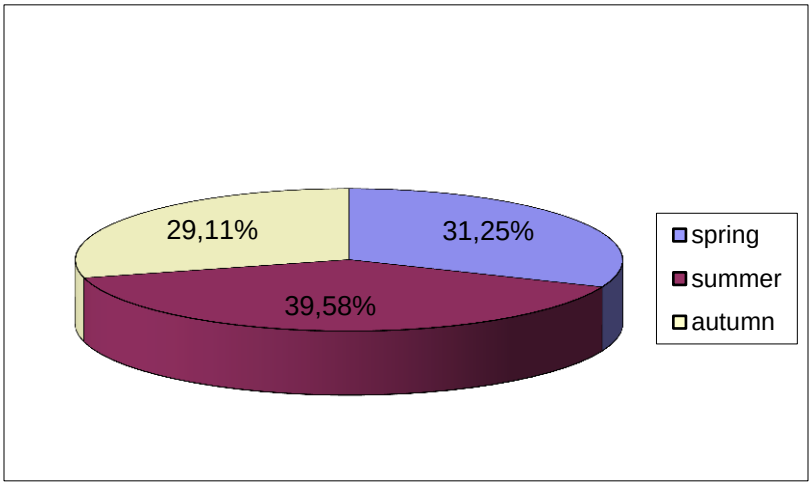

Figure 3. The effect of season on road accidents with weasels

In describing the vegetation near road accidents it was assumed that in the town/village it is scarce (4.17% of the cases) (**Figure 4**). In open areas with low natural vegetation or farm crops 81.25% of the cases were reported, and in areas with high (forest or shrub vegetation) - 14.58%. The increased mortality of the weasel on road crossing open habitats can be related to its preferences to pastures, meadows, heaths, agricultural crops (14, 16, 17).

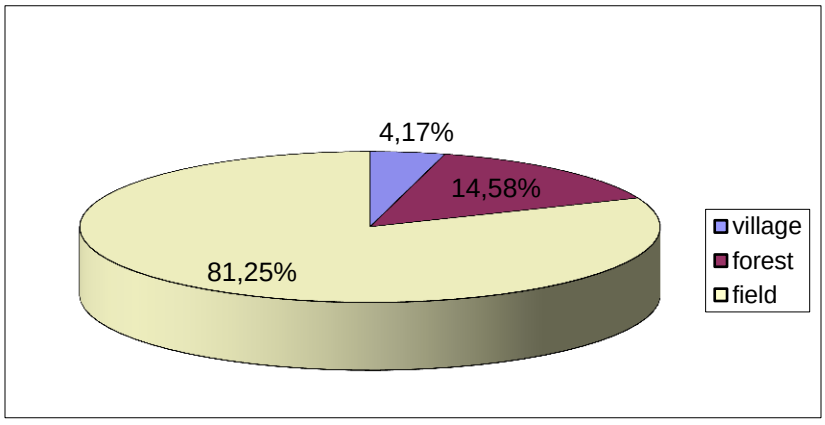

Figure 4. The effect of vegetation on road accidents with weasels

High mortality was reported close to (500 m) animal farms, farmyards and feed production plants **(Figure 5).** Perhaps the density of the weasel population around such sites is greater because of the abundance of rodents. Moreover (unpublished data) on poultry and rabbit farms it harms the young generation.

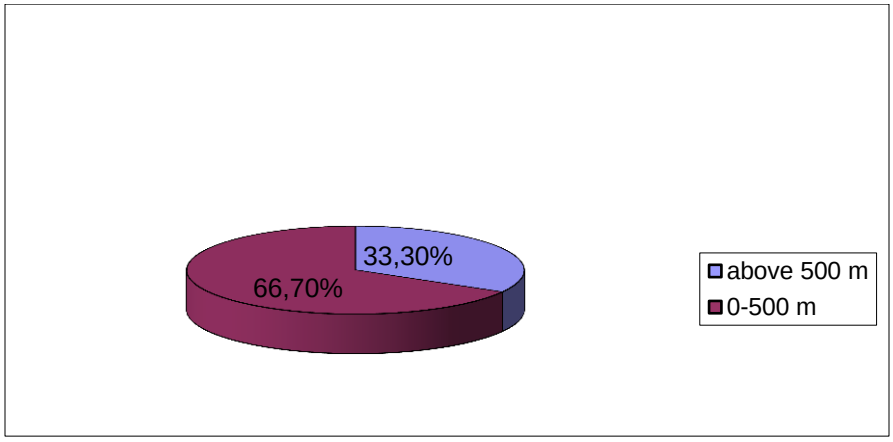

Figure 5. The effect of distance to animal farms and farmyards on road accidents with weasels

Data about accidents concerning distance from the town/village show that at distance over 2000 m mortality is 25% (**Figure. 6**). In comparison, around towns/villages (500-2000), (0-500) and inside these it is a total of 75%. If we assume that at distance from 500 to 2000 m from the villages and small towns through which the studied route passes the landscape is anthropogenically altered, it is clear that the weasel is connected to it. The same is claimed by (7, 18). The results of telemetric studies indicate that linear elements (one of which are roads) in arable land are used as pathways (14). This can be another reason for mortality caused by vehicles and another proof of the connection on that animal to the cultural landscape.

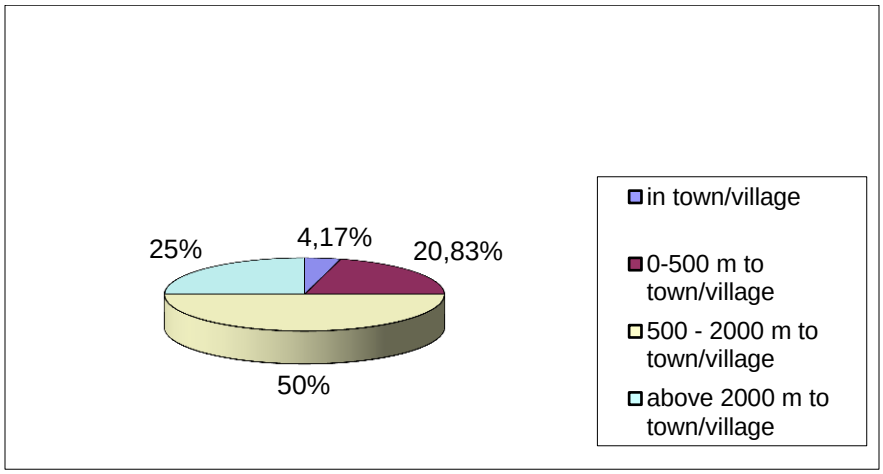

Figure 6. The effect of distance to town/village on road accidents with weasels

CONCLUSIONS

1. The highest is the mortality of the weasel on the road network from March to September, which coincides with the breeding season and the displacement of the young generation during active vegetation.
2. Increased mortality was observed in open habitats and near farms, feed production plants and farmyards.
3. The location of the majority of road accidents compared to urban areas shows that the weasel inhabits the vicinity.
4. The outlined characteristics of the habitat and the seasonal features of road accidents provide direction for future more detailed studies of the factors influencing this type of mortality in weasels.

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