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Wooded area, forest road-killed animals: Intensity and seasonal differences of road mortality on a small, newly upgraded road in western Romania

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ABSTRACT

The roads are one of the most obvious expressions of modern society, being considered vital for economical growth. Nevertheless, roads have a very strong negative impact upon environment, manifested, among others, by road mortality. In Romania numerous minor roads are currently upgraded and asphalted. In the year 2016, on a road of this kind, in a wooded mountain area, we recorded 1628 road killed animals belonging to 48 taxons. The majority were forest and wet areas animals (earthworms, snails, amphibians, etc), characteristic for the road's vicinity. Flying or dry areas animals were fewer. The road crosses the forest and the wet areas animals' habitats. Now, they are certain victims on the road, because its recent upgrade had increased the cars' speed. Road mortality differed between periods and according to the road surroundings aspect. The highest road mortality intensity was registered at the end of the spring. It has dropped in the summer and then rose again in the autumn, but just moderately. The animals were affected according to their life cycle and ecological demands. On this minor road surrounded by relatively uniform wooded habitats, the road mortality differences were determined in the first place by the demandings and life cycle of the victims, which were affected by meteorological conditions. This studied road is a proof of how forest native animals are exposed once their habitat is crossed by a road.

1. Introduction

New roads should be constructed in regions with low biodiversity but important for the agriculture, and regions with high biodiversity should be avoided in the context of the forecasted increase of road network length in the next decades (see in: Laurance et al., 2014). Romania is a country with a rich biodiversity (see in: Sima, 2010; Florea and Stratilă, 2013), where the road network is well developed, branching the entire country surface (e.g. Tătaru, 2013). However, for tourism purposes (the easy access increasing the tourists' number) even now the construction of new roads or the upgrade of the

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old ones is proposed even in protected areas with rich biodiversity (e.g. Constantinescu et al., 2010; Drăgan and Cocean, 2015). In the last years in Romania the upgrade of minor roads has gained a great momentum, also in protected areas, with direct impact on fauna, causing high road mortality (e.g. Cicort-Lucaciu et al., 2012, 2016). The minor roads negative impact upon the fauna is well established (e.g. van Langevelde et al., 2009; Matos et al., 2012; D'Amico et al., 2016). Nevertheless, because of economic reasons, the building of new roads is permanently boosted (see in: Laurance et al., 2014). Thus, for conservative purposes the importance of road-less areas is more and more highlighted (e.g. Selva et al., 2011; D'Amico et al., 2016). Such an area in Western Romania is Codru-Moma Mountains; they are not crossed by any modernized road, but only by few forest dirt roads, much of them being not practicable by car (Fey et al., 2001). However, these mountains are surrounded by villages connected to the road network, from which start upstream forest roads (Fey et al., 2001). In the last years some of these roads were modernized, like the road situated upstream Finiș locality, which was recently asphalted. The modernized road from Finiș crosses a densely forested region (Fey et al., 2001). Because even narrow forest roads with low traffic indirectly affected the neighboring fauna (Chen and Koprowski, 2016) we presumed that a modernized road will have a strong negative impact manifested also regarding road mortality, affecting especially forest animals. We hypothesized that the native fauna related with forested regions should be affected by the road traffic in the same manner, regardless its taxonomic appurtenance (vertebrates or invertebrates). We hypothesized that their ecological demands will be more important in their contact with the road than their taxonomic position. Thus, we proposed the following objectives: (1) to establish the fauna road mortality intensity. (2) To observe the seasonal differences of road mortality. (3) To establish the most vulnerable species and periods. (4) To analyze the entire road-killed animals, both invertebrates and vertebrates.

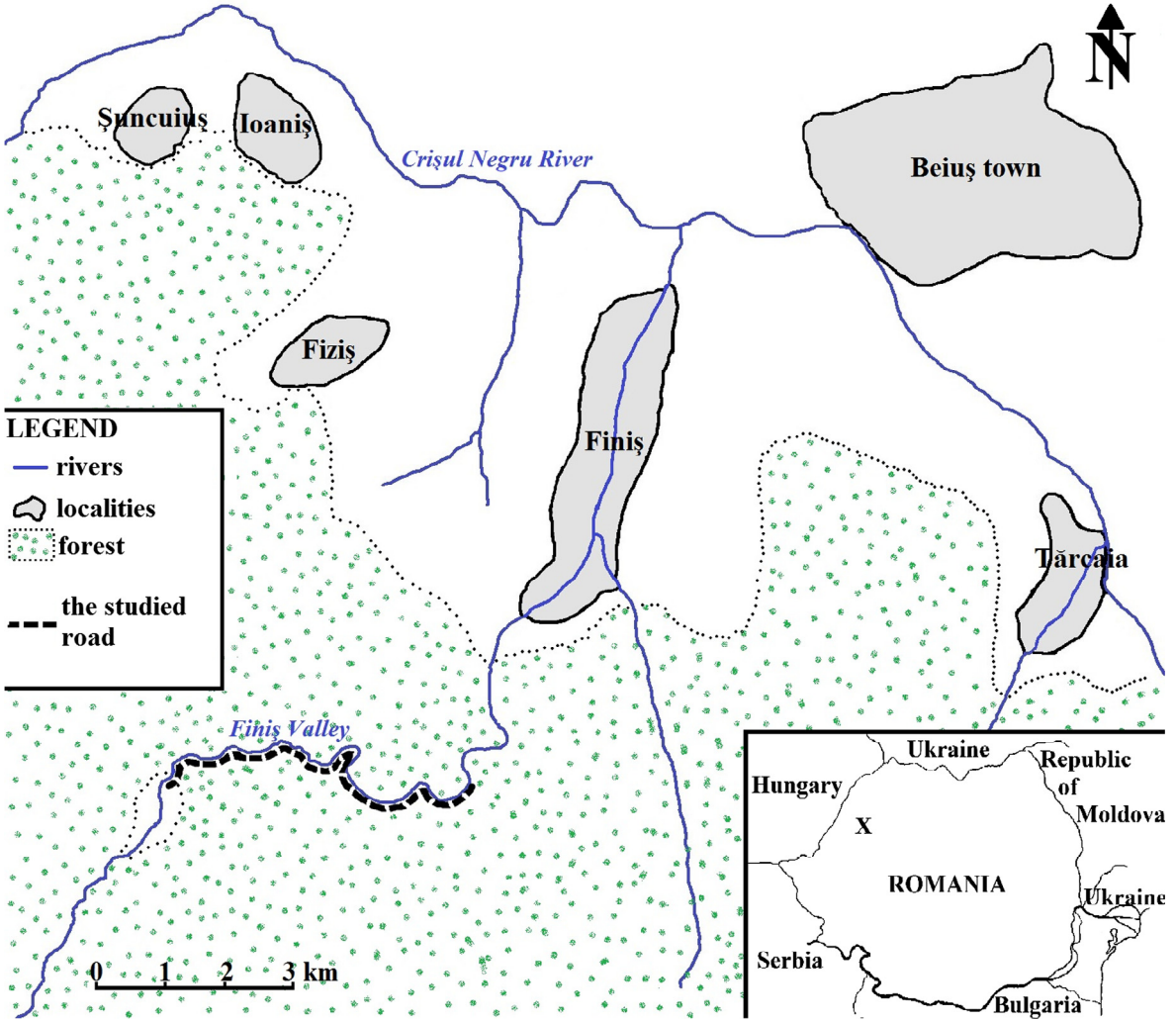

Fig. 1. The studied road near Finiș locality, Romania.