HOW DO TEMPORAL AND SPATIAL FEATURES AFFECT ANTEATER ROADKILL IN BRAZIL?

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RESUMO

Movement, dispersion, ecology and animal behavior are possible determining factors for the mortality rate of species on roads. Understanding the magnitude of roadkill and the features that affect the species mortality via vehicular collision are essential to measure road impact and propose conservation strategies. Medium-large mammals are highly vulnerable to collision given their general high mobility, low reproductive rates, specialist diets and low population densities. Among them, the superorder Xenarthra is in the top 10 of species most affected by the roadkill collision in Brazil. However, there is no research about the influence of temporal and spatial features on Xenartha's mortality rate. Therefore, we evaluated the patterns of roadkill of two species, the giant anteater (Myrmecophaga tridactyla) and the southern tamandua (Tamandua tetradactyla) across a temporal and spatial gradient in the Brazilian Center-Western region. The surveys were conducted along four different road transects: T1, along 155 BR-262 to the bridge over the Paraguay River (total extension: 397 km); T2, along BR-262 to 156 Três Lagoas (305 km); T3, along BR-163 and BR-267 to Nova Andrandina (275 km) and T4, 157 along MS-040 to Bataguassu (300 km) covered 1,259 km of paved road. The monitoring maintaining regular intervals between April 2017 and March 2018, resulting in 25 surveys. For each recorded animal, we collected tissue samples for molecular sex identification and road ecology analysis. We tested whether roadkills vary seasonally, and additionally, we identified the hotspots for each species across each highway using the modified 2D-Ripley K test and the 2D Hotspot identification analysis. We used regression analyses and generalized linear models to test the influence of temporal (e.g. temperature and humidity), and spatial (e.g. forest coverage %) features on roadkill rates, respectively. We recorded 320 killed individuals (1.28 individuals/100 km/day), including 191 giant anteaters (60 females, 85 males, and 46 without gender) and 129 (17 females, 75 males, and 37 without gender) southern tamandua for one year. If we consider the natural sexual ratio of both species is 1:1, males of the southern tamandua were more killed than females (3:1), while the roadkill rate for male giant anteaters (1.5:1) reveals an equal tendency in the roadkills' genders. No influence of temperature and humidity were registered in any evaluated roadkill pattern. However, the female roadkill of both species peaked in the rainy season which can reveal the influences of seasonal factors on female's movement, possibly related to feeding and reproduction patterns, contributing to an increased collision rate. Males were killed on roads at similar rates throughout the year. We found, in total, ten roadkill hotspots for both species on all roads. In general, the numbers of giant anteater roadkill were negatively related to traffic and the proportion of vegetation and positively related to density of fragments around the road, with these variables contributing together to the roadkill patterns. Thus, the spatial aggregation of roadkills is explained by both proportion of vegetation and traffic characteristics of roads, which may influence the anteaters' behavior of crossing this barrier. The anteaters seem to avoid roads with intense traffic, but crossing points are generally near vegetation patches. Looking at landscape scale, landscape structures around roads seems to affect anteaters' movement patterns, in which they possibly move higher distances where vegetation remnants are numerous and sparse, increasing the probability of crossing roads.

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This study reinforces the value of using specific traits to analyze roadkill rates and the need for the integration of areas to provide efficient mitigation measures.

PALAVRAS-CHAVE: Conservation, Seasonality, Landscape Structure, Road Ecology.

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