

Behavioral responses of barn owls and stone martens to highways: do ecological or highway features explain the differences?

Authors - Clara Grilo (cbgrilo@fc.ul.pt), Joana Sousa (joanavazsousa@gmail.com), Hugo Matos (hmcmatos@gmail.com), Inês Leitão (inesnobreleitao@gmail.com), Paula Pinheiro (paula.c.pinheiro@gmail.com), João Bernardo (jbindio@gmail.com), Mónica Costa (monica.mb.costa@gmail.com), Filipe Silva (filipesdias@gmail.com), Dyana Reto (dyana.pereira@gmail.com), Fernando Ascensão (fernandoascensao@gmail.com), Margarida Santos-Reis (mmreis@fc.ul.pt)

Affiliation - Universidade de Lisboa, Centro de Biologia Ambiental (CBA), Faculdade de Ciências C2 5 1749-016 Lisboa, Portugal; Departamento de Biología de la Conservación, Estación Biológica de Doñana (EBD), Consejo Superior de Investigaciones Científicas (CSIC) Calle Américo Vespucio s/n, E-41092 Sevilla, España.

Key words - movement patterns, radio-tracking, crossing rates, passages use

Abstract

Several studies have documented that owls and carnivores are two *taxa* highly impacted by road mortality, but little is known whether roads attract or repulse individuals. The main goal of this study was to evaluate the response behavior of two model species (barn owl and stone marten) through the (a) home-ranges shape and size; (b) effect of traffic volume on the space use patterns; and (c) highway crossings rate. We radio-tracked 10 barn owls and 10 stone martens captured within 2000m of A2 and A6 highway (14900 and 5700 vehicles/day, respectively) in southern Portugal. Fixes were taken every 30 minutes from dusk to dawn. Six individuals of each species provided data to estimate home-range and the response behaviors were not similar. All barn owls had the highway as the home-range (95% Kernel estimator) boundary while stone martens randomly included or excluded the highway in the home-range. Barn owls also showed a positive correlation between the distance to highways and traffic volume, while stone martens only responded to trucks traffic. On average, we found 7.47 barn owls highway crossings in each 100 radio-tracking hours while for stone martens this value was almost three times higher (16.5 crossings). The most likely explanation for the observed species-specific differences is behavioral. Owls use the acoustic system to communicate and locate prey, and therefore seem to be more sensitive to the presence of highways and traffic than stone martens. Low traffic (2000 vehicles/night) may explain the tendency of stone martens to cross the highways instead of using the existing passages (1.96 passages/km). Reducing risk of mortality is therefore a management need. Natural obstacles would force owls to fly higher whilst crossing the highway and will also reduce the disturbance in the vicinity, while passages adaptation may improve its use by stone martens.