More than 10 thousand reptiles road-killed per year on a recent paved road in southern Brazil

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Wildlife mortality on roads due to vehicle-animal collisions is highlighted as one of the main causes of diversity loss and is considered the major road impact concerning persistence of wildlife populations. Higher road-kills of reptiles occur when animals cross the road for feeding and breeding, but they also can be attracted to roads to elevate their body temperature. Reptile mortality on roads is underestimated because of their fast carcass removal and low detectability. In this study we aimed to estimate the magnitude of reptile road mortality and identify road-kill hotspots and hot moments on a 276.8 km road (BR-101) in Southern Brazil. We carried out 24 monthly surveys with two observers in a car at 40 – 50 km/h. To estimate mortality magnitude, we calculated the daily mortality rate, corrected by detectability and carcass removal time, both estimated from experiments performed by placing carcasses on the road. The presence of road-kill hotspots was tested by Ripley’s K statistic and the location of hotspots was identified with the 2D HotSpot identification analysis in software SIRIEMA V.2.0. To assess the temporal distribution of road-kills we carried out a circular analysis in ORIANA 4.02 software, which converts months into angles and road-kill records in each month into frequencies. For all analysis, we considered the total number of recorded road-kills (1070). We also analyzed all species with more than 80 records separately: *Erythrolampus poecilogyrus*, *Erythrolampus semiaureus*, *Philodryas patagoniensis*, *Salvator merianae*, *Helicops infrateniatus* and *Trachemys dorbigni*. The road mortality rate, corrected by our method’s detection (41%) and carcass removal (characteristic time 3.71 ± 0.091 days), was 28.2 road-kills/day, and the mortality magnitude was 10,263 reptile road-kills per year. The lizard *Salvator merianae* presented the highest mortality rate per day (3.73), followed by the snakes *P. patagoniensis* (3.40), *E. poecilogyrus* (2.98), *E. semiaureus* (2.74), the turtle *T. dorbigni* (2.44) and the snake *H. infrateniatus* (2.19). Summer months had the highest concentration of reptile mortality, and also of the species that were analyzed separately. Road-kill hotspots identified for each species were not spatially coincident. The studied road was recently paved and the magnitude of mortality identified may indicate that some populations can be suffering a drastic decline and may become locally extinct in the near future. Summer season is a critic period for all species of reptiles, and temporary mitigation measures could be implemented in this period. Although hotspots location varied among species, priority areas can be identified for the implementation
of a multi-species mitigation plan. These results must be complemented by local population size studies to evaluate the mortality effects on the different species.