

# ACTIVITY PATTERNS AND TEMPORAL OVERLAP OF ARMADILLOS AND INVASIVE SPECIES IN THE ATLANTIC FOREST AND PAMPA BIOMES OF SOUTHERN BRAZIL

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## RESUMO

The greater naked-tailed (*Cabassous tatouay*), nine-banded (*Dasypus novemcinctus*), seven-banded (*D. septemcinctus*) and six-banded (*Euphractus sexcinctus*) armadillos (order Cingulata) can be found in the Atlantic Forest and Pampa biomes in southernmost Brazil. Although these species possess important roles in the maintenance of their ecosystems, few studies have been done to improve our understanding of their ecology and threats to their conservation in these severely degraded biomes. The objective of this study was to estimate the activity patterns of the Cingulata and of two invasive species that are known to compete with and prey on armadillos, posing a serious threat to their conservation, the wild boar (*Sus scrofa*) and the domestic dog (*Canis lupus familiaris*), in six areas of the Atlantic Forest and three areas of the Pampa, as well as the temporal overlap between each of these species. We obtained records of these species through camera trapping in the spring and summer. The study areas in the Atlantic Forest were sampled between 2017 and 2019. Those in the Pampa were sampled between 2013 and 2015 and 2019 and 2020. Stations in the Atlantic Forest were set 1km apart and consisted of two paired cameras, while those in the Pampa were set 2km apart and consisted of single cameras. Records were only considered independent when they occurred in intervals of over one hour. Each species was recorded in at least one area of each biome, except for the six-banded armadillo, which was not recorded in the Atlantic Forest. The nine-banded armadillo was the most frequent (65.6% of records), being the only species recorded in all study areas. Apart from nine records of nine-banded, a single record of greater naked-tailed and another of seven-banded armadillo, all records of Cingulata were either crepuscular or nocturnal. Records of boars were mostly diurnal in the Atlantic Forest (74.5%), but nocturnal or crepuscular in the Pampa (74.5%). Records of dogs were mostly diurnal (77.8%). Only the nine-banded armadillo showed statistically significantly non-uniform activity patterns in all areas where it was recorded ( $p < 0.01$  in the Rayleigh test of uniformity), with an average activity between 23:00 and 00:00. The overlap coefficient between the nine-banded armadillo and any other species of Cingulata was greater than 0.75. The coefficient between the nine-banded armadillo and boars in the Pampa was 0.8. We conclude that the activity pattern of the greater naked-tailed armadillo is likely mostly nocturnal, an information that was absent from scientific literature. Furthermore, the activity patterns of the seven-banded and six-banded armadillos are also likely mostly nocturnal in these environments, which contradicts previous knowledge about these species. The nine-banded armadillo was, as expected from previous literature, mostly nocturnal. It did not show any significant changes to its activity based on the biome in which it was found. Apparently, temporal segregation does not play an important role in the way these species avoid competition for resources. Further research might be needed to understand the difference in the activity pattern of boars in each biome.

**PALAVRAS-CHAVE:** Activity pattern, Cingulata, Invasive species, Temporal overlap

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