

MAMMALIAN PREDATOR-PREY DIVERSITY PATTERNS: WHAT DO THEY TELL US ABOUT "ISLAND" CONTINENTS?

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Owing to their long geographic isolation, the mammal faunas of Australia and pre-interchange South America represent independent experiments in mammal evolution. Despite this, they are remarkably similar in their absence of native placental predators and their relative paucity of marsupial predators. The present study was undertaken in order to investigate the potential effects of this low predator diversity on prey diversity.

Predator and prey diversity were calculated for 70 modern North American, Eurasian, and African faunas. A second-order polynomial regression was used to derive an equation describing the average (expected) ratio of predator to prey diversity for non-isolated continents; this equation was then compared to data from modern and fossil South American and Australian faunas.

Fossil faunas from both South America and Australia demonstrate a much lower diversity of predators than expected based on prey diversity. This suggests that the low predator diversity does not result from a lack of prey items, but rather from a different predator/prey ratio for faunas with marsupial predators.

Modern South American faunas have predator diversities that are only slightly lower than expected based on prey diversities. This suggests that these faunas might not yet have reached the new predator-prey equilibrium necessitated by the shift from marsupial to placental predators after the Great American Biotic Interchange.

Many modern Australian faunas are "depauperate" compared to their fossil counterparts due to the introduction of placental predators and the correlated extinction of endemic taxa. However, predator-prey ratios from these "depauperate" faunas are closer to expected values (based on other continents) than are the ratios from fossil Australian faunas. This implies that the present decline of Australian native fauna may represent an "expected" adjustment of the continent's predator/prey ratio from a marsupial to a placental level, primarily via a reduction in prey diversity.