

Do marsupials make good predators? Insights from predator–prey diversity ratios

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ABSTRACT

Questions: Was mammalian predator diversity in South America unusually low during the Cenozoic before the Great American Biotic Interchange (GABI)? If yes, what factors might account for this? Does a similarly low diversity of predators characterize modern and fossil Australian faunas?

Data studied: Predator and prey diversity for 385 modern mammal faunas, 13 South American paleofaunas, and 15 Australian paleofaunas.

Analysis method: I regressed predator diversity on prey diversity by continent for both modern and fossil faunas and compared slopes and intercepts of the regression lines. I also compared relative predator diversity (= predator–prey ratios) using analysis of variance.

Conclusions: Predator diversity is much lower than expected in pre-GABI South American faunas and in modern and fossil Australian faunas; in all of these, marsupials are the primary predators.

Keywords: Australia, carnivore, Cenozoic, marsupial, paleofauna, phorusrhacid, predator diversity, South America.

INTRODUCTION

Understanding patterns of species distributions is a fundamental theme of macroecological investigations (Brown, 1995). Certainly some of the most well-documented macroecological phenomena are patterns of species diversity in relation to latitude, altitude, productivity, and area (Schluter and Ricklefs, 1993; Rosenzweig, 1995). Many other factors can affect diversity on smaller scales, however, such as disturbance frequency, habitat complexity, competition, and predation (Ricklefs and Schluter, 1993). In island/isolated faunas these factors can influence diversity to different degrees, making these communities highly amenable to investigations of pattern and process.

For most of the past 65 million years, the mammals of South America represented such an isolated fauna; the continent was cut off from all other major land masses and dispersal to and from South America was extremely limited (Simpson, 1980; Houle, 1998; Reguero *et al.*, 2002;

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