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Abundance and diversity of small-bird assemblages in the Monte desert, Argentina

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Abstract

Assemblages of small bird species (<90 g body mass) from the Monte desert in Argentina were studied to analyze spatial and temporal variation in abundance and species richness. Mean species richness was higher during breeding season than in non-breeding season. The same pattern was observed in aerial insectivores, while granivores and substrate insectivores did not differ between breeding and non-breeding seasons. Overall bird abundance was similar across seasons. Species richness was positively correlated with bird abundance and negatively correlated with dominance; bird abundance and dominance were not correlated. These patterns could be explained by distinct responses of functional groups of birds; dominant species were granivores in the non-breeding season and aerial insectivores during the breeding season, and bird abundance in functional groups changed according to food supply. Most species are residents or regular migrants, while there are few nomadic and transient species. Predictable annual fluctuations in rainfall and resource availability should favor a migratory strategy more than nomadic movements. Similarly, breeding is strongly seasonal and most species start breeding when the first summer rains have generally not yet fallen. Finally, concordances in assemblage structure at local and regional scale suggest that similar mechanisms are acting on the local bird assemblages across the Monte.

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Keywords: Bird assemblage structure; Body mass; Breeding timing; Granivores; Insectivores; Monte desert; South America

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1. Introduction

Bird faunas of many desert regions have been well studied, as in Australia (e.g. Schodde, 1982; Wiens, 1991b; Franklin et al., 2000; Morris and Wooller, 2001), Africa (Maclean, 1974; Dean, 1997; Robertson et al., 1998), Asia (Cowan, 1990; Newton and Newton, 1997; Khoury, 1998; van Heezik and Seddon, 1999) or North America (Wiens and Rotenberry, 1980; Wiens, 1991b; Naranjo and Raitt, 1993; Patten and Rotenberry, 1998). In contrast, ecological studies of bird assemblages from arid and semiarid lands of South America are limited. Examples include broad intercontinental comparisons based on generalizations from few samples (Orians and Solbrig, 1977; Schluter and Repasky, 1991), the influence of food shortage on local abundance of bird assemblages (Blendinger and Ojeda, 2001), studies on the seasonal fluctuation of avian populations, habitat use and bird abundance in two localities in the Monte desert (Marone, 1991, 1992; Marone et al., 1997; Blendinger and Alvarez, 2002) and Western Chaco (Capurro and Bucher, 1982, 1986), and the effect of livestock on bird abundance and distribution (Gonnet, 2001).

Bird species richness is usually lower in desert ecosystems than in more humid environments of the same region. Thus, birds in arid zones constitute an impoverished portion of the regional pool of species, including a reduced number of endemic species (Maclean, 1974; Schodde, 1982; Wiens 1991a, pp. 278–310; Stotz et al., 1996; van Heezik and Seddon, 1999). In these ecosystems, birds are faced with harsh environmental conditions, where daily and seasonal thermal fluctuations are pronounced, and where food and water availability is largely unpredictable. Consequently, the composition of dryland bird assemblages can be highly variable in both space and time (Schodde, 1982; Dean, 1997). Local abundances of many bird species can differ very strongly among neighboring localities or between years in the same area. Unpredictable rainfalls and their direct effects on productivity are causal factors of this variability in bird assemblage structure (Morton, 1993, pp. 159–169).

In contrast, the Monte desert of South America has a strong annual seasonality with a predictable rainy season, having potential consequences for the predictability of bird assemblages. To investigate this possibility, I analyzed seasonal changes and the relationships between a number of species and individuals for bird assemblages in the Monte desert. Specifically, I analyzed seasonal changes in bird abundance and species richness, and I explored the variations in abundance patterns for different functional groups of bird species. Also, a strong annual seasonality should affect the timing of reproduction. I expect a marked seasonality in reproductive activity, contrasting with other low elevation desert where inter-annual climatic differences strongly influence reproductive activity resulting in a breeding period expanded throughout the year (Maclean, 1974; Schodde, 1982).

Furthermore, I studied similarities and differences in assemblage structure between localities. Rabinovich and Rapoport (1975) suggested that bird species richness in the Monte desert changes along the latitudinal gradient as a consequence of diverse origins. Thus, it should be possible to differentiate between a southern bird fauna in the plains under Andean–Patagonian influence, and another one in the northern valleys (“bolsones”) and mountain slopes under Chacoan influence.

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