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Habitat selection by large mammals in a southern Brazilian Atlantic Forest

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Abstract

Habitat selection, which is mainly a consequence of competition and predation, allows species to coexist. The present study was conducted in two reserves in an Atlantic Forest area in Santa Catarina State, southern Brazil, and provided information on several large mammal species through photographic records. Records were related to certain environmental parameters, such as width of passages (trails and roads), vegetation density and proximity to water, in order to assess the relationship between each mammal species and its microhabitat. Thirty-two camera trap stations were placed during 17 months for 150.8 (±62.2) days on average. Terrestrial mammals tended to use different habitats: *Puma concolor* used mainly dirt roads and open areas; *Leopardus pardalis*, *Cerdocyon thous* and *Nasua nasua* used more large trails and intermediate-forested sites; and *Cuniculus paca*, *Dasypus novemcinctus*, *Leopardus tigrinus*, *Eira barbara* and *Leopardus wiedii* were recorded more often on narrow trails and in densely forested sites. Some of these forest species, such as *D. novemcinctus*, *C. paca* and *L. pardalis*, also showed relationships with watercourses. Information on habitat selection allows more effort to be addressed to the habitat associated with focal species, and indicates the significance of environmental heterogeneity, which makes it possible for species to coexist.

Keywords: Camera trap; Environmental parameters; Microhabitat; Neotropical mammal community; Species interaction

Introduction

Animal and plant species often occur in many different habitats in the same region, where they may experience different development rates, life spans, and birth and death rates (Pulliam and Danielson 1991). This habitat selection allows species to coexist (Orians and Wittenberg 1991). It is in part a consequence of competition and predation, stabilising both of them, and acting as an optimal-foraging process (Rosenzweig 1991) or resource partitioning (Schoener 1974). In some cases, experience in a natal habitat affects habitat selection after the individual leaves its natal land and begins to search for new habitats (Stamps and

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Swaisgood 2007). Multispecies studies have emphasised the potential for differential susceptibility and optimal habitat selection to maintain community diversity (Rosenzweig 1991).

Habitat-selection theorists have drawn their inspirations primarily from mobile animals, by imagining them moving through environments pursuing and capturing prey, seeking shelter, and avoiding predators (Orians 1991). This process affects nearly all individual subsequent choices (Orians and Wittenberg 1991).

However, habitat selection can be viewed at different spatial scales. On a micro-scale, habitat selection becomes the fine-grained theory of optimal foraging, in which foragers choose prey from among various types that they encounter at random. On slightly larger scales, in which different habitat patches are incorporated, individuals may choose to search within patches or to pass through them without looking for prey, nest sites, or other resources. On macro-scales, the study of habitat selection becomes the study of emigration and immigration (Orians 1991). Scale also affects the costs of habitat selection. Small-scale variation can be handled without shifts in home ranges, whereas large-scale changes require such shifts, often over long distances (Morris 1987). The longer the distance, the less knowledge that organisms are likely to have about the environments into which they move (Orians 1991).

In the Atlantic Forest, most studies focusing on large-sized mammal communities rely on effects of forest fragmentation and hunting (e.g. Chiarello 1999; Cullen-Jr et al. 2000; Quadros and Cáceres 2001), and a few of them have treated of habitat selection on its direct meaning (Santos et al. 2004), with some comparing ecologically similar species (Vieira and Port 2007) or even analysing habitat use of a sole species (Di Bitetti et al. 2006).

Since the majority of the studies undertaking micro-scale habitat selection in the Atlantic Forest has focused on small mammals (e.g. Gentile and Fernandez 1999; Dalmagro and Vieira 2005) and due to the scarce information on large-sized mammals in the biome, our aim was to examine the relationships between relative abundance of large mammal species and different microhabitats in a dense Atlantic Forest of southern Brazil. These different microhabitats were around trails of different width and dirt roads where frequencies of movements of mammals in such ways were examined by camera traps.

Material and methods

Study site

The study was conducted in an Atlantic Forest area in Santa Catarina, southern Brazil, in two reserves: Reserva Ecológica do Caraguatá-REC (4200 ha; central coordinates 27°25′51″ S, 48°51′01″ W), and a section of the Parque Estadual da Serra do Tabuleiro-PEST (5000 ha; central coordinates 27°51′36″ S, 48°38′33″ W).

The two study areas are located in the hills of the Serra do Mar, at altitudes between 420 and 1100 m asl, and are 40 km apart (Fig. 1). The main vegetation type is the dense broadleaf evergreen Atlantic Forest with montane and high-montane patches (Veloso et al. 1991). There are few relicts of *Araucaria angustifolia* in the two areas, since they comprise bordering patches of the mixed broadleaf evergreen forest as well (Gaplan 1986). The climate is subtropical with a high annual rainfall (1800 mm). Mean annual temperature varies between 20 °C and 24 °C in January and

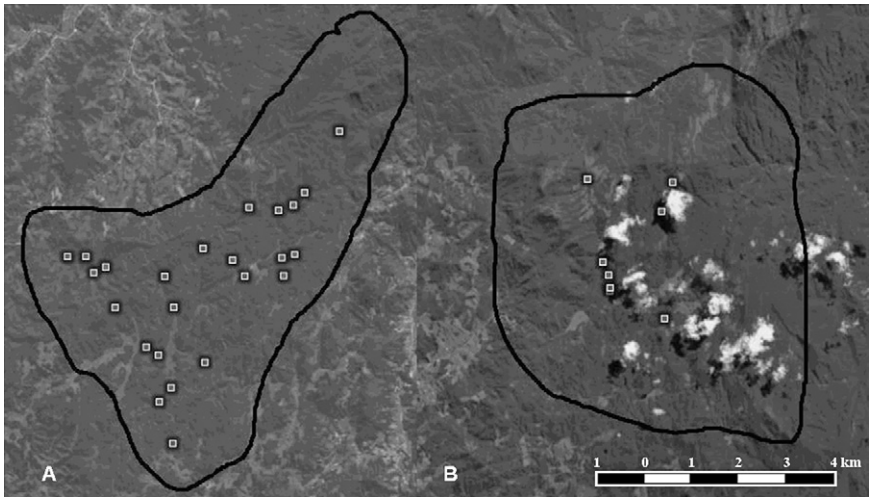

Fig. 1. The two study areas (A – Reserva Ecológica do Caraguatá – REC; B – Parque Estadual da Serra do Tabuleiro – PEST), far 40 km apart, lied in the Atlantic Forest of southern Brazil. Points in the picture are the camera-trap stations.