

CONTRIBUTIONS

Tapirus terrestris occurrence in a landscape mosaic of Atlantic Forest and Eucalyptus monoculture in southeast Brazil

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Introduction

Generally, fragmentation and habitat loss associated with permanent landscape-scale alterations such as roads, agriculture and other non-habitat areas can inhibit habitat connectivity, changing the spatial distribution pattern of species or modifying the movement of individuals among habitat patches (Saunders *et al.*, 1991; Jepsen *et al.*, 2005). When landscape changes decrease forest connectivity, species that are unable to cross non-forested portions of the landscape, or “matrix”, can become confined to isolated forest patches, thus, reducing the overall population size and the probability of persistence (Debinski & Holt, 2000; Fahrig, 2003), specially of large mammals (Olsson *et al.*, 2011).

Because they demand large amounts of resources in order to survive, large mammals, such as the lowland tapir (*Tapirus terrestris*), are known to move across different natural habitats and occupy extensive home ranges (Noss *et al.*, 2003; Medici, 2010). The lowland tapir is the last neotropical mega-herbivore mammal of Pleistocene origin (Thoisy *et al.*, 2010) and has had its populations reduced in Brazilian Atlantic Forest. Within the Brazilian state of Espírito Santo, this species is considered “Endangered” (Passamani & Mendes, 2007). Its populations are restricted to six protected areas in north of Doce River and possible in a protected area in the southwest region of Espírito Santo (Flesher & Gatti, 2010). Cattle pastures, eucalyptus plantations and other agricultural lands overwhelmingly dominate these surrounding landscapes. And the main threats for the last populations of lowland tapir in this state are catastrophic fires, hunting and genetic effects of isolation (Medici *et al.*, 2007; Flesher & Gatti, 2010).

The survival and persistence of tapirs populations in fragmented environments may be favored for its

ability to move to available and suitable habitats. Some studies regarding the ability of tapirs to move across non-habitat areas report the capacity of this species to cross different types of low quality matrix, such as agricultural lands and grassland (Noss *et al.*, 2003; Medici, 2010). Thus, understanding how they use different elements of the landscape can help to define strategies of management and conservation (Medici, 2010). In an attempt to draw attention to these questions, we report evidence of movement of the lowland tapir across eucalyptus forests, unpaved roads, and Atlantic Forest fragments in the state of Espírito Santo, Brazil.

Materials and Methods

This study is part of the Pró-Tapir project that aims to evaluate the effects of habitat fragmentation on populations of *T. terrestris* in the Atlantic Forest of the state of Espírito Santo, southeastern Brazil. The Private Natural Heritage Reserve Recanto das Antas (Reserva Particular do Patrimônio Natural, in Portuguese, hereafter “RPPN”) (Figure 1) (2.202 ha) is a private area of FIBRIA CELULOSE S.A., a Brazilian company, and it is part of the largest lowland forest remnant in the Espírito Santo. It is contiguous with the 24,000 ha Sooretama Biological Reserve and the 22,000 ha Vale Natural Reserve forming a forest block of more than 46,000 ha in the north of Espírito Santo. RPPN Recanto das Antas, located at the coordinates 19°5’ south latitude, 39°58’ west longitude, mostly consists of discontinuous primary vegetation, interposed by extensive eucalyptus and papaya plantations, cabruca (cacao trees planted in the shade of thinned native forest), seringal (rubber tree culture), and smaller amounts of coffee plantations and cattle pastures,

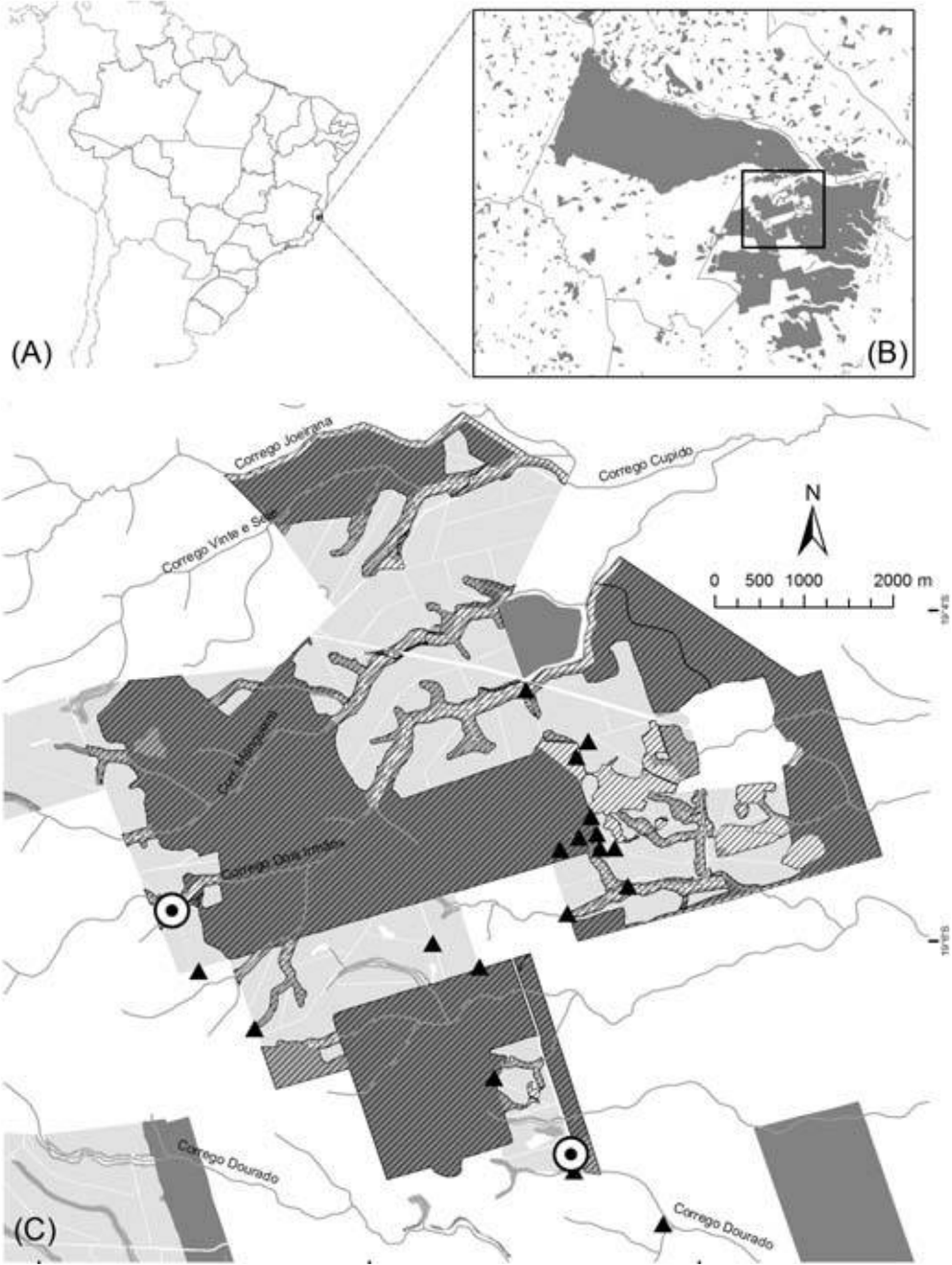


Figure 1. Map showing traces of *Tapirus terrestris* in RPPN Recanto das Antas. Map of Brazil (A) showing block of Atlantic Forest remnant (B) evidencing RPPN (C). Open hatch corresponds to RPPN area, dark gray corresponds to forest fragments, light gray corresponds to eucalyptus plantation, triangles indicates indirect traces and circles with dots indicate sightings.

which are not part of the reserve. Unpaved roads used for eucalyptus harvesting and transportation also cross the area.

During the survey in RPPN we made random searches for traces of tapirs along the area, which includes footprints, foraging signs, and sightings inside forest fragments, trails, unpaved roads and adjacent areas. The records presented here were made over

four monthly campaigns, of five days each, from January/2011 to April/2011. We also considered past and recent records made by people that work inside and outside the studied area.

Results and Discussion

On February 21st, 2011 at 6:30 p.m, we recorded one sighting of an individual of *Tapirus terrestris* leaving the forest and moving toward an eucalyptus plantation. The second sighting was made from an unpaved road in April 2nd, 2011 at 4:30 p.m when one individual was inside the eucalyptus monoculture (Figure 2) eating a shrub. We also have reports from workers of RPPN Recanto das Antas and local farmers about occasional sightings inside eucalyptus plantations and on unpaved roads documented through photographic records. (Figure 3). In another study, Flesher & Gatti (2010) also reported through interviews tapirs using eucalyptus in this landscape mosaic in northern Espírito Santo.

During the study period, we also found footprints on unpaved roads crossing between eucalyptus and forest fragments. Footprints were oriented in both directions, entering and leaving eucalyptus plantations, a type of evidence also reported by Silva (2001) in the state of São Paulo, southeast Brazil. Records of tapirs inside eucalyptus and on roads between eucalyptus plantations obtained so far does not seem sporadic, since traces were found in the same areas in different campaigns. These records provide evidence that tapirs use these non-habitat areas to reach forest fragments and show the displacement of individuals between forest fragments and areas of monoculture and open areas, although

maximum distance and frequency of use still need to be investigated.

Considering our data, we formulated three hypotheses, for further investigation, on how tapirs use the eucalyptus plantations: 1) tapirs use eucalyptus plantations between patches of Atlantic Forest to search for food; 2) tapirs use eucalyptus monoculture as a corridor; or 3) a combination of the two previous hypotheses, tapirs use eucalyptus plantations as a corridor and for opportunistic feeding. In a study of Furtado *et al.* (2010), they observed that tapirs often utilize agriculture fields and natural fragmented areas from farmlands around protected areas. This previous study and our data suggest that, in this particular fragmented landscape, eucalyptus plantations can also be part of *T. terrestris*' home ranges.

Noss *et al.* (2003) also concluded that agricultural landscapes surrounding protected areas contribute to the maintenance of tapir populations. The use of planted forest around protected areas as corridors could mitigate the effects of fragmentation and facilitate movement of lowland tapirs in remnant patches of Atlantic Forest. Since tapirs may travel up to a few kilometers outside the limits of the forest (Flesher & Ley, 1996; Fragoso *et al.*, 2003), the existence of planted forests can serve to expand their foraging areas, and, according to Silva (2001), if properly managed, can also be locally important for conservation of other mammals. With Pró-Tapir project, we are looking forward to examining the above hypotheses and to answering more questions on the use of eucalyptus forests by tapirs.

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Figure 2. An individual of *Tapirus terrestris* inside eucalyptus monoculture in RPPN Recanto das Antas, northern of Espírito Santo.

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Figure 3. *Tapirus terrestris* on unpaved roads next to and in eucalyptus plantation in RPPN Recanto das Antas, northern of Espírito Santo.