Short Articles

PREDATION BY COMMON MARMOSETS (*CALLITHRIX JACCHUS*) OF SMALL MAMMALS CAUGHT IN TRAPS

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Introduction

Studies describing predation of other mammalian taxa by primates are still scarce in the Neotropics and especially in Brazil. However, there are reports of bird's nest predation by *Leontopithecus chrysopygus* (see Passos, 1997) and *Callithrix jacchus* (see Lyra-Neves et al., 2007), or of small lizards and frogs by *Callithrix jacchus* (see Alonso and Langguth, 1989), *Callithrix geoffroyi* (see Passamani and Rylands, 2000), *Sapajus xanthosternos* (see Canale et al., 2013) and *Callithrix jacchus* (see Amora et al., 2014). *Callithrix jacchus* (Linnaeus, 1758), the white-tufted-ear-marmoset or common marmoset, is native to northeastern Brazil. These primates are arboreal and inhabit various kind of vegetation, including areas with disturbed and fragmented vegetation (Rylands and Farias, 1993; Castro and Araújo, 2006; Bicca-Marques et al., 2006). The diet of *Callithrix jacchus* is varied, including fruits, flower parts, plant exudates, fungi, seeds, invertebrates and vertebrates (Nash, 1986; Stevenson and Rylands, 1988; Caton et al., 1996; Digby and Barreto, 1993; Castro and Araújo, 2006; Bicca-Marques et al., 2006; Digby et al., 2011).

Methods

Here we report *C. jacchus* attacking small mammals caught in live traps. The data come from a study in a 13-ha patch of semi-deciduous forest (Mata de Tabuleiro), on the coast of the state of Ceará, northeastern Brazil. The forest is isolated, and the marmosets were often observed moving through gardens betweeen houses and along streets to reach other forest fragments. The study was based on observations of *C. jacchus* in a 1-ha area of the fragment, where "Tomahawk®" and "Shermann®" live traps were set in a grid (Auricchio and Salomão, 2002) to monitor populations of non-flying small mammals.

Results

The animals attacked by common marmoset were those caught in the traps being checked between 6:30 am and 9:30 am during the monthly trapping campaigns from November 2008 and December 2009: five consecutive days in each month. Four attacks were recorded, involving three small mammals captured in Tomahawk® traps: two attacks, one fatal, on Red-nosed armored tree rats *Makalata didelphoides* (Desmarest, 1817) (Fig. 1), an attack on a gray short-tailed opossum *Monodelphis domestica* (Wagner, 1842), and the predation of a woolly opossum *Micoureus demerarae* (Thomas, 1905) (Fig. 2). Three traps were on a tree and one on the ground.

Figure 1. *Makalata didelphoides* killed by *Callithrix jacchus*.

Figure 2. *Micoureus demerarae* after being attacked.

The first non-lethal record was of a female *M. domestica*, which suffered an open fracture of her right hind leg. In this case, we observed an adult individual of *C. jacchus* on a tree, about one meter above the ground, which then ran down from the tree and approached the trap. When on the ground, the marmoset pull on the short-tailed opossum by its hind legs and tail, but then saw us and desisted, climbing back into the tree and remainimg there vigilant and vocalizing until we approached the trap. The rest of the marmoset group stayed close, vigilant and vocalizing, in a radius of approximately three meters.

The second non-fatal record was of a male *M. didelphoides* who survived the attack, but was badly wounded and

had lost his tail, probably pulled out of the trap during the attack of *C. jacchus*. This rodent commonly and easily loses its tail, as an anti-predator strategy. For the other two, another red-nosed armored tree rat and the woolly opossum, their hind and front legs, as well as other body parts of were clearly pulled out of the trap and eaten (Figs. 1 and 2). Three of these episodes occurred in the dry season, and one in the beginning of the rainy season.

Discussion

The concentration of attacks in the dry season may be associated with differences in food availability, as was observed by Vilela and Faria (2002), Lyra-Neves et al. (2007) and Vilela and Del-Claro (2011). Low food availability in drier periods induces species to move into different environments and change their behavior, not only in spatial use patterns and social activities, but also in food preferences (Chapman, 1987). We cannot say that food availability influenced the concentration of the attacks in the drier period, because we did not assess the availability of resources during the monitoring years. The greater number of small mammals attacked may indicate the opposite; as the capture success in the dry season was higher and the probability of encountering a trap with a small mammal also increased. Groups of *C. jacchus* were observed in various situations lurking around traps containing captured animals. All of these events occurred during the morning hours, in agreement with the period of greatest activity of marmosets (Rylands and Farias, 1993; Schiel et al., 2010).

During the small mammal monitoring program we also captured white-eared opossums *Didelphis albiventris* Lund, 1841, but never observed *C. jacchus* to attack them, probably due to ther larger size; larger and heavier than *C. jacchus*. The opossums are also aggressive, as observed by Oliveira and Santori (1999) in predation events of *Bothrops jararaca* (Wied-Neuwied, 1824) by *D. albiventris*.

Few studies have reported predation of vertebrates by marmosets (Passos, 1997; Lyra-Neves et al., 2007; Vilela and Del-Claro, 2011; Amora et al., 2014). These primates usually prey on nests of small birds such as *Pachyramphus polychopterus* (Vieillot, 1818) and *Elaenia flavogaster* (Thunberg, 1822), because they offer less resistance to attacks. The marmosets are a food source for larger birds, such as *Rupornes magnirostris* (Gmelin, 1788) and *Cathartes aura* (Linnaeus, 1758), (Lyra-Neves et al., 2007).

Researchers have suggested that marmoset predation of small mammals was uncommon, because of their differences in activity periods. The marmosets are essentially diurnal and the small mammals are mostly nocturnal. This asynchrony can be the key factor promoting the exclusion of small mammals from the diet of *C. jacchus*. Birds, amphibians, and small lizards are the main vertebrate representatives in the diet of the genus *Callithrix* (Alonso and Langguth, 1989; Rylands and Farias, 1993; Lyra-Neves et al., 2007; Vilela and Del-Claro, 2011; Digby et al., 2011). The small mammals being attacked here were easy prey for *C. jacchus*; caught in the open and unable to flee. The marmosets were opportunistic in this case, and an important message is that those doing research monitoring small mammals in areas where marmosets are common should check the traps earleir in the day before the marmosets become active.

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CONSUMO DE EXSUDATOS POR *CEBUELLA PYGMAEA* E OUTROS MAMÍFEROS EM UM FRAGMENTO FLORESTAL NO SUDOESTE DA AMAZÔNIA

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Os exsudatos são um recurso altamente energético, composto principalmente por água, polissacarídeos complexos, cálcio e traços de minerais (ferro, alumínio, silício, magnésio e sódio) (Nash, 1986). Devido a sua composição, eles representam um importante componente da dieta (anual ou sazonal) de alguns primatas, principalmente espécies da família Callitrichidae (Soini, 1988; Peres, 2000). Contudo, apesar de sua disponibilidade em muitas espécies vegetais, seu consumo requer adaptações anatômicas e fisiológicas que viabilizam a sua exploração e digestão (Garber e Porter, 2010).

No Parque Zoobotânico da Universidade Federal do Acre (*ca.* 150 ha; 9º56"30"–67º52'08"S, 9º57'19"–67º53'00"O) em Rio Branco, Estado do Acre, Brasil, o micoleãozinho (*Cebuella pygmaea*, Callitrichidae) é um primata especialista na exploração de exsudatos. O Parque Zoobotânico é um fragmento florestal urbano caracterizado por uma cobertura de floresta secundária em diferentes estágios de regeneração (Meneses-Filho et al., 1995). Além do leãozinho, esse fragmento é habitado por seis espécies de primatas: soim-vermelho (*Saguinus weddelli*, Callitrichidae), bigodeiro (*Saguinus imperator*, Callitrichidae), macaco-de-cheiro (*Saimiri boliviensis*, Cebidae), parauacu (*Pithecia irrorata*, Pitheciidae), zogue-zogue (*Callicebus cupreus*, Pitheciidae) e macaco-da-noite (*Aotus nigriceps*, Aotidae).

Registros do consumo de exsudatos de oito espécies vegetais foram obtidos pelo método *ad libitum* (Altmann, 1974) durante um estudo do comportamento e ecologia de um grupo de leõezinhos composto por oito indivíduos (um casal de adultos, dois subadultos, dois juvenis e dois filhotes) no período de abril de 2011 a fevereiro de 2012, o qual totalizou 138 dias de observação (1656 horas), com uma média de 15 dias por mês. Três dessas espécies vegetais também foram exploradas por outros mamíferos: os callitriquídeos *Saguinus weddelli* e *Saguinus imperator* e o quatipuru-roxo *Guerlinguetus ignitus* (Sciuridae) (Tabela 1).

Concluímos que *Saguinus weddelli* e *S. imperator*, apesar de não apresentarem o nível de especialização dentária e digestiva encontrado nos leõezinhos (Terborgh, 1983; Garber, 1984, 1993; Ferrari, 1993; Heymann e Smith, 1999), podem ser considerados potenciais competidores diretos pelas fontes de exsudato disponibilizadas pela atividade de escarificação de *C. pygmaea* na área de estudo. Por outro lado, além do número de registros de consumo de exsudatos ter sido menor, a importância desse recurso para a dieta de *G. ignitus* tem sido considerada insignificante