Oropendola nest predation and rodent consumption by the black-capped capuchin (*Sapajus apella)* in the Manu Biosphere Reserve, Peru

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The Neotropical primate *Sapajus apella* (Linnaeus, 1758), the black-capped capuchin monkey, is widely distributed across the Amazon basin (Boubli et al., 2020). Capuchins are generalist platyrrhines, occurring in most tropical forest types, where they forage opportunistically (Sabbatini et al., 2008; Lynch Alfaro et al., 2012; Boubli et al., 2020). They exploit a diverse variety of food sources, such as fruit, seeds, arthropods and vertebrate prey including small mammals (Rose, 1997; Resende et al., 2003; Albuquerque et al., 2014). Their foraging strategy is highly resourceful and adaptive, and are often considered as important predators of nests (Canale and Bernardo, 2016), including those of caiman (Torralvo et al., 2017), coatis (Rose, 1997) and especially of birds (Watts, 2020). In this work, we report observations of a foraging event by *Sapajus apella* that includes the first record of egg predation of the russet-backed oropendola, *Psarocolius angustifrons* (von Spix, 1824), as well as the predation of arboreal rodents, *Oecomys* sp. (Thomas, 1906).

The predation event occurred within the grounds of the Manu Learning Centre (MLC), Manu Biosphere Reserve, southeast Peru (12°47'21"S; 71°23'28"W). The MLC is a research facility, owned and operated by the Crees Foundation, within a 643-ha reserve of secondary-growth, lowland tropical forest. The grounds are a mostly cleared area which hold a research station and lodges. On 13 December 2018 at 10:30 a.m., two *Sapajus apella* individuals (one male and one unknown sex) were spotted running on the ground from the neighboring forest (~25m away) towards a cluster of vegetation within the MLC grounds which includes an aguajal palm (*Mauritia flexuosa*) and a tree (unidentified sp.) that is utilized as a nesting site for *Psarocolius angustifrons*. The pair ascended the aguajal palm initially and leapt to the adjacent tree hosting at least a dozen separate oropendola nests. With no adult oropendolas present, they began to

systematically inspect the oropendola nests, shaking them and reaching into each nest entrance (Fig. 1). The pair appeared to alternate between checking the nests and engaging in vigilance behavior toward human observers. At around 10:40 a.m., one capuchin successfully located a *Psarocolius angustifrons* egg from within a nest and descended to the palm tree, against which it proceeded to crack open the egg. It consumed the contents as if the egg were a cup. Meanwhile, the other capuchin continued to examine the remaining nests, but failed to acquire any eggs. Following the egg predation, both capuchins began rummaging through the layers of palm tree sheath and continued to alternate between inspection and vigilance (Fig. 2). At 10:50 a.m., one capuchin individual extracted an arboreal rice rat, *Oecomys* sp., from within the sheaths and performed a fatal, craniocervical bite. It proceeded to feed on the rodent, consuming its head first (Fig. 3), and fed selectively on parts of its torso before discarding the carcass into the palm sheath. Soon after, the second capuchin located another rat of the same genus, from the same location, ingesting and disposing of it in a similar manner. No food transferring was observed. The foraging event was interrupted as spectators gathered at the base of the tree. Both monkeys remained in the palm tree until the spectators dispersed, before descending to the ground and retreating to the surrounding forest. No remnants of either rodent carcass were able to be retrieved.

Despite both species co-occurring across much of their distributional ranges (BirdLife International, 2018; Boubli et al., 2020), no previous records exist of any predation event involving *Psarocolius angustifrons* and *Sapajus apella*. Russet-backed oropendolas are social colonists, known to select nesting sites in isolated trees which are difficult for capuchins to access and therefore deter attacks (Robinson, 1988; Leak and Robinson, 1989). Furthermore, adult oropendolas are known to actively defend their

nests against predators by employing alarm call warnings and aggressive, mobbing tactics (Leak and Robinson, 1989), but no adults were present at the time of predation. There are records of capuchins depredating the nests of other *Psarocolius* spp. and the closely related cacique (*Cacicus* spp.), with entire colonies being eradicated as the nesting sites in these events allowed access from the surrounding canopy (Robinson, 1985; Leak and Robinson, 1989).

Capuchins have great capacity for cognitive and extractive, manipulative skills (Sabbatini et al., 2008; Canale et al., 2013). In fact, *Sapajus apella* have the ability to use tools, unique amongst Amazon forest-dwelling platyrrhines (Torralvo et al., 2017). Since their foraging techniques are flexible and explorative, capuchin monkeys can habituate to human-modified landscapes, especially in response to abundant, novel food resources (Sabbatini et al., 2008). They are also known to alter their foraging strategy to locate bird nesting sites (Sabbatini et al., 2008; Canale and Bernard, 2016). To reach the oropendola colony here, the capuchins travelled terrestrially across the cleared grounds, a risky behaviour due to possible exposure to predators such as felids and raptors (Ferrari, 2009), but especially to humans as they are widely hunted for bushmeat and illegal trade (Sabbatini et al., 2008; Boubli et al., 2020). Capuchins can indeed show use of the forest floor, especially during times of food scarcity in the dry season (Siemers, 2000; Sabbatini et al., 2008). However, the events reported here occurred at the onset of the wet season, when food is relatively abundant (Siemers, 2000; Ferrari et al., 2008). As opportunistic foragers, capuchins may exploit any available food sources, regardless of season or resource abundance (Milano and Monterio-Filho, 2009).

Among Neotropical primates, capuchins are considered the most omnivorous (Resende et al., 2003), exhibiting plasticity in their diet, habitat use and foraging

behavior. In this event, given their explorative approach, it is assumed that the capuchins were actively seeking out the oropendola colony and that the arboreal rodents were opportunistic encounters. These observations serve as useful additions to the dietary and behavioral repertoire of this generalist primate.

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Figures

Figure 1. *Sapajus apella* individual inspecting the oropendola nests in the canopy. Photograph by Ruth Little.

Figure 2. Both *Sapajus apella* individuals on the aguajal palm, with one (male) inspecting the palm sheaths while the other (unknown sex) being vigilant. Photograph by Ruth Little.

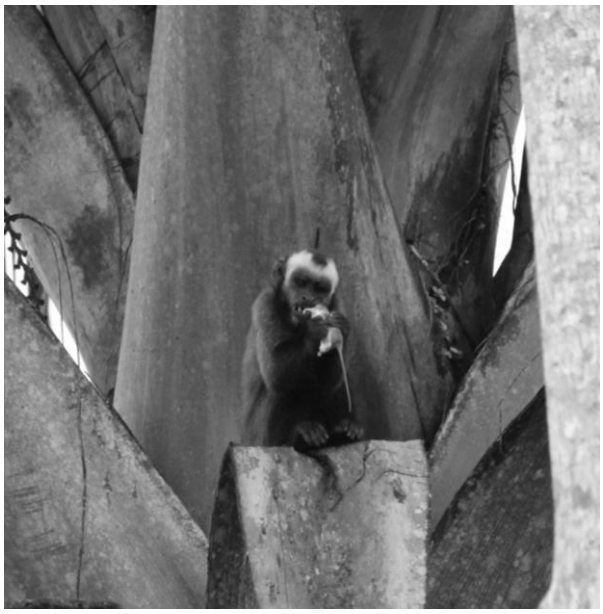

Figure 3. *Sapajus apella* individual feeding on the *Oecomys* sp. by consuming its head first. Photograph by Ruth Little.

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