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PRIMATE PREDATION BY BLACK HAWK-EAGLE (*SPIZAETUS TYRANNUS*) IN BRAZILIAN AMAZONIA

KEY WORDS: *Black Hawk-Eagle*; *Spizaetus tyrannus*; diet; fragmentation; foraging; Neotropics; predation; primate; raptor.

Although predation is rarely observed, predation risk has an important influence on social structure, foraging behavior, and the manner in which primates travel between locations (Fichtel 2012, McGraw and Berger 2013). Primate predators include mammals, snakes, and raptors (Isbell 1994, Correa and Coutinho 1997). The Neotropics has several species of hawks and eagles of sufficient size and power to successfully attack primates (Ferguson-Lees et al. 2000). The Harpy Eagle (*Harpia harpyja*) is known to take a variety of larger-bodied species (≥ 2.5 kg) from at least six primate genera (Barnett et al. 2011). Crested Eagles (*Morphnus guianensis*) and Ornate Hawk-Eagles (*Spizaetus ornatus*) also capture or attack juveniles of larger-bodied primates (Julliot 1994, Gilbert 2000), as well as smaller (< 2.5 kg) primates (Terborgh 1986, Greco et al. 2004). *Micrastur* forest-falcons, although smaller, also attack small primates such as subadult *Callithrix* (*M. semitorquatus*, Alonso and Langguth 1989) and *Saguinus nigricollis* (*M. ruficollis*, Izawa 1978).

The Black Hawk-Eagle (*Spizaetus tyrannus*) is a large (2–2.9 kg, wingspan 140 cm; Quintero and Jácome 2011) and widely distributed Neotropical raptor (Hilty 2003). Though its diet includes birds, snakes, lizards, bats, and rodents (Rangel-Salazar and Enriquez-Rocha 1993, Sick 2001), it is considered to be a primate predator (e.g., Wheeler 2010). Although its presence elicits alarm calls and escape behavior among primates (*Callicebus nigrifrons*; César et al. 2012), published records of actual attacks are scarce (e.g., *Alouatta guariba*, Miranda et al. 2006; *Saguinus oedipus*, Dawson 1976). Here we report three attacks by Black Hawk-Eagles on primates. These include the first published record of raptor predation for the genus *Mico*, and the first record of attempted predation by Black Hawk-Eagles on a member of the genus *Saimiri*.

On 24 July 2012, at 13:00 H, by the Tapajós River, upstream from the town of Itaituba (04°16.55'S, 55°59.03'W) and just inside the northern boundary of Amazonas National Park, Pará State, Brazil, we saw a group of 6–8

Santarem marmosets (*Mico humeralifer*) crossing the open laterite surface of BR-230 (the Transamazonica Highway), at this point some 5 m in width. As we watched the primates, a Black Hawk-Eagle flew down from the forest edge and plucked an adult marmoset from the trailing end of the group. The eagle then flew out of the road-clearing and up over the trees with the primate in its talons. The remainder of the group of primates reacted swiftly, either briefly pressing themselves flat or crouching as the bird passed over, and then fleeing for the trees bordering the road, where they concealed themselves in dense vegetation. We heard no vocalizations.

Our second observation was on 1 November 2010, at 10:32 H, in an area of secondary forest fragments approximately 60 yr old, on the southern bank of the Rio Negro, near Sítio Santa Rita (03°12.69'S, 60°11.55'W), municipality of Iranduba, Amazonas State, Brazil. There we saw a juvenile Black Hawk-Eagle leave a perch on a dead tree and fly toward a group of 17 common squirrel monkeys (*Saimiri sciureus*) that were crossing a clearing via a natural bridge formed by a large partially fallen branch approximately 16 m aboveground. The group had been feeding since 09:30 H on a variety of fruits and insects, including grasshoppers and fig fruits, and on the flowers of a species of *Tabebuia* (Bignoniaceae), and appeared to be traversing the branch to reach a large *Spondias* sp. (Anacardiaceae) tree that was in fruit. The bird struck at a small squirrel monkey, which evaded capture by dropping from the branch into lianas below. When briefly visible < 2 min later, the animal was piloerecting, but appeared undamaged. Although the bird did not return during the next hour, the monkeys immediately dispersed to dense vegetation on either side of the clearing, disappeared from view, and were not detected either moving or calling for approximately 20 min, after which they moved quietly and cautiously in bushes near the ground at the edge of the clearing.

On 15 February 2013, at 09:58 H, at a distance of ca. 35 m across a canopy gap, in the same general area as the