

# Rediscovery of the Crested Eagle *Morphnus guianensis* (Daudin, 1800) in the fragmented Atlantic Forest of Bahia, Brazil

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**ABSTRACT:** We here report the second documented record of Crested Eagle *Morphnus guianensis* from the Bahian Atlantic Forest, from a 2,300 ha patch of *Tabuleiro* forest in a pasture-matrix. The only previous documented record from Bahia is from the beginning of the 19<sup>th</sup> Century. This is the first record of this eagle from fragmented landscapes in the Atlantic Forest, in an isolated forest patch five times smaller than minimum expected home-range size. This observation suggests that *M. guianensis* may outlast the habitat fragmentation in Atlantic Forest landscapes, potentially relying upon multiple forest patches to hunt. The eagle was photographed after a failed predation attempt on a group of Golden-headed Lion Tamarins *Leontopithecus chrysomelas*. It is the first record of a potential prey species for Crested Eagles in the Atlantic Forest.

**KEY-WORDS:** Diet, habitat loss, *Leontopithecus chrysomelas*, predation, stepping stones.

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The Crested Eagle (*Morphnus guianensis*) is a rare, patchily-distributed, forest-dwelling eagle occurring from southern Mexico (Chiapas) to Argentina (Misiones). It prefers lowland tropical and subtropical forests (GRIN 2014) but very little is known about its natural history. It is considered 'Near Threatened' globally, with declines inferred due to habitat loss and hunting (BirdLife International 2014) although confidence in these assessments is hampered by the natural rarity of this poorly studied species. The majority of recent Brazilian records are from Amazonia (e.g. WikiAves 2014, Gomes 2014). The few records from Atlantic Forest are mostly undocumented, very old (> 25 years), from the coast from Bahia (Wied-Neuwied 1820) to Rio Grande do Sul (Sick 1997). Owing to massive loss of the lowland Atlantic Forest, the Crested Eagle is Critically Endangered in São Paulo (Silveira *et al.* 2009), Minas Gerais (COPAM 2010) and Espírito Santo (Ipema 2005), and Possibly Extinct in Rio de Janeiro, Paraná and Rio Grande do Sul (Bergallo *et al.* 2000, Bencke *et al.* 2003, Mikich & Bérnils 2004). Recent records (< 25 years) in the Brazilian Atlantic Forest are anecdotal and lack documentation in the form of specimens, photos or voice-recordings. These reports come predominantly from protected areas such as the Serra do Caparaó National Park (Zorzini *et al.* 2006), Sooretama Biological Reserve (Parker & Goerck

1997), Morro do Diabo, Intervalles and Jacupiranga State Parks (Galetti *et al.* 1997). The only recent record from an unprotected area is from Grão Pará, Santa Catarina, where a pair were reported soaring in thermal air currents over forest fragments in 2005 (Albuquerque *et al.* 2006). However, this is unusual behavior for this species, which apparently prefers the forest interior and it is rarely seen soaring or using thermal currents (LFS *pers. obs.*).

The only previous documented record from the state of Bahia concerns an adult male killed by locals at the Ilhéus River, near the city of Itororó (Bokermann 1957), reported by Wied-Neuwied in 16 January 1817 (1820, 1846). Almost two hundred years later, we report the second documented record of *Morphnus guianensis* in Bahia, which forms the northern limit for this species in the Atlantic Forest. On the afternoon of 5 December 2012 an adult bird was photographed (Figure 1) in a 2,300 ha *Tabuleiro* forest (15°59'S, 39°23'W; 197 m altitude) in the municipality of Belmonte, after a failed predation attempt on a reintroduced group of Golden-headed Lion Tamarins *Leontopithecus chrysomelas*. This *Tabuleiro* forest is in an advanced state of regeneration and harbors other endemic and threatened birds (*Amazona rhodocorytha*) and mammals, such as *Sapajus xanthosternos*, *Chaetomys subspinosus* and *Bradypus torquatus* (R. Costa-Araújo *pers. obs.*, Moura 2003). The forest fragment lies in a



**FIGURE 1. a-b.** *Morphnus guianensis* photographed in a 2,300 ha *Tabuleiro* Forest fragment on 5 December 2012 at Belmonte, Bahia, Brazil. Photos by R. Costa-Araújo.

landscape dominated by cattle pasture, in addition to *Eucalyptus* plantations, some cocoa agroforests and a few small degraded forest patches (Landau 2003, R. Costa-Araújo *pers. obs.*).

In addition to both documented records (Costa-Araújo *et al.* this paper, Wied-Neuwied 1820, 1846) there are two undocumented reports of Crested Eagles from Bahia: one heard only in 1974 at Porto Seguro (Willis & Oniki 2003) and an anonymous report from the municipality of Belmonte in 1995 (Anonymous 1995). Our record is unambiguous evidence for the persistence of *Morphnus guianensis* in the Southern Bahian *Tabuleiro* forests.

This is the first documented record of *M. guianensis* using a small forest fragment in the Atlantic Forest. Indeed, Crested Eagles were recorded breeding in a small patch of *Terra Firme* forest in Amazonia (Andretti 2010, Lees *et al.* 2013), which is similar in structure and floristic composition to the coastal *Tabuleiro* forest (Thomas 2003). According to the estimates of Thiollay (1989) from French Guiana, a Crested Eagle territory may include up to 100 km<sup>2</sup> of continuous habitat (see also Galetti *et al.* 1997). Nevertheless, we recorded this failed predation attempt in a patch five times smaller than this estimates, isolated by several kilometers from larger forest blocks (73 km<sup>2</sup> in Estação Veracel and Pau-Brasil private reserves, or 115 km<sup>2</sup> in Pau Brasil National Park). Our record suggests that Crested Eagles may persist in fragmented Atlantic Forest

landscapes, potentially relying upon multiple patches to hunt. Further studies should address this hypothesis because persecution is a major threat for large raptors in fragmented landscapes (Trinca *et al.* 2008).

The feeding behavior of *Morphnus guianensis* remains poorly understood. Bierregaard (1984) reported on the prey-species brought to a fledging over three months in a nest near Manaus that included mostly snakes and small mammals. Vargas *et al.* (2006) reported a curious case of a young Harpy Eagle being fed by an adult Crested Eagle, in which snakes and mammals were the only prey delivered. A recent study found mammals highly represented in the Crested Eagle's diet and that primates accounted for 25% of mammal prey items (Gomes 2014). This observation is consistent with predation events by *M. guianensis* on eleven primate species from six different genera. The body mass of primates subject to successful or attempted predation events ranges between 0.3-3 kg (Table 1). The small-bodied species from genus *Leontopithecus* (Costa-Araújo *et al.* this paper), *Saguinus* (Vargas *et al.* 2006, Vasquez & Heymann 2001, Kessler 1995, Gomes 2014), *Saimiri* (Robinson 1994, Boinski *et al.* 2003), *Pithecia* (Gilbert 2000) and *Callicebus* (Gomes 2014) covers the majority of primate predation records and an young *Ateles paniscus* (Juliott 1994) completes the list. *Leontopithecus chrysomelas* are small tamarins, with a body-mass similar to most *Saguinus* spp. ( $\leq 0.7$  kg) and may form part of the diet of Crested Eagles.

**TABLE 1.** Primate species attacked and/or preyed by *Morphnus guianensis*, with minimum and maximum adult weight (Emmons & Feer 1997) and body size class: small ( $\leq 3$  kg) and medium (3-8 kg).

Specie	Weight (g)	Body size
<i>Saguinus fuscicollis</i>	338-436	Small
<i>Saguinus geoffroy</i>	453-520	Small
<i>Saguinus labiatus</i>	500-650	Small
<i>Saguinus midas</i>	415-665	Small
<i>Saguinus mistax</i>	536-700	Small
<i>Leontopithecus chrysomelas</i>	480-700	Small
<i>Saimiri sciureus</i>	480-1400	Small
<i>Saimiri oerstedii</i>	600-750	Small
<i>Callicebus caligatus</i>	860-1,400	Small
<i>Pithecia pithecia</i> *	1,650-2,350	Small
<i>Ateles paniscus</i> *	2,500-3,200†	Medium

\*Attack on a younger individual.

†Estimated biomass of the young individual preyed (Julliot 1994).

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