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SHORT NOTE

WHITE-NECKED HAWK (*AMADONASTUR LACERNULATUS*) FEEDING ON AMPHISBAENIDAE

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Abstract · The White-necked Hawk (*Amadonastur lacernulatus*) is an Atlantic Forest endemic bird of prey with a poorly known diet. Here, we describe three different predatory interactions between White-necked Hawks and worm lizards (Amphisbaenidae) from Ubatuba, São Paulo, Brazil. During these events, hawks were recorded grasping, killing and consuming amphisbaenids. Due to their fossorial life, worm lizards are uncommon prey items for most birds of prey and such predator-prey interaction can be related to flooded amphisbaenians galleries after heavy rain episodes. To our knowledge, this is the first report of White-necked Hawks preying on amphisbaenids.

Resumo · Gavião-pombo-pequeno (*Amadonastur lacernulatus*) predando Amphisbaenidae.
O gavião-pombo-pequeno é uma ave de rapina endêmica da Mata Atlântica cuja dieta é pouco conhecida. Neste manuscrito, descrevemos três diferentes interações predatórias entre o gavião-pombo-pequeno e cobras-cegas que ocorreram em Ubatuba-SP, Brasil. Devido a seus hábitos fossoriais, as cobras-cegas são presas incomuns para a maioria das aves de rapina e tais eventos podem estar relacionados a condições climáticas particulares. Baseado em nosso conhecimento, este é o primeiro registro de gavião-pombo-pequeno predando um anfisbaenídeo.

Key words: Accipitridae · Birds of prey · Diet · Feeding behavior · Worm lizard

The White-necked Hawk *(Amadonastur lacernulatus,* Temminck 1827) is a bird of prey from the Accipitridae family and endemic to Brazil (Sick 1997, Amaral & Cabanne 2008). It occurs along most of the Brazilian coast (from Santa Catarina to the Paraiba States), but also in more continental localities in the Atlantic Forest biome (Zorzin et al. 2006, Carvalho & Marini 2007, Amaral & Cabanne 2008). This species, a typical inhabitant of forest and forest edges (Srbek-Araújo et al. 2009), is more common at lower altitudes (Willis & Oniki 2002). *A. lacernulatus* appears to be a relatively uncommon species, with low population density (Olmos et al. 2006, Simon et al. 2007), and even rare in some areas (Roda & Pereira 2006). The species was ranked as Vulnerable by the International Union for Conservation of Nature (IUCN) in its Red List of Endangered Species (IUCN 2018), which is linked to habitat destruction due to anthropogenic pressure (Mallet-Rodrigues et al. 2007, Amaral & Cabanne 2008).

The feeding habits of *A. lacernulatus* are poorly known and predatory events of this species are rarely seen (Olmos et al. 2006, Srbek-Araújo et al. 2009). Most studies focused on the diet of *A. lacernulatus* have suggested a generalist diet, composed by different groups of invertebrates like gastropods, insects and arachnids (Martuscelli 1996, Sick 1997) and small vertebrates such as mammals, snakes, lizards, amphibians and other birds (Garsk & Andrade 2004, Cunha et al. 2006, Olmos et al. 2006, Amaral & Cabanne 2008, Srbek-Araujo et al. 2009).

On the other hand, Amphisbaenia is an infraorder of squamates with a snake-like shape and cosmopolitan distribution (Vidal & Hedges 2009). Amphisbaenids, also known as worm lizards, have fossorial habits, spending most of their life in underground tunnels. These animals sometimes ascend to the ground surface, especially to escape from flooding after heavy rain episodes (Colli & Zamboni 1999, Teixeira et al. 2014, Hoek & Jarrín-V 2017). During their surface activity, amphisbaenids become briefly vulnerable to predators such as birds, as shown by previous records of birds feeding on them (Zotta 1934, Folly et al. 2015, Smaniotto et al. 2017). However, due to the secretive nature of amphisbaenids and the complex interaction of the factors that promote prey-predator contact, these kinds of records are still rare. Here, we documented one predation and two other possible predatory interactions between the *A. lacernulatus* and amphisbaenids that occurred in Ubatuba-São Paulo, Brazil in 2018.

Two events (on 22 February and 03 April, 2018) were recorded by a camera trap (Bushnell, model Essential E3, set to video record after motion detection), located within the area of Projeto Dacnis (an NGO for Atlantic Forest conservation) at Ubatuba, São Paulo, Brazil. The area of Projeto Dacnis is a lowland Atlantic Forest patch of 131.6 ha (23°27'24.33"S, 45° 8'46.68"W). The camera trap site where the interactions were recorded is characterized by a sparse tree formation, with a

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Figure 1. Image captured from a video recorded by a camera trap at Projeto Dacnis research area in Ubatuba, São Paulo, Brazil, showing a White-necked Hawk (A. lacernulatus) grasping an amphisbaenid (A). A. lacernulatus restraining the amphisbaenid with beak (B).

closed canopy, and a few centimeters of leaf litter. The third record was made by a citizen during a fortuitous encounter at Camburi Beach in Ubatuba, São Paulo, Brazil (23° 22'6.39"S, 44°46'58.14"W), in an area with secondary vegetation and a dense canopy, a few meters from a camping site. The first record, on 22 February, 2018 at 13:45 h. (GMT-3), recorded one specimen of *A. lacernulatus* attacking an amphisbaenid, grasping and kicking with its talons and tearing the worm lizard with its beak (Figure 1). Most of the attacks seemed to be directed at the head of the prey. At the end of our record, the *A. lacernulatus* individual held its prey with the talon and made a few short leaps getting out of the range of the camera, so it was not possible to check if the bird fed on its prey (video file at: hbw.com/ibc/1613047).

The second encounter was recorded on 3 April, 2018 at 14:54 h. (GMT-3), but it was not possible to make sure if it was the same specimen or not. The bird was recorded scratching at the leaf litter with its feet, attacking something on the ground, and finally raising its head holding an amphisbaenid (apparently dead) in its beak. After a few seconds, the hawk ingested the prey (video files at: hbw.com/ibc/1613044 and hbw.com/ibc/1613043).ibc/1613044 and hbw.com/ibc/1613043).

The last record was made in Camburi Beach, also located in the municipality of Ubatuba, on 13 September, 2018 at 10:35 h. (GMT-3), when a citizen with his smartphone recorded one *A. lacernulatus* individual. In the picture, it is possible to identify an amphisbaenid, restrained by the hawk's talons (Figure 2). Unlike the other two records, where the hawk stays on the ground during the event, the bird was perched on a fallen tree branch 150 cm above the ground. After a few seconds, the specimen flew away, carrying the amphisbaenid in its talons. Again, it was not possible to confirm if the hawk fed on the worm lizard.

As far as we know, this is the first record of *A. lacernulatus* feeding on amphisbaenids. Due to the fossorial lifestyle of amphisbaenians, predator-prey interactions with birds of prey seem to be rare, and even the notorious "reptile-eater" bird of prey, Laughing Falcon (*Herpetotheres cachinnans*, Linnaeus, 1758), has not been recorded feeding on amphisbaenids (Costa et al. 2014).

During the heavy rain season, most of the underground galleries can be flooded, forcing amphisbaenids to ascend to the ground surface (Colli & Zamboni 1999, Teixeira et al. 2014, Hoek & Jarrín-V 2017), facilitating visual contact by predators such as *A. lacernulatus*. It is interesting to note that our first record occurred in the middle of the rainy season (319 mm of average precipitation during this period), and the second at the end of it, when the soil could be saturated with water (321 mm and 239 mm of precipitation in March and April, respectively, Climatempo 2018). For our second record, the predator-prey interaction happened after a heavy rain episode. The observation at Camburi beach occurred in the middle of September (175 mm of precipitation). Unfortunately, while other birds have been recorded preying on amphisbaenids, no details about weather conditions are given (Folly 2015, Koski & Koski 2017, Smaniotto et al. 2017), making it hard to establish whether amphisbaenid predation is generally weather-driven.

The apparently opportunistic predatory behavior of *A. lacernulatus* described here seems to agree with other opportunistic feeding events mentioned by other authors. These include records of an *A. lacernulatus* close to an army ant raid (a huge number of ants foraging in the same area), capturing invertebrates trying to escape (Martuscelli 1996), another one following a grass mower to capture fleeing invertebrates (Martuscelli 1996), and even patrolling mist nets to predate on captured birds (Garsk & Andrade 2004).

The present work adds a new and unusual item to the diet of *A. lacernulatus* and suggests an opportunistic hunting behavior to feed on a kind of prey usually poorly available for birds of prey. From our records, it isn't clear if this feeding behavior is linked to a fortuitous predator-prey encounter or to an active search for this kind of prey in these climatic conditions. Future studies to test these hypotheses can be helpful to enlighten questions regarding how birds of prey explore different feeding opportunities in different weather conditions.

Figure 2. White-necked Hawk (*A. lacernulatus*) holding an amphisbaenid at Camburi Beach, Ubatuba-SP, Brazil. Photography by: Devidson Eduardo do Santo Oliveira.

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