ACTA
AMAZONICA

http://dx.doi.org/10.1590/1809-4392202300090

SHORT COMMUNICATION

Kleptoparasitism attempt on a greater grison (*Galictis vittata*) by a white hawk (*Pseudastur albicollis*) in the Brazilian Amazon

Talita Vieira BRAGA*, Ricardo Augusto Serpa CERBONCINI, Louri KLEMANN JUNIOR

Universidade do Estado do Amazonas, Centro de Estudos Superiores de Itacoatiara, Laboratório de Biodiversidade, Ecologia e Conservação de Ecossistemas Amazônicos, 69100-000 Itacoatiara, Amazonas, Brazil

* Corresponding author: talitavbr@gmail.com; https://orcid.org/0000-0001-7683-9927

ABSTRACT

Facultative kleptoparasites face the risk of trying to steal food resources from competitors. This type of interaction is little known, but anecdotal observations indicate that birds of prey may take advantage of their accurate sight to detect the best opportunities for kleptoparasitism. We recorded a camera trap video of an attempt of kleptoparasitism by the white hawk, *Pseudastur albicollis,* that tried to steal food from a greater grison, *Galictis vittata,* in a recently selectively-logged forest site in central Brazilian Amazonia. The attempt was unsuccessful as the greater grison responded aggressively to the attack. The event occurred in a linear clearing, which may have increased the bird's ability to detect its potential host. Kleptoparasitic interactions are difficult to detect in forest environments. Recording opportunistic kleptoparasitic interactions in tropical forests may not only depend on the increasing use of camera traps, but also on habitat conditions that facilitate the detection of potential hosts.

KEYWORDS: Accipitridae, aggressive behavior, camera trap, Carnivora, food thief

Tentativa de cleptoparasitismo de um furão-grande (*Galictis vittata*) por um gavião-branco (*Pseudastur albicollis*) na Amazônia Brasileira

RESUMO

Cleptoparasitas facultativos enfrentam os custos envolvidos no roubo do alimento em troca da compensação pelo valor nutricional do item roubado. Essa interação é pouco conhecida, mas observações anedóticas indicam que aves de rapina podem se beneficiar de sua visão acurada para cleptoparasitar. Reportamos uma tentativa de cleptoparasitismo de um furão-grande, *Galictis vittata,* por um gavião-branco, *Pseudastur albicollis,* em uma floresta na Amazônia central brasileira recentemente manejada para corte seletivo de impacto reduzido. Como o furão-grande respondeu agressivamente ao ataque, a tentativa de roubo falhou. O evento foi registrado por uma armadilha fotográfica em uma clareira linear. O ambiente mais aberto pode ter aumentado a habilidade do gavião-branco em encontrar o seu hospedeiro. Eventos de cleptoparasitismo são dificilmente registrados em ambientes florestais. Registros de cleptoparasitismo em florestas tropicais podem não depender apenas do uso intensivo de armadilhas fotográficas, mas também de condições ambientais favoráveis à detecção de possíveis hospedeiros pelo cleptoparasita.

PALAVRAS-CHAVE: Accipitridae, comportamento agressivo, armadilha fotográfica, Carnivora, roubo de comida

Kleptoparasitism is the act of stealing food from another individual – the food thief (Brockmann and Barnard 1979; Iyengar 2008). This strategic interaction benefits the kleptoparasite by decreasing the investment in food search, while the host is negatively affected by the loss of food acquired after investing time and energy (Thompson 1986; Iyengar 2008). A trade-off exists between the nutritional value of the food resource and the cost of stealing it from others, and kleptoparasites may face the risks of attacking a host with a probability of success in each situation (Thompson 1986; Iyengar 2008; Flower *et al.* 2013). Thus, the costs and benefits of kleptoparasitism may differ between individuals and species. In rare cases, obligate kleptoparasites evolved adaptations to increase their chances of stealing food from others, while in most cases, facultative kleptoparasites may learn to detect the best opportunities for attempting it (Brockmann and Barnard 1979; Morand-Ferron *et al.* 2007; Iyengar 2008).

Food thieves can be found in several animal taxa, but most studies reported it for birds (probably as they are easier to be spotted in the act; Iyengar 2008), especially conventional

CITE AS: Braga, T.V.; Cerboncini, R.A.S.; Klemann Junior, L. 2023. Kleptoparasitism attempt on a greater grison (*Galictis vittata*) by a white hawk (*Pseudastur albicollis*) in the Brazilian Amazon. *Acta Amazonica* 53: 239-242.

predator birds that predominantly feed on other vertebrates, such as Charadriiformes, Accipitriformes, and Falconiformes (Brockmann and Barnard 1979; Morand-Ferron *et al.* 2007; Latorres and Borges 2022). Vertebrates can be important food resources, but most of them are also vagile and difficult to locate and capture. Consequently, the cognitive and acrobatic abilities to find and capture prey are also assets of kleptoparasites for stealing food (Morand-Ferron *et al.* 2007; Iyengar 2008). Furthermore, birds are visually oriented, and their vertebrate prey are large and can be easily detected while being carried by other predators – the potential hosts of kleptoparasites (Iyengar 2008).

Kleptoparasites are more common than expected in birds of the family Accipitridae (Brockmann and Barnard 1979; Morand-Ferron *et al.* 2007). The white hawk, *Pseudastur albicollis* (Latham, 1790) (Accipitriformes: Accipitridae), is a forest species (body size length: 47 to 51 cm) distributed from southern Mexico to Bolivia and Brazil, and is found in the entire Brazilian Amazon (Marquez *et al.* 2005; BirdLife International 2020; Pallinger and Menq 2021). Reptiles and amphibians are the most common prey of the white hawk (Pallinger and Menq 2021). Other less common records include predation of arthropods, small mammals and other birds (Pallinger and Menq 2021), such as a toucan (Ramphastidae; Sick 1997), a great tinamou, *Tinamus major* (Gmelin, 1789) (Lamm 1974), an Amazonian motmot, *Momotus momota* (Linnaeus, 1766) (Komar 2003), nestlings of the yellow-rumped cacique, *Cacicus cela* (Linnaeus, 1758) (Silva and Campos 2011), and also opportunistic feeding of a red-capped manakin, *Ceratopipra mentalis* Sclater, 1857 and a white-collared manakin, *Manacus candei* (Parzudaki, 1841) captured in mist-nets (Komar 2003).

White hawks usually land on the forest edge for long periods to find their prey (Pallinger and Menq 2021). Similarly to other birds of prey (Ubaid and Beco 2022), the species may also follow other animal groups in search for food, such as black-crowned Central American squirrel monkeys, *Saimiri oerstedii* (Reinhardt, 1872) (Boinski and Scott 1988), black-capped capuchin monkeys *Sapajus apella* Linnaeus, 1758 (Zhang and Wang 2000), and white-nosed coatis, *Nasua narica* (Linnaeus, 1766) (Booth-Binczik *et al.* 2004), and may detect potential prey fleeing from these groups. Thus, the white hawk may have an opportunistic feeding behavior, an expected trait for a predator that may act as a kleptoparasite in situations where competitors may be vulnerable (Iyengar 2008).

When species followed by the white hawk are small, they may also be their potential prey (Boinski and Scott 1988; Peres 1993). However, medium to large size species (> 2 kg) may be too large to be predated by the white hawk (Zhang and Wang 2000; Booth-Binczik *et al.* 2004). Also, interaction with coatis can be mutualistic, as coatis may benefit from the exceptional sight of birds of prey against potential predators (Beisiegel 2007). Nevertheless, an attack of the white hawk on a medium size mammal, the northern tamandua, *Tamandua mexicana* (Saussure, 1860), was reported in the literature, possibly as a consequence of territorial defense (Monroy-Ojeda *et al.* 2020).

Here we report what may be the first record of an attempt at kleptoparasitism by a white hawk. On the occasion, a white hawk appeared to have attempted to steal dead prey from a medium-sized mammal, the greater grison, *Galictis vittata* (Schreber, 1776) (Carnivora: Mustelidae). The observation occurred in central Brazilian Amazonia, in the state of Amazonas, Brazil (2°50'S, 58°36'W). The event was recorded within an area of more than 270,000 ha of evergreen forest (*floresta ombrófila densa de terras baixas*; Veloso *et al.* 1991) destined to reduced-impact logging, which favors practices that minimize environmental impacts (see Werger 2011 for details). The interaction was recorded on a 10-second video by a camera trap (Core Low Glow, Bushnell, Kansas, USA) used for wildlife monitoring at the study site. The record took place on 14 June 2021 on a site logged in the previous year (the complete video is available at https://github.com/rcerboncini/klepto_amazonica).

The greater grison was carrying a small mammal in its mouth, possibly a spiny rat of the *Proechimis* genus based on its size and white belly with brownish dorsal pelage (Figure 1a,d; Mendes-Oliveira and Miranda 2015). The grison was surprised by the attack of the white hawk and dropped the prey to react by growling and keeping in an alert state (Figure 1b,c). The grison kept looking in the direction where the white hawk flew for a few seconds, and then returned to collect its prey (Figure 1c,d).

The diet of the greater grison is poorly known, with sporadic records in the literature including reptiles, amphibians and fish, but possibly with a preference for small mammals and birds (see references in Yensen and Tarifa 2003). The similarity in prey consumption between the greater grison and the white hawk suggests that the white hawk attempted to steal food from the greater grison. Also, the greater grison may be too large (average 2.4 kg; Yensen and Tarifa 2003) to be captured as prey by the white hawk (Monroy-Ojeda *et al.* 2020). Nevertheless, the greater grison can be a prey for larger birds of prey, such as the harpy eagle, *Harpia harpyja* (Linnaeus, 1758) (Casanova *et al.* 2022).

The probability of success of a kleptoparasitism attempt may increase if the host abandons the feeding resource after being attacked by the kleptoparasite to escape predation or to avoid suffering injuries in a potential fight (Brockmann and Barnard 1979). In both situations, abandoning the prey is a risk for the host, and the kleptoparasite will probably grab the chance of stealing it. However, that was not what we observed in the video. Although the greater grison dropped

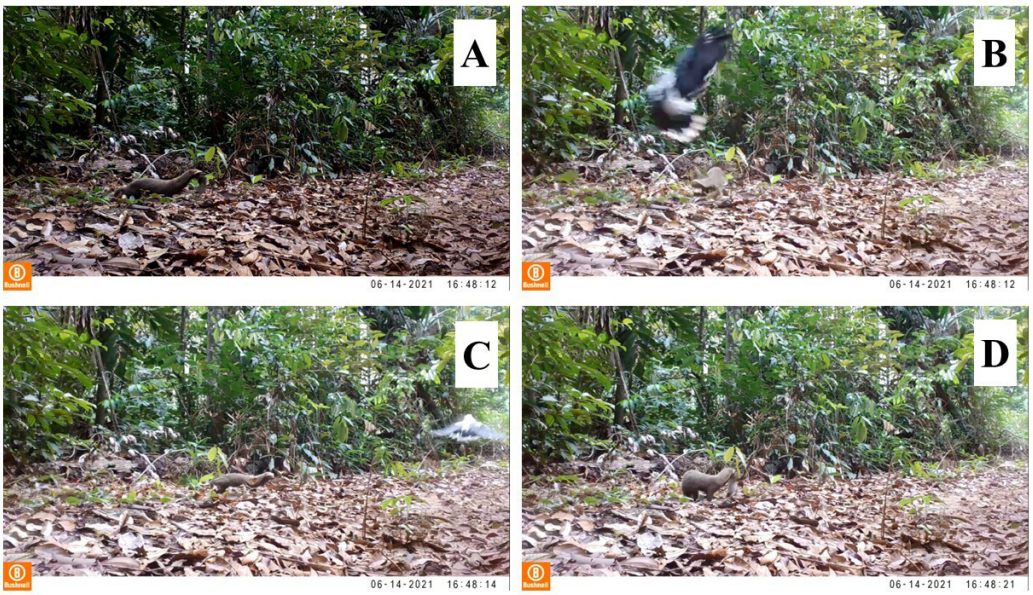

Figure 1. Record of an attempt at kleptoparasitism by a white hawk, *Pseudastur albicollis,* on a greater grison, *Galictis vittata*, in central Brazilian Amazonia. A – *the* greater grison carrying a small mammal in its mouth; B – the greater grison being attacked by the white hawk; C – the greater grison in an alert state with its prey dropped on the ground, while the white hawk flies away; D – the greater grison carrying its prey again after the threat is gone. This figure is in color in the electronic version.

its prey on the ground, it responded quickly and aggressively to the white hawk's attack, and it did not abandon its prey, collecting it again after the threat was gone. This response may be an example of retaliation from the host, which resulted in the kleptoparasite's failed attempt (Iyengar 2008).

Another situation that may benefit kleptoparasites include the ability of the kleptoparasite to identify feeding resources in the mouth or claws of their potential hosts (Brockmann and Barnard 1979; Iyengar 2008). The greater grison usually takes its prey to a secure place before consuming it (Yensen and Tarifa 2003), which may increase the ability of kleptoparasites in detecting it as potential hosts. Also, the record occurred in a drag-line of a recently selectively-logged site, and the more open environment of this type of linear clearing may increase the ability of birds of prey such as the white hawk to detect their potential hosts for stealing food (Paulson 1985; Morand-Ferron *et al.* 2007).

After analyzing the video record and considering the species traits, we suggest that this may be an occasional and opportunistic event, once the greater grison is a low-density species (Arita *et al.* 1990), and is not commonly recorded by camera traps in the Amazon forest (Antunes *et al.* 2022). This is the first record of a white hawk attempting kleptoparasitism, which may also indicate that this type of behavior is not common in the species. However, as an opportunistic bird of prey that follows mammals while foraging (Boinski and Scott 1988; Zhang and Wang 2000; Booth-Binczik *et al.* 2004), the white hawk may stay alert to other animals' movements, even those that are not their targets for predation, increasing the opportunities for finding food resources (Brockmann and Barnard 1979). Furthermore, the white hawk is a forest specialist (Marquez *et al.* 2005; Pallinger and Menq 2021), and the forest environment may reduce the probability of detecting these events (Morand-Ferron *et al.* 2007). While the probability of evolving kleptoparasitic strategies is higher in more open environments (Paulson 1985; Morand-Ferron *et al.* 2007), the perceived lower occurrence of kleptoparasitism inside forests may also be owed to lower detectability (Morand-Ferron *et al.* 2007). In this way, the increasing popularization of the use of camera traps (O'Connell *et al.* 2011) may allow a better understanding of kleptoparasitism by increasing the number of records such as the one reported in here. Detecting opportunistic kleptoparasitic interactions in tropical forests may also depend on habitat conditions that favor the detection of potential hosts by kleptoparasites, such as the linear clearing in this case.

ACKNOWLEDGMENTS

Jucimar Almeida, Lilian Braga, and others helped during fieldwork. Precious Woods Amazon and Amazonas Energia provided the equipment (camera traps) used to record the species in the study. Fundação de Amparo à Pesquisa do Estado do Amazonas financially supports the work of TVB (PROFIX-RH 01.02.016301.00375/2022-27) and RASC (FIXAM 062.01637/2018 / PROFIX-RH 01.02.016301.02613/2022-39).

REFERENCES

Antunes, A.C.; Montanarin, A.; Gräbin, D.M.; Monteiro, E.C.S.; de Pinho, F.F.; Alvarenga, G.C.; *et al.* 2022. AMAZONIA CAMTRAP: A dataset of mammal, bird, and reptile species

recorded with câmera traps in the Amazon forest. *Ecology,* 103: e3738.

Arita, H.T.; Robinson, J.G.; Redford, K.H. 1990. Rarity in Neotropical forest mammals and its ecological correlates. *Conservation Biology,* 4: 181-192.

Beisiegel, B.D.M. 2007. Foraging association between Coatis (*Nasua nasua*) and birds of the Atlantic Forest, Brazil. *Biotropica,* 39: 283-285.

BirdLife International. 2020. *Pseudastur albicollis*. *The IUCN Red List of Threatened Species 2020:* e.T22695786A168802065. (https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T22695786A168802065.en). Accessed on 11 Dec 2022.

Boinski, S.; Scott, P.E. 1988. Association of birds with monkeys in Costa Rica. *Biotropica,* 20: 136-143.

Booth-Binczik, S.D.; Binczik, G.A.; Labisky, R.F. 2004. A possible foraging association between White Hawks and White-nosed Coatis. *The Wilson Bulletin,* 116: 101-103.

Brockmann, H.J.; Barnard, C.J. 1979. Kleptoparasitism in birds. *Animal Behaviour,* 27: 487-514.

Casanova, G.M.; Ninabanda, R.; Licuy, M. 2022. Depredación de Grisón Grande (*Galictis vittata*) por Águila Harpía (*Harpia harpyja*). *Revista Ecuatoriana de Ornitología,* 8: 44-47.

Flower, T.P.; Child, M.F.; Ridley, A.R. 2013. The ecological economics of kleptoparasitism: pay-offs from self-foraging versus kleptoparasitism. *Journal of Animal Ecology,* 82: 245-255.

Iyengar, E.V. 2008. Kleptoparasitic interactions throughout the animal kingdom and a re-evaluation, based on participant mobility, of the conditions promoting the evolution of kleptoparasitism. *Biological Journal of the Linnean Society,* 93: 745-762.

Komar, O. 2003. Predation on birds by the White Hawk (*Leucopternis albicollis*). *Ornitologia Neotropical,* 14: 541-543.

Lamm, D.W. 1974. White Hawk preying on the Great Tinamou. *The Auk,* 91: 845-846.

Latorres, A.M.; Borges, S.H. 2022. Unconventional bird predators are relevant to vertebrate trophic relationships? A community science platform helps to answer this question. *Food Webs*, 31: e00232.

Marquez, C.; Bechard, M.; Gast, F.; Vanegas, V.H. 2005. *Aves Rapaces Diurnas de Colombia.* Instituto de Investigación de Recursos Biológicos "Alexander von Humboldt", Bogotá, 394p.

Mendes-Oliveira, A.C.; Miranda, C.L. 2015. *Pequenos Mamíferos Não-Voadores da Amazônia Brasileira.* Sociedade Brasileira de Mastozoologia, Rio de Janeiro, 336p.

Monroy-Ojeda, A.; Arroyo-Gerala, P.; Cruz, F.C.; Narvaez, R.L.; Gómez, L.M.; Perez, J.L.J.; *et al.* 2020. Observation of a White Hawk (*Pseudastur albicollis*) attacking a Northern Tamandua (*Tamandua mexicana*) in Chiapas, Mexico. *Journal of Raptor Research,* 54: 463-465.

Morand-Ferron, J.; Sol, D.; Lefebvre, L. 2007. Food stealing in birds: brain or brawn? *Animal Behaviour,* 74: 1725-1734.

O'Connell, A.F.; Nichols, J.D.; Karanth, K.U. 2011. *Camera Traps in Animal Ecology: Methods and Analyses.* Springer, Tokyo, 271p.

Pallinger, F.; Menq, W. 2021. *Aves de Rapina do Brasil: Diurnos. v.1*. Editora do Autor, São Paulo, 184p.

Paulson, D.R. 1985. The importance of open habitat to the occurrence of kleptoparasitism. *The Auk,* 102*:* 637-639.

Peres, C.A. 1993. Anti-predation benefits in a mixed-species group of Amazonian Tamarins. *Folia Primatologica,* 61: 61-76.

Sick, H. 1997. *Ornitologia Brasileira.* Editora Nova Fronteira, Rio de Janeiro, 912p.

Silva, E.F.; Campos, C.E.C. 2011. Nidificação, predação e nidoparasitismo em colônias de *Cacicus cela* (Aves: Icteridae) na Amazônia Oriental, Amapá, Brasil. *Biota Amazônia,* 1: 8-16.

Thompson, D.B.A. 1986. The economics of kleptoparasitism: optimal foraging, host and prey selection by gulls. *Animal Behaviour,* 34: 1189-1205.

Ubaid, F.K.; Beco, R. 2022. Interspecific foraging association between the cryptic forest-falcon, *Micrastur mintoni* and primates in an Amazon rainforest in Brazil. *Acta Amazonica,* 52: 49-52.

Veloso, H.P.; Rangel-Filho, A.L.R.; Lima, J.C.A. 1991. *Classificação da Vegetação Brasileira, Adaptada a um Sistema Universal*. IBGE, Rio de Janeiro, 124p.

Werger, M.J.A. 2011. *Sustainable Management of Tropical Rainforests: the CELOS Management System.* Tropenbos International, 282 p.

Yensen, E.; Tarifa, T. 2003. *Galictis vittata*. *Mammalian Species,* 727: 1-8.

Zhang, S.; Wang, L. 2000. Following of Brown Capuchin Monkeys by White Hawks in French Guiana. *The Condor,* 102: 198-201.

RECEIVED: 16/01/2023
ACCEPTED: 14/03/2023
ASSOCIATE EDITOR: Sergio H. Borges

DATA AVAILABILITY

The data that support the findings of this study are available on GitHub and can be accessed at https://github.com/rcerboncini/klepto_amazonica.