

SPIZAETUS

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CARACARA CHERIWAY IN COSTA RICA

SPIZAETUS TYRANNUS IN VENEZUELA

CICCABA HUHULA IN COLOMBIA

BUTEO RIDWAYI IN DOMINICAN REPUBLIC

FALCO RUFIGULARIS IN PANAMA

EAGLES IN NICARAGUA



SPIZAETUS

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Female *Caracara cheriway* photographed in the United States © Nick Dean

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The NRN is a membership-based organization. Its goal is to aid the research and conservation of Neotropical raptors by promoting communication and collaboration among biologists, raptor enthusiasts, and other conservationists working in the Neotropics. To join please e-mail the NRN coordinator, Marta Curti, at mcurti@peregrinefund.org, stating your interest in Neotropical raptor research and conservation.

FIRST RECORD OF CONSUMPTION OF PEACH PALM FRUITS (*BACTRIS GASIPAES*) BY THE CRESTED CARACARA (*CARACARA CHERIWAY*) IN COSTA RICA

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The Crested Caracara (*Caracara cheriway*) is a neotropical bird of prey of the Falconiformes Order that ranges from northern South America to the southwestern United States and southern Florida (Dwyer 2014). The species ranges in size from 50 to 60 cm long, has a wingspan of 120 cm, and weighs between 1,000 to 1,300 grams. The males and females are identical in appearance and can be found singly, in small groups, or in groups of more than 50 individuals (Ramírez et al. 2017). In Costa Rica, the Falconiformes Order is represented by the Falconidae family, which includes a total of 10 species of falcons and 3 species of caracaras (Garrigues et al. 2018).

Among the 3 species of caracaras in Costa Rica, the Crested Caracara is the one with the broadest distribution and can usually be found in agricultural areas, perched high up in trees or on the ground. The species is common in the northern

and southern Pacific lowlands and foothills of Costa Rica. It is becoming increasingly common in the southern Pacific lowlands and foothills and in the northern central Caribbean lowlands, from sea level to 1,500 meters above sea level. It is uncommon from the central valley to east of Cartago (Garrigues and Dean 2014).

With the expansion of its natural range, the majority of studies carried out for this species focus on diet and feeding habits and have shown that the Crested Caracara is omnivorous and utilizes varied foraging tactics (Sazima 2007). It is a bird of generalist and opportunistic feeding behavior. While it generally feeds on carrion, it also has been reported to be a kleptoparasitic species for vultures (Sibley 2001) and for the Loggerhead Shrike (*Lanius ludovicianus*) (Partida and Rodríguez-Estrella 2015). It also hunts insects and small to medium-sized vertebrates (Ramírez et al. 2017).

By analyzing regurgitated, indigestible prey remnants in the form of pellets from Crested Caracaras in Florida, Morrison et al (2007) reports the consumption of a list of insects and spiders that belong to 34 families and at least 72 genera, including several chemically-protected species that use a diverse variety of deterrent strategies like ammonia, formic acid, carboxylic acid, alcohols, isoprenoids, esters and aldehydes. These insects included caterpillars, grasshoppers, silphid beetles (*Necrodes surinamensis*), pentatomid or stink bugs, earwigs (*Doru taeniatum*), staphylinid beetles (*Creophilus maxillosus*) carabid beetles (*Agonum extensicole*, *Scarites subterraneus*, *Calosoma sayi*), fire ants (*Solenopsis invicta*), and trap jaw ants of the genus *Odontomachus*.

Documented vertebrate prey of the Crested Caracara include fish, turtles, snakes (Sibley 2001), juvenile American Alligators (*Alligator mississippiensis*) (Bent 1938), skunks, rabbits (Henderson 2002), bird nestlings, frogs, rodents (Stiles and Skutch 2003), juvenile Green Heron (*Butorides virescens*) (A. Rojas pers. comm), Cattle Egret (*Bubulcus ibis*) (Phillips et al. 2010), and Cane Toad (*Rhinella horribilis*) (Garcia-Mata et al. 2017). There is also a documented attempt of predation on a juvenile Howler Monkeys (*Alouatta palliata*) (McKinney, 2009). To date, the records of frugivory in the species of the Falconiformes order seem to be relatively rare worldwide. However, there are reports of fruit consumption

for both falcons and caracaras. In this document, we describe the consumption of Peach Palm fruits (*Bactris gasipaes*) by the Crested Caracara from a series of direct observations documented by digital photographs and [videos](#) in northern Costa Rica.

Observations

On 2 August, 2016 at 1530h in the town of La Unión de Venecia de San Carlos, Alajuela Province, Costa Rica (10°22' 17.80" N, 84°17' 32.80" W, datum WGS84, ~ 335 m.a.s.l.) two Crested Caracaras were observed collecting and eating Peach Palm fruits around a small stream in a grassland area dedicated to cattle farming (Figure 1).

One of the birds was seen flying toward a barren Peach Palm that was situated beside another palm that had four large clusters of fruit. After landing on a frond of the barren plant and watching the fruit clusters for several seconds, the bird flew and landed on a cluster with the most developed fruits. While balancing itself by beating its wings, it made use of its long legs and curved bill to remove an individual fruit from the peduncle that had already been damaged and partially eaten by other fruit-eating birds such as Montezuma Oropendolas (*Psarocolius montezuma*) and Red-lored Parrots (*Amazona autumnalis*).

Upon grabbing the fruit with its bill, the bird perched over another cluster of fruit. It grabbed

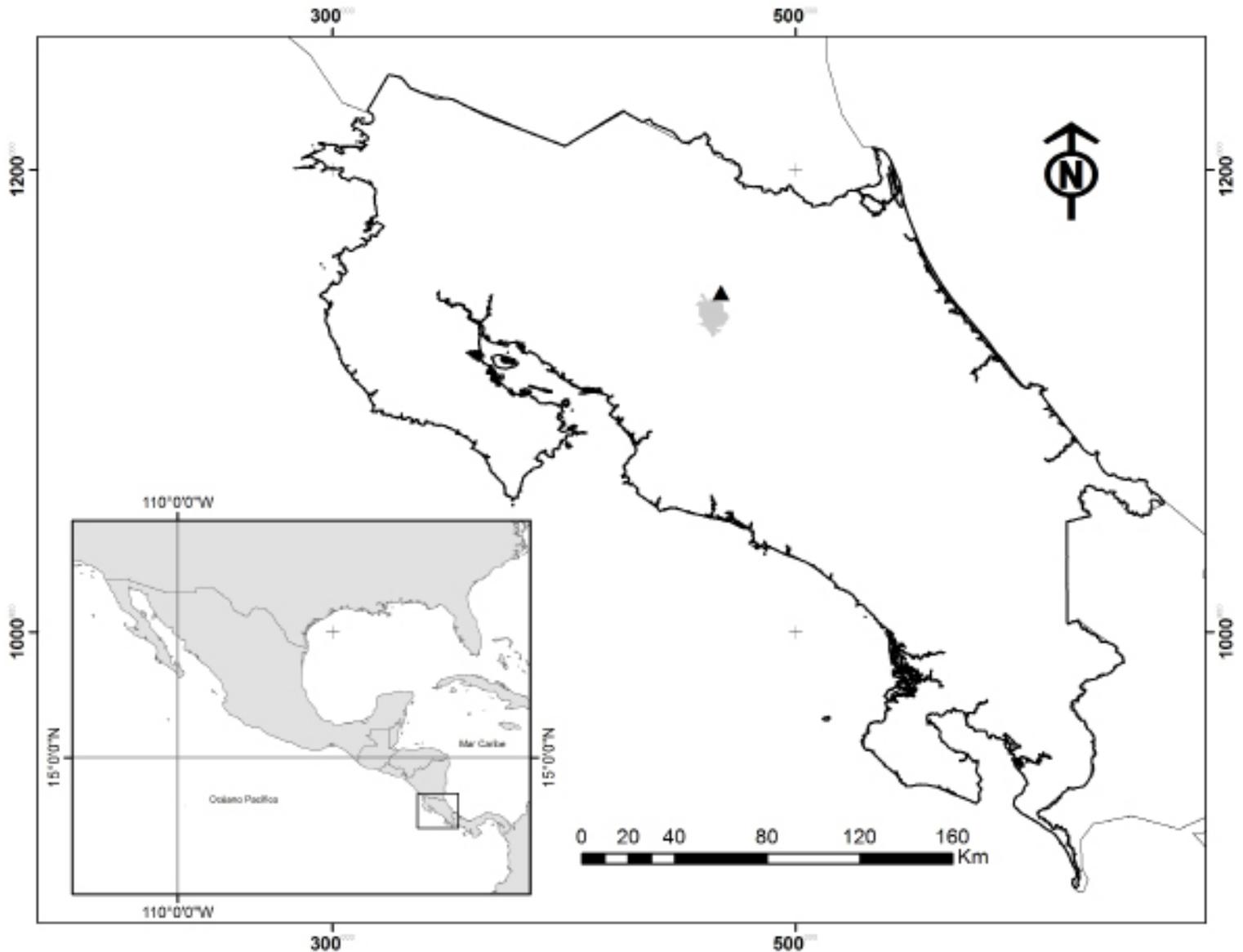


Figure 1. Location site of the fruit consumption events of the Crested Caracara in the town of La Unión de Venecia, Costa Rica. Map © Juan Marcial Serano Sandí.

the already torn Peach Palm fruit with its talons and began consuming the central portion, which became exposed when it was torn off its peduncle (Figure 2). A little before the fruit would be fully consumed, a second adult Crested Caracara flew to another palm around eight meters away from the fruiting one and remained quiet.

After eating the first fruit by itself, the first bird went back to the same fruit cluster and again used

its talons to grab the fruit and its hooked bill to bite, thus removing a second fruit from its peduncle. The first caracara then flew to the same palm where the second caracara was perched. The second caracara approached the first caracara and both of them ate the totality of the fruit together.

A few moments later, a third fruit was taken by the first bird and consumed only by that individual bird. After consuming the fruit, the bird went

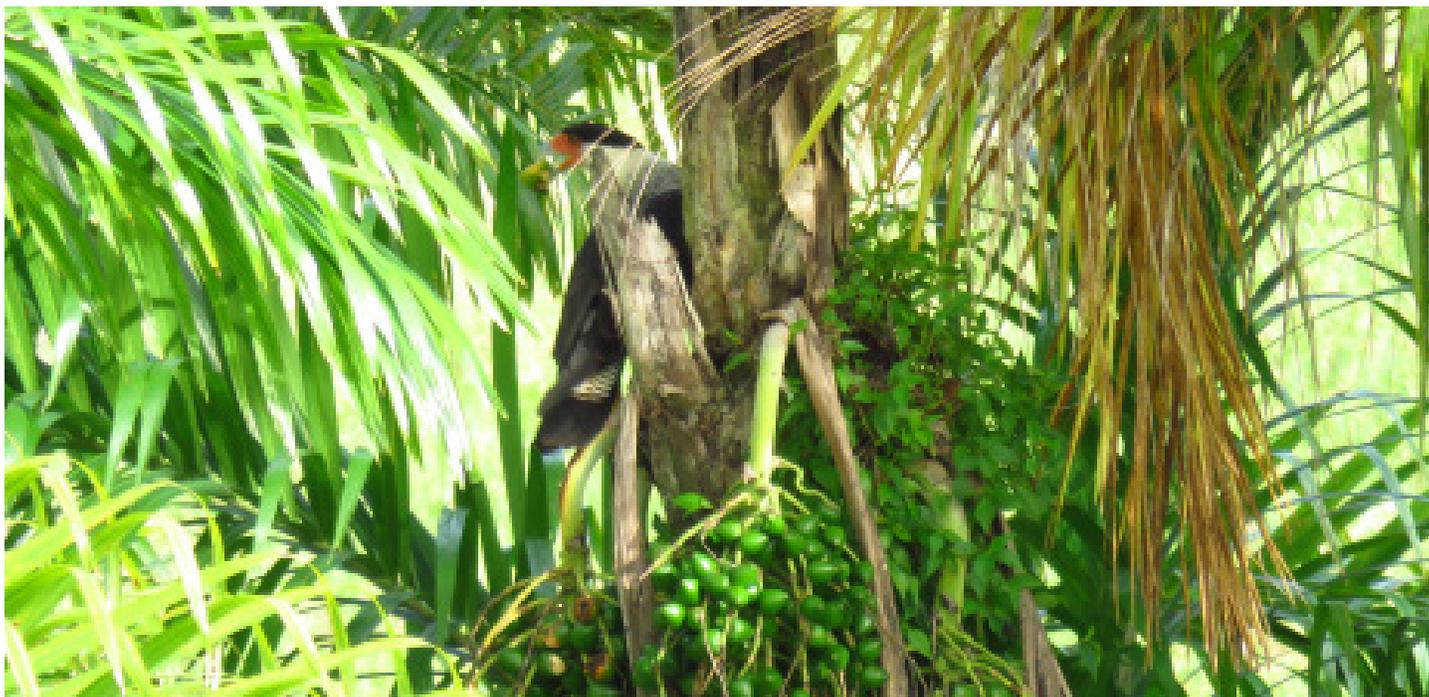


Figure 2. Adult Crested Caracara with a recently picked Peach Palm fruit in the town of La Unión de Venecia, Costa Rica. Photo © Alberth Humberto Rojas Carranza.

back to the fruit cluster to grab a fourth fruit. After eating half the fruit, the caracara dropped it to the ground. The first bird grabbed a fifth fruit and flew with it to the second bird. Both birds consumed the fruit together.

Once the first bird went back to the fruit cluster and grabbed a sixth fruit, it flew with the fruit in its bill to a forested area located at approximately 100 meters away from the Peach Palms. With the use of EL Swarovision 10x42 binoculars we observed it consuming the fruit. After finishing the fruit, the caracara dropped the seed to the ground. Approximately two minutes after the first bird finished consuming the fruit in the forest, the second caracara flew toward the same general area. After remaining perched for several minutes, both birds flew away.

Discussion

Fruit consumption has been rarely reported for the Crested Caracara along its distribution range. However, Skoruppa and Lee (2008) have documented their consumption of pecan fruits in the central part of Texas in the United States. In comparison, the Southern Caracara (*Caracara plancus*), has been documented eating fruits in Brazil, including the Urucuri or Motacú Palm (*Attalea phalerata*) (Galetti and Guimarães 2004) and the Buriti Palm (*Mauritia flexuosa*) (Prada and Araújo 2012).

It is important to point out that the Peach Palm fruit is considered a very nutritive food source that contains important amounts of vitamin A, beta-carotene, potassium and carbohydrates. Despite its low levels of proteins and other minerals,

the Peach Palm fruit flower has been used as a good food source for several species of domestic animals including pigs, cattle, and geese (Rios et al. 2016). Arroyo and Murillo (2000) also report its use as feed for domestic chickens. However, it has to be thermally treated to temperatures over 100 Celsius degrees for over 20 minutes to obtain the best meal. Without thermal treatment, there is a reduction in consumption and conversion of the feed and poor weight gain. This is because of the presence of inhibiting proteolytic factors.

Similarly, Gómez et al. (1998) cite the presence of lectines and tripsine inhibitors as anti-nutritional factors contained in the Peach Palm fruits. These substances also can negatively affect the digestion and the absorption of proteins in the diet. The Peach Palm fruit also contains carotenoid pigments. Arroyo and Murillo (2000) found that by feeding thermally-treated Peach Palm fruits to egg-laying hens, a greater grade of pigmentation in egg yolk occurred.

Facial flushing and color variation have been recorded for the ceres of Crested Caracaras (Dwyer 2014). The ceres are highly vascularized, with large patches of bare skin extending from the proximal edge of the beak to below the eye on both sides of the face (Negro et al. 2006). They are commonly described in color as orange (Wheeler and Clark 1999) or orange-yellow to red (Ferguson-Lees and Christie 2001). Dwyer (2014) cites that the colors indicated do not de-

scribe the whole range of cere colors of any caracaras because there are records that show that when a caracara is threatened or frightened, the cere changes color within seconds becoming pale yellow, dark yellow, and even pale blue.

It is of particular interest that Dwyer (2014) indicates that carotenoid, melanin, and hemoglobin-based colors can facilitate reversible color changes within seconds via blood flow within the body. Considering this, the observations reported in this document can generate new questions about how raw Peach Palm fruit consumption can influence color signals used by the Crested Caracaras. Another interesting topic to consider is the seed dispersal role of caracaras through their frugivorous activity, transporting seeds to different environments that may have beneficial or prejudicial effects for the germination of the plant species being consumed.

Based on our observations, we consider that the Crested Caracara acted as a primary seed dispersal agent for the Peach Palm fruits, as it was solely responsible for the separation of six individual fruits from their fruiting plant and transporting one seed over 100 meters away. Because there is very little information about frugivory in the Crested Caracara, we consider it important to develop more detailed studies about the species' interspecific relations, diet, and feeding habits. In this manner, we can understand the ecological function of this particular bird at an ecosystem-

ic level in the neotropical region, particularly in Costa Rica and Central America, where this report represents the first record of fruit consumption for the species.

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* * *

OBSERVATION OF BLACK HAWK-EAGLE (*SPIZAETUS TYRANNUS*) FEEDING ON EGGS IN THE VENEZUELAN COASTAL CORDILLERA

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The Black Hawk-eagle (*Spizaetus tyrannus*) is a raptor widely distributed in Central and South America. In Venezuela, it is found in humid forests in the east and south of Orinoco River, as well as in cloud forest in the Andes and the Coastal Cordillera up to 1,800 m.a.s.l. (Hilty 2003). The Black Hawk-Eagle is relatively common and frequently observed while hovering and vocalizing, especially during sunny days, although it can also be observed perched in the interior or edge of mature and secondary forests (Hilty 2003).

The diet of the Black Hawk-Eagle is still poorly known, especially in Venezuela. Observations across its range indicate that this eagle consumes small and medium-sized vertebrates including reptiles such as iguanas and snakes, but mainly arboreal mammals such as squirrels, monkeys (*Mico sp.*, *Saimiri sciureus*), and birds including toucans

(*Pteroglossus*, *Ramphastos*) and cracids (Rangel-Salazar and Enriquez-Rocha 1993; Quintero and Jácome 2011; Barnett et al. 2015). Prey are ambushed from the sub-canopy (Robinson 1994; Jone y Dorward 2014). Other species of *Spizaetus* have a similar diet that differs in the proportion of mammals, birds and reptiles according to the location. This suggests that this genus' diet is eclectic, and even includes carrion occasionally (Whitacre et al. 2012; Jone and Dorward 2014). Information about the diet of Venezuelan raptors is quite scarce. In this article we describe an observation of a Black-Hawk Eagle eating an egg in the Palmichal Forest Reserve, Venezuelan Coastal Cordillera.

Palmichal Forest Reserve (10° 19' N, 68° 13' W, 1000 m.a.s.l.) is a 10,000 ha area that protects the watersheds of Río Morón, Serranía del Litoral, Carabobo state. Palmichal is considered



Figure 1. Premontane humid forest of the Reserva Forestal Palmichal, Cordillera de la Costa, Venezuela. Photo © G. Buitrón-Jurado.

an Important Bird Area (IBA) (Birdlife International 2017). Our observation took place along the dirt road that connects field stations within the reserve. The area is premontane humid forest characterized by a continuous canopy of 20 to 25 m dominated by palm species such as *Euterpe precatoria* (Palmiche), *Socratea karstenii* and *Dicorycium fuscum*, and emergent trees of *Gynerthera caribensis* reaching up 40 m (Buitrón-Jurado and Fernández unpublished data) (Figure 1).

In the afternoon of 18 April 2015, after 1400h, we observed an adult Black Hawk-Eagle on the ground along the side of the road. Although the slope and distance obscured its prey, we observed that it was feeding on something. We tried get-

ting closer to obtain photographs, but the eagle became frightened and flew away. Immediately, we approached hoping to see what the hawk-eagle had been eating. We found a broken egg with the remains of egg white and yolk (Figure 2).

Though the egg shell was broken, (appearing to have been carefully opened), we did not observe any specific effort on the part of the hawk-eagle to accomplish this. We only observed the raptor repeatedly lowering its head for some of the egg content and raising it immediately. Based on the absence of blood or embryonic remains, we believe the egg to have been recently laid. Very little content was spilled on the ground. The egg itself was a whitish color with small brown dots



Figure 2. Remains of an egg eaten by a Black Hawk-eagle (*Spizaetus tyrannus*) in the Reserva Forestal Palmichal, Cordillera de la Costa, Venezuela. Photo © G. Buitrón-Jurado.

and stains. Based on its size it seemed to belong to *Penelope purpurascens* or *P. argyrotis* (Londoño 2014) which were recorded in the area on subsequent days.

Egg consumption by raptors has been described in several Asian and Australian species such as the Indian Black Eagle (*Ictinaetus malayensis*) which is considered a specialist nest predator (Ferguson-Lees and Christie 2001). It has also been observed in the Black-chested Buzzard (*Hamirostra melanosternon*), the Brown Goshawk (*Accipiter fasciatus*), and the Little Eagle (*Hieraaetus morphnoides*) (Aumann et al. 2016). Oophagy is considered, however, an opportunistic behavior because it is

rarely observed. Some suggest that some raptors eat eggs as a result of a reduction of other food sources (James 1993).

Among Neotropical raptors, egg and nestling consumption has been recorded in several species such as the Great Black-Hawk (*Buteogallus urubitinga*) which has been documented eating eggs and nestlings of nighthawks and hoatzins in Southeastern Peru (Robinson 1994). An almost intact egg shell was found in the stomach of the Gray-headed Kite (*Leptodon cayennensis*) by Haverschmidt (1962), and entire broods are important in the diet of the Crane Hawk (*Geranospiza caerulescens*) and Swallow-tailed Kite

(*Elanoides forficatus*), the latter which has been observed carrying complete nests to feed its nestlings (Coulson 2001). Despite these reports, egg consumption has not been previously observed in the Black Hawk-Eagle or other species of the genus (Funes et al. 1992, Whitacre et al. 2012), thus this record increases the known items in the diet of this species in Venezuela. We suggest further studies about the trophic ecology of raptors considering the scarce information about the diet of *Spizaetus* hawk-eagles in Venezuela.

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BREEDING RECORDS AND NOTES ON PARENTAL CARE OF BLACK-AND-WHITE OWL (*CICCABA HUHULA*) EN COLOMBIA

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The Black-and-white Owl (*Ciccaba huhula*) (Daudin 1800) is a little-known, nocturnal owl that is distributed throughout the Amazon Rainforest and Piedemonte, from northern Argentina and southern Brazil to the center of the eastern slope of the Eastern Colombian Andes mountain range and the Orinoco Plains (Hilty and Brown 1986, Holt et al. 1999, Rodríguez 2018, Figure 1).

In Colombia *C. huhula* is initially known from four specimens, but often goes unnoticed throughout its distribution (Hilty and Brown 1986). This owl inhabits areas along river banks, terra firme rainforests, seasonal floodplain forests, forest edges and trees in clearings. It frequents especially the forests of *Araucaria sp.* and can tolerate sites with anthropogenic disturbance, such as banana and coffee crops (Hilty and Brown 1986, Chaparro et al. 2015). There is no clear information about the reproductive biology of *C. huhula*. In Colom-

bia, there is only one record of reproduction on 27 January 1948 of a juvenile near Villavicencio (Meta) (Hilty and Brown 1986). This owl's diet includes insects, especially large nocturnal butterflies, beetles, mantids, and small vertebrates (Holt et al. 1999, Bodrati and Cockle 2013). We present the reproduction records reported in Colombia and describe the parental care of *C. huhula* in the Colombian Amazon, which constitute the first contributions to the knowledge of the reproductive biology of this species in the country.

Methods - Study Area

The Amazon region is known for its vast expanse of tropical forest and its high biodiversity. Within this region is the department of Caquetá whose capital is Florence, located on the Andean-Amazonian foothills of the eastern mountain range of the Colombian Andes, with an area of 2,292 km² and an average elevation of 242 m.a.s.l. (Peña 1997). According to Holdridge (1987), the

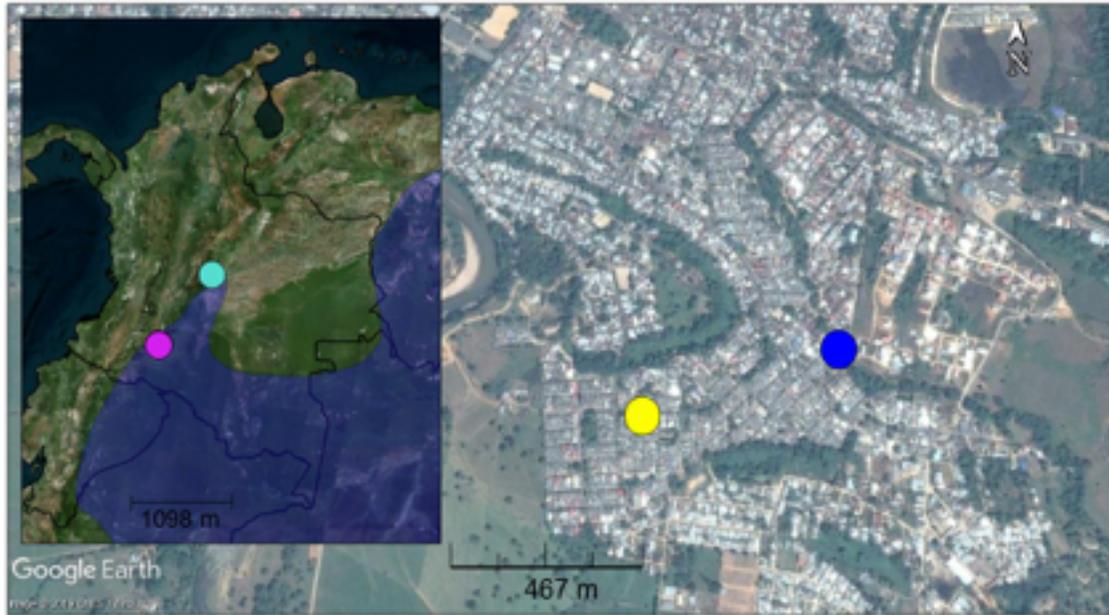


Figure 1. Distribution of *Ciccaba hubula* and reproduction records in Colombia. Dark blue: Meta. Lilac: Caquetá. Yellow: Yapurá. Blue: Caño el Despeje, Villa Mónica. Taken from BirdLife International (2019).

capital of Caquetá is categorized as a very humid tropical forest life zone. Our study area was located in two peri-urban areas of Florence (Figure 1), as shown below:

- **Caño el Despeje in the Villa Monica neighborhood:** (Coordinates: N 1° 36 '01.7"; W 75° 35 '55.4". Elevation: 421 m.a.s.l.). It is described as a tree-lined peri-urban area south of Florence, 800 meters straight from the Hacha River, which surrounds the city of Florence.

- **Barrio Yapurá:** located south of the city on Calle 1ª D with Carrera 22ª (Coordinates: 1 ° 35'57.3" N; 75 ° 36'10" W. Elevation: 260 m. a.s.l.). It is described as a residential area surrounded by some noisy commercial establishments and a tree-lined area dominated by *Spathodea campanulata* and *Carapa gujanensis* 600 meters in a straight line

from the Hacha River. About 200 meters away, there are relics of wetlands in serious deterioration due to urbanization.

Parental Care Observations

We made direct observations using 10 x 42 binoculars, and documented observations using photographs and videos. For the first reproductive event, we made one observation on 2 June 2016. For the second reproductive event, we made five visits during the day and at night, between 30 August and 10 September, 2019. For the taxonomic nomenclature we follow Remsen et al (2019).

Results

Reproductive Event 1:

On 16 March, 2015, for the first time an adult *C. hubula* was documented in the urban area of



Figure 2 (above, left). Juvenile *Ciccaba hubula* on 2 June, 2016. Photo © Jorge Muñoz-García.

Figure 3 (below, left): Nestling *Ciccaba hubula* on 31 August 2019. Photo © Jorge Muñoz-García

Figure 4 (right): Adult *C. hubula* on 31 August 2019 carrying a bat (*Molossidae*) to its young. Photo © Cristian Camilo Castaño Vargas

Florencia, in the Entre Ríos residential complex (Coordinates: N 1 ° 38'04 " ; W 75 ° 36 ' 17.2 ". Elevation: 357 m.a.s.l.). The adult was heard vocalizing insistently during the night. Subsequently, on 2 June, 2019 at 2100 h, in Villa Monica, only 3.9 km away in a straight line, we found a nestling Black-and-white Owl (Figure 2) on the ground and placed it in a tree.

Reproductive Event 2:

On 30 August, 2019 at 1930 h, we found a young Black-and-white Owl only 470 m in a straight

line from the first reproductive event. The owl had apparently fallen from a tree to the ground. We picked it up and placed it on a low branch of a *C. gujanensis* tree. During our observation, both parents remained attentive to our presence, and were perched approximately 7 m from us in a mango tree (*Mangifera indica*).

They showed aggressive behavior with one of the people who tried to approach the owlet directly. At this time, we were able to closely observe the owl family.



Figure 5. Left: Fledgling *Ciccaba hubula*. Right: Adult *C. hubula* on 7 September, 2019 Photo © Jorge Muñoz-García.

On 31 August, 2019 at 2030 h, we observed the *C. hubula* young being cared for by both parents. They brought the owlet prey, identified as a bats of the Molossidae family (Figure 3). Initially, one of the adults offered prey to the owlet, which repeatedly pecked it. The adult moved away a couple of times, while still holding on to the prey. It then returned to the perch where the owlet was perched. The young owl finally grabbed the prey with its beak and placed it between its legs to peck at and eat.

A week later on September 7, ca. at 1000 h., we observed the owlet (Figure 4) on top of a *C. gujanensis* tree, making short flights between branches. It remained most of the day under the careful surveillance of one of its parents (Fig. 4) which was perched on a lower branch in a mango tree. At sunset of the same day, at 1750 h., one of the adults approached the owlet to feed it.

Discussion

Despite the importance of the Amazon Region, in recent decades it has undergone major changes due mainly to the accelerated rate of deforestation, which in Colombia reached 66.6% of the total area deforested in 2017 with more than 60,300 ha. deforested in the department of Caquetá in the same year. The Department of Caquetá and the Amazon Region are considered the most affected by deforestation in Colombia (MINAMBIENTE 2017).

It is possible that *C. hubula* tolerates arborized urban environments in response to the changes in its original habitat, since historically *C. hubula* has been considered a strict forest species with a slight tolerance of rural environments (Hilty and Brown 1986, Chaparro et al. 2015). Likewise, in Colombia, there are only three documented reproductive events of *C. hubula*, taking into ac-

count the registration of a juvenile near Villavencio (Meta) reported by Hilty & Brown (1986) and our two new reproduction reports in Florencia (Caquetá). These three observations do not present a marked reproductive time for *C. hubula* throughout the year, although they do coincide with the observation of a single chick that what was reported in Argentina by Bodrati & Cockle (2013) who found two nests containing young and an egg, respectively, between October-November 2010 and September-November 2013 in the Atlantic Forest of the province of Misiones (Argentina).

Both were located in the fork of a *Parapiptadenia rigida* tree at 15.2 m high and covered by epiphytes. Both adults brought food to the young, especially large nocturnal butterflies (Sphingidae: *Manduca spp* and *Neococytius spp*), and defended the nest against the researchers, behavior that we documented during our study. However, we also documented that *C. hubula* feeds abundantly on bats (Chiroptera: Molossidae) - a result of the abundance of insects attracted to the street lights in the urban area of Florence.

According to comments from the local neighbors, there has been an evident decrease in the abundance of bats that previously inhabited the ceilings of the houses, which they attribute to the presence of the owls. Despite these first observations of reproduction and parental care of *C. hub-*

ula in Colombia, information about its reproductive biology on a larger scale remains very scarce. It is necessary to conduct more detailed studies of this species' ecology and conservation.

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MY TIME AS A VOLUNTEER ON THE RIDGWAY'S HAWK (*BUTEO RIDGWAYI*) PROJECT IN DOMINICAN REPUBLIC

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Figure 1. Ridgway's Hawk nestlings in their nest, Dominican Republic. Photo © Nickolas Lormand

My name is Gabriela Diaz and I'm currently a volunteer on the Ridgway's Hawk Project in Punta Cana, Dominican Republic. I studied Hotel Management in college, not biology or ornithology, so you are probably wondering at this point "how did I end up working with one of the most endangered hawks in in the world...?"

Everything started in December of 2018. At the time, I was working for a travel agency, but felt

unfulfilled. I always had a love for nature and animals and I had a desire to work in ecotourism. Regardless, in the Dominican Republic the field of ecotourism is still budding and there are not many opportunities to find a job in this area.

One day a close friend of mine, Eladio Fernandez, knew how badly I wanted to start working in nature, so he suggested I take a look at the internship that was available on the Ridgway's Hawk



Figure 2. Female *Buteo ridgwayi* in Punta Cana, Dominican Republic. Photo © The Peregrine Fund

Conservation Project. I had never heard about this project before, but Eladio described what the work entailed and it wasn't long before I contacted Thomas Hayes, the director in the Dominican Republic for Fondo Peregrino RD. And so.... my adventure began!

I arrived to Punta Cana in January of this year with so many questions and doubts. I knew nothing about birds. I wasn't sure I was going to be able to recognize their calls or even recognize them at all, but all these questions stayed in the past as

the months went by. Soon, I was able to see that I was capable of learning and executing the task at hand.

As soon as I laid eyes on my first Ridgway's Hawk I fell in love with it. Their calls, their graceful flight and even the way they attacked me at times (when I was close to the nest), were all thrilling experiences. At that instant, I knew I was exactly where I was meant to be.

During the months that I worked as an intern, I got to participate in field work, education and leading hawk tours. "Gavilanes" - as we call them in Spanish - have a nesting season that starts in January and ends in August of every year. Currently in Punta Cana there are 19 pairs of Ridgway's Hawks, and some single individuals that are currently on their own. Every week I need to check each and every single pair of hawks, to observe their behavior and determine if they are incubating, nest-building, or if they have young. This can take as little as 10 minutes or up to 3 hours - often there's no in-between. This job is very important and it's necessary to be as accurate as possible. There is a bot fly (*Philornis sp*) that parasitizes these hawks by laying its eggs on the nestlings. The larvae grow under the chick's skin, and they feed on their blood and flesh.

To prevent this, we climb each nest and treat it with Permacap, usually when the pair has been incubating the eggs for 28 days. This new treat-



Figure 3. Biologist Gabriela Díaz in Punta Cana, Dominican Republic. Photo © Fundacion Grupo Punta Cana

ment method works very well. We then wait for the nestlings to hatch. After many days of observing them, we are ready to check them closely and band them when they are 30 days old.

The education component of the project plays a major role in the conservation of these hawks. As some of you may know, Punta Cana is a very touristy zone. It's surrounded by hotels, and both wealthy and poor communities. For some reason, the "gavilanes" love to build their nests near ho-

tels, villas, *conucos* (agricultural fields) and places where they are close to humans. That's why the education part is key. Marta Curti is the person in charge of the education aspect of the project. She's been working for The Peregrine Fund for almost 20 years.

Lucky me that I was able to join Marta in some of the most rural and poorest communities around Punta Cana, to interact with people. I got to listen to their stories, what they think and what they know about these amazing birds.

Currently the project is active in three different areas: Los Haitises National Park, Punta Cana, and Aniana Vargas National Park.

My experience leading "Hawk Tours" in these locations has been amazing and very fun. What I'm looking for with these tours is for people to be able to see and to connect with the "gavilanes" - to connect with the communities that play a huge role in protecting the hawks, and to get to know the project and the people behind it.

This has been an amazing journey and I'm so grateful to have had the opportunity to work on something as beautiful as this. This is only the start.

* * *

MONITORING A PAIR OF BAT FALCONS (*FALCO RUIFIGULARIS*) NESTING IN A NEST BOX ON THE INTERNATIONAL SCHOOL OF PANAMA CAMPUS, PANAMA

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The Bat Falcon (*Falco ruficularis*) is a Neotropical raptor whose population is currently in decline, though the species is still categorized as Least Concern by IUCN (BirdLife International, 2016). The species is found throughout Central America, with a distribution ranging from Mexico to Argentina (GRIN, 2019). This falcon has a diverse diet and is known to feed on a wide variety of small birds, bats, large insects, mice, frogs, and snakes. Though active throughout the day, it is most active at dawn and dusk. Like many falcon species, the Bat Falcon does not build a stick nest, but instead nests in tree cavities, cliffs, and cavities in buildings with a clutch size of 2-4 eggs (GRIN, 2019).

As part of The Peregrine Fund's American Kestrel Partnership citizen science program, a team of high school students built and installed two kestrel nest boxes on our campus at the International School of Panama, Panama City, Panama. The area around the school includes some for-



Figura 1. Bat Falcon pair, female (ledge), male(box) using a nest box in Panama City, Panama. (15/04/19)
Photo © Guinevere van Strien.



Figura 2 (above, left): 14/04/19 18:58:08 30°C Monitoring the nest box at night

Figura 3 (above, center): Dead fetus in the abandoned egg. Photo © Guinevere van Strien.

Figura 4 (above, right): 14/04 /19, 38°C, 12:47:00, The Interchange: the male arrives and the female leaves.

Figura 5 (above, left): The female with her eggs.

Figura 6 (above, right): The male is visible at the entrance to the pipe in the right upper corner. Notice how close the pipe is to the nest box. We named it "the refrigerator," since it provided easy-to-get meals. Photo © Guinevere van Strien.

ested areas, yet it is mainly surrounded by other buildings, housing, highways and a golf course. The surroundings are quickly becoming urbanized, and the same depletion of nature can be seen on campus. For example, one of the sports fields that used to attract many birds and insects and was a yearly nesting space for Southern Lapwings (*Vanellus chilensis*) was recently filled in with artificial grass.

The boxes had a 24cm² base and 50cm long side panels and were placed near the top of a three-story building overlooking the sports fields and were filled with a small layer of sawdust. The entrance hole to the box (a 3"x4" oval), was sized for American Kestrels which had been nesting on campus for several years in a row. This year, no American Kestrels were observed, perhaps displaced by the Bat Falcons. It is important to note

that the box chosen by the Bat Falcons did not have a roof, thus they entered and exited through the top of the box, rather than the entrance hole.

We observed the Bat Falcon pair from October 2018 until they abandoned their nest in June 2019. Observations were made using two cameras: a Meidase 1080P Trail Camera hung so as to provide views of the opening and vicinity of the box. It provided motion-activated day and night footage. The other was a wireless endoscope camera that was hung to provide views of the inside the box. We also collected and dissected pellets and food remains. Because the falcons chose to raise their young in such a human-altered environment, part of our research looked into the possible advantages and disadvantages this location provided. One clear example of how the campus benefited this pair was food-related. We saw the male entering a nearby drainage pipe, the location of a bat roost, which was evident by bat droppings. Within five minutes he could return to the box with a successful catch.

Hunting excursions were most frequent around the morning and dusk, and lasted up to an hour. Caught prey was taken back to the box to be defeathered and shared. Since one bird was always needed near the box they would occasionally switch roles, signaled by a short and low volume call. During this switch, the male would arrive from hunting and take over monitoring duties to allow the female to depart. The female would then

hunt or eat and rest on the ledge above the box. This became less frequent as nesting season progressed since the female consistently incubated. The male rarely entered the box but frequently monitored it.

Based on collected pellets, their diet consisted mainly of bats, swallows, large insects, and the occasional lizard. They were also seen hunting parakeets. They preferred high roosts that looked over the campus, such as a lightning rod, but certain perches with sharp edges or hard surfaces seemed to irritate their feet (van Strien, personal comm.). Previous records suggest that Bat Falcons lay their eggs in March and incubate for around 30 days (GRIN, 2019). However, this pair laid their eggs in mid-April and incubation lasted for 47 days. The late nesting may have been due to the delayed rains in 2019. This could have contributed to the failure of the nest, as it was abandoned in June without any hatchlings.

On 3 June, we determined that the adults had abandoned the nest, as they had not been seen in or around the nest for several days, and one of the eggs had already begun decomposing. On this day, we retrieved the eggs and opened them, noting that the egg shells were uniform and did not show abnormalities. Two of the three eggs were fertile. According to the Avian Web database, embryo death is most common during either the first 3 days of incubation or the last 3 days before hatching (Johnson, 2011). Examining the eggs

showed that the chicks were in their final stages of development, as they already had fully-formed talons, feathers, and beaks. Both chicks, however, had not fully absorbed the yolk sac. Nevertheless, both fertile eggs showed signs of pipping through a small indent on the surface. This suggests that perhaps the chicks were simply too weak to continue their hatch, especially considering they may have already been lacking the nutrients from the yolk.

There are many theories as to why the nest may have failed. One reason may be that the embryos may have suffered from infection. The lidless box could have trapped rain and the adults left feces and food scraps all over the nest, leading to possible contamination of the eggs. This could explain the foul smell and rotting of the eggs (Johnson, 2011).

The late hatching could suggest that the chicks were left too cold during incubation (Johnson, 2011), which may have been disrupted by human activity nearby. The box was next to an active classroom, there was a noisy walkway underneath, and the birds were cautious around our cameras; all demonstrating the challenges birds face in urban environments.

The adults did not try to assist the hatch, and instead attempted to incubate for another week. If during these last stages of incubation the female continued to turn the eggs, the yolk sac may have

twisted and hindered absorption (Johnson, 2011). This could indicate that the pair was young and inexperienced with parenting techniques.

The final possibility is poisoning through insecticides, pesticides, herbicides, or fertilizers, the effects of which can be particularly grave for top predators (Skaare, et al, 2000). The school does use such substances, and there is no consistent tracking of their use in Panama's agricultural sector. Therefore, it is possible they have ingested prey containing harmful substances. Whether or not this was a direct culprit for the failure of the nest is unknown, yet it is almost certainly a risk the birds face (Ehrlich and Paul, 1988).

As of October 2019, we still observe a pair of Bat Falcons occasionally visiting the campus to hunt. They have not shown interest in the nest box yet, but perhaps they will try this upcoming breeding season. If they do, we hope to conduct further observations of the pair to learn more about its nesting, hunting and general behavior in an urban environment.

Raptors are an increasingly popular subject of study due to their sensitivity to habitat change, making them a good indicator to how human activities are impacting wildlife. The long-term consequences of urban habitats on the species are not yet certain, hence this type of research is valuable (Donázar et al.,2016).

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HARPY EAGLE (*HARPIA HARPYJA*) AND CRESTED EAGLE (*MORPHNUS GUIANENSIS*) IN INDIGENOUS TERRITORIES OF THE NICARAGUAN MOSQUITIA, ONE OF THE FIVE GREAT FORESTS OF MESOAMERICA

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The Mosquitia of Mesoamerica constitutes one of the five most relevant natural landscapes in Mesoamerica. It encompasses a significant cultural and geographical environment shared between Honduras and Nicaragua, containing indigenous communities and traditions, and a remarkable landscape of natural ecosystems. It includes potentially sustainable populations of Harpy Eagle (*Harpia harpyja*), and Crested Eagle (*Morphnus guianensis*). These species are considered conservation emblems, as they require an extension of hundreds of square kilometers, including natural forests with minimal human intervention, prey, and an “adequate” level of connectivity on a large geographic scale. Thus Mosquitia has a high value for biodiversity conservation at the regional level and is a key region for the conservation of these species in Mesoamerica.

Both species belong to the Accipitridae family, and are the largest birds in Nicaragua and Mesoamerica. The Harpy Eagle has an estimated weight of 4.5-9 kg and the Crested Eagle weighs approximately 3 kg. Located at the top of the food chain, they feed on small arboreal and terrestrial mammals, some snakes, and smaller birds (Stiles and Skutch 1995, Howell and Webb 1995, Vargas et al 2006). Although very little is known about these species in Nicaragua, with the exception of some occasional sightings, both are under protection by law (Veda Nacional Indefinida, La Gaceta No 36 2019). Harpy and Crested Eagles are found respectively in Appendices I and II (Schulenberg 2009, Smith 2012), and BirdLife International (2019) categorizes them as Near Threatened (NT). However, the Red Book of Nicaragua categorizes the Harpy Eagle as Critically

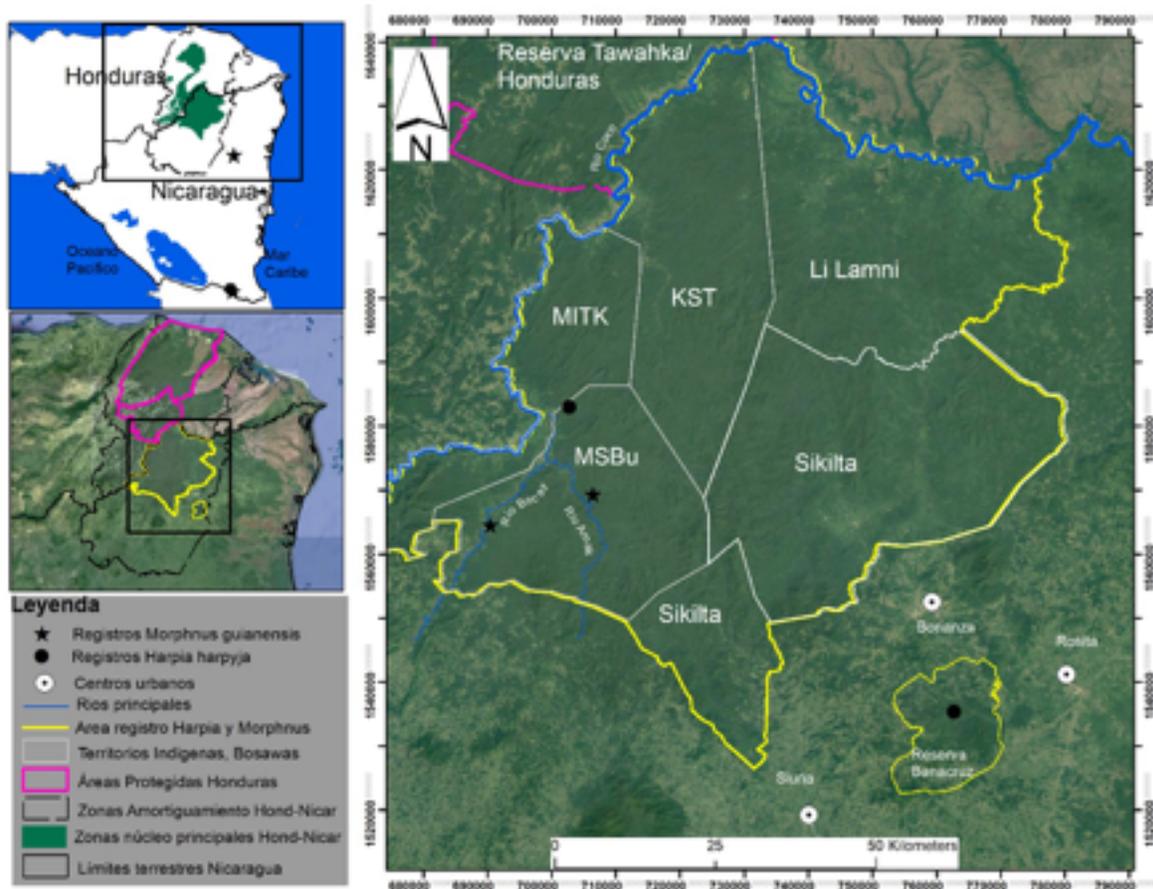


Figure 1. Records of Harpy Eagle (*Harpia harpyja*) and Crested Eagle (*Morphus guianensis*) in indigenous territories of the Nicaraguan Mosquitia: Mayangna Sauni Bu (MSBu), Miskito Indian Tasbaika Kum (MITK), Kipla Sait Tasbaika (KST), Li Lamni and Sikilta. Map by Fabricio Díaz-Santos, WCS/Programa de Conservación de Jaguares Nicaragua. October, 2019.

Endangered (CR), and the Crested Eagle is categorized as Endangered (EN) because these birds are at high risk in their wild state as a result of deforestation, forest fragmentation and land use change (Red List 2018).

The Wildlife Conservation Society (WCS) and the Darwin Initiative of the United Kingdom have made it a priority to contribute to the knowledge and conservation of biodiversity worldwide, with emphasis on the most relevant natural landscapes, such as the Northern Mesoamerican re-

gion. For that reason, between 2016-2019, both institutions generated a baseline of avifauna in the indigenous territories of the northern region of Nicaragua.

The baseline includes bird sampling and the use of landscape-scale camera traps, and evaluating different types of vegetation and human influence along a gradient of use in indigenous communities in the Coco and Bocay river basins. These territories include Mayangna Sauni Bu (MSBu), Miskito Indian Tasbaika Kum (MITK),

and Kipla Sait Tasbaika (KST), which together with three more Indigenous Territories, are part of the Bosawás Biosphere Reserve (RBB) (Figure 1), and represent an Important Bird Area (IBA) NI024 (Morales et al 2009).

The RBB includes other smaller areas, geographically separated from Indigenous Territories, with an altitudinal gradient between 100 and 1,700 meters above sea level, with tropical humid and rainforests (Holdridge et al 1971). Several authors have described how the indigenous people of the Mesoamerican Mosquitia have modified their environment on a landscape scale (Koster 2006, 2008a, 2008b, Dunn and Smith 2011, Dunn et al 2012) - a similar and widespread pattern that has been repeated in indigenous communities from other forested Neotropical regions. In

general terms, the pattern of human use in areas close to the communities is intense and implies the modification of the landscape for small-scale migratory agriculture for self-consumption. These impacts are reduced the further away one is from settlements. Approximately 3 km away in each of the communities of MSBu, MITK, and KST, it is common to find a patchwork of natural and secondary forests. Hunting in the forest also decreases in areas farther away from the communities (Escamilla et al 2000, Smith 2005, 2008, 2010, Dunn and Smith 2011, Dunn et al 2012) - approximately 6 km in the case of the MSBu, MITK, and KST territories.

Additionally, some indigenous people engage in the incipient activity of cattle ranching in the Nicaraguan Mosquitia. This is exerting a grow-

Figure 2 (left). Harpy Eagle, 23 April, 2019. Indigenous territory Pilawas Community, MSBu – Nicaraguan Mosquitia. WCS/Nicaragua Jaguar Conservation Program. 2019.

Figure 3 (right). Harpy Eagle, 23 April, 2019. Indigenous territory Pilawas Community, MSBu – Nicaraguan Mosquitia. WCS/Nicaragua Jaguar Conservation Program. 2019.





Figure 4 (left) and Figure 5 (right). Harpy Eagle, 2 November, 2009. Banacruz. Photo © Arnulfo Medina-Fitoria.

ing negative impact on the natural forests of their territories, and is most evident in communities on the banks of the Río Coco channel that constitutes the border between Honduras and Nicaragua.

The forest in the Indigenous Territories of the Nicaraguan Mosquitia includes a single block of approximately 6,000 km², plus another 2,000 km² of other protected areas around these territories, including the Banacruz Reserve. It is precisely its size and its well-preserved forest that allows the Nicaraguan Mosquitia to be part of the Five Great Forests Initiative of Mesoamerica (WCS Newsroom 2019). These areas in Nicaragua are also ecologically linked to natural areas of the Honduran Mosquitia, which includes the Río Coco and Patuca basins, with 8,300 km² of the Río Plátano Biosphere Reserve and 2,331 km² in the Tawahka Biosphere Reserve.

Harpy Eagle

The most recent photographic record of a Harpy Eagle in Nicaragua occurred on MSBu in RBB, (14 ° 18'38.7" N, 85 ° 07'12.3" W) at an elevation of 239 m.a.s.l. on 23 April 2019. The individual was photographed with a Bushnell camera trap. This constitutes the third photographic record for the country in three and a half years (Figure 1). The bird remained in the area for 25 minutes (Figures 2 and 3) and had prey in its talons, which we were not able to identify.

Before this above-described record, Howell (in Martínez-Sánchez and Will 2010) mentions two other Harpy Eagle records. The first, a sighting in the department of Rivas / San Juan del Sur Pacific region of Nicaragua, was with no specific date. The second record was in the year 1907 in Matagalpa. The individual was collected and the skin is in the American Museum of Natural



Figure 6 (above left). Crested Eagle, 29 November 2018. Indigenous territory, Ahsawas Community, MSBu – Moskitia Nicaragüense. Photo © Carlos Gonzales Dixon - WCS Nicaragua.



Figure 7 (above right) and Figure 8 (below left). Crested Eagles in dark morph and light morph, respectively. Photographed on 26 February, 2017 in the indigenous territory, Puluwas Community, MSBu - Nicaraguan Moskitia. Photos © Fabricio Díaz-Santos, WCS/Programa de Conservación de Jaguares Nicaragua.

History (AMNH) (Martínez-Sánchez and Will 2010). The first photographic record of a Harpy Eagle in Nicaragua took place on 2 November 2009 (Figures 4 and 5). This was a casual sighting in the protected area of Banacruz, (N 13 ° 52'32", w 84 ° 34'08.8 ') at 236 m.a.s.l. (Figure 1). The second photographic record was in Río San Juan, Nicaragua, on 16 February 2016 (eBird List S27703613).

Crested Eagle

There are two records for this species - one in 2018 and one in 2017. These represent three in-

dividual Crested Eagles in Nicaragua. The most recent occurred on 29 November, 2018 in the community of Ahsawas, Bocay River, MSBu, RBB (N 14 ° 11'14.3, W 85 ° 05'11.1'') at 192 m.a.s.l. (Figure 6). The other record was of two - one dark morph and one light morph - observed on 26 February, 2017, in the Puluwas Community, MSBu Territory (N 14 ° 11'14,3'', W 85 ° 05'11.1 '') at 296 m.a.s.l. (Figures 1, 7, and 8).

Although Howell does not report this species in Nicaragua, it is described as an "expected species" since it is present north and south of the

country (Martínez-Sánchez and Will 2010). The first records were reported on eBird in May and December 2001 (Lists S9151143 and S9151576 respectively), in Alamikamba, North Caribbean Coast Autonomous Region (RACCN) (Kjeldsen 2003, 2005), and then in March 2015, in Río San Juan , (eBird S22510801, Figure 1).

Connectivity Assessment of the Nicaraguan Mosquitia

WCS has carried out biodiversity research and management activities with the communities of the Indigenous Territories of the Nicaraguan Mosquitia since 2006, and is now initiating a similar process in the Indigenous Areas and Territories on the Honduran side. The recent record of *H. harpyja* in a camera trap constitutes the first record of this species in a study of this type in Nicaragua. In addition, the recent records of *Morphnus guianensis* in the communities of Ahsawas and Puluwas are evidence of the importance of the Indigenous Territories of the Nicaraguan Mosquitia for the conservation of large raptors.

Traditional land use by indigenous communities at the landscape level and their dependence on natural forest, prior to the introduction of livestock, has favored the conservation of this natural wooded landscape that, interconnected with secondary forests, has made the conservation and preservation of these species possible. The records of these eagles in the Honduran Mosquitia, (Vargas et al 2006, Gallardo 2014, eBird 2012), show

that the ecosystem on both sides of the border constitutes a single ecological region and that it is a high priority for the balance and conservation of the biodiversity at a regional level, and in particular of these two magnificent raptors.

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OF INTEREST...

Experiences

Volunteer: nest searching, telemetry, band reading (Vic, Australia)

<https://ornithologyexchange.org/jobs/board/short-term-positions/volunteer-nest-searching-radio-tracking-banding-colour-band-resighting-vic-australia-r16016/>

We have recently discovered that the Australian passerine, the Eastern yellow robin (*Eopsaltria australis*), has two distinct genetic lineages, even though the lineages look exactly the same. This component of the project is looking at what happens when the two lineages interbred – is there fitness consequences to crossing between two locally adapted lineages? Breeding season runs from end of August - early January, and I am looking for people for any time within the breeding season.

Preference is given to volunteers with previous birding experience (any of the tasks detailed above), or people that enjoy taking photos of birds. Please send an email to Lana (lana.austin@monash.edu) including: Why you are interested in the project, what you hope to get out of your time with us, your current resume and preferred dates and length of stay.

Grants

Rufford Small Grants

<https://apply.ruffordsmallgrants.org/>

A grant of up to £ 6,000 is available for nature conservation projects. Projects should focus on issues of nature / biodiversity in countries that do not belong to the first world. The impact must be pragmatic, measurable and durable.

The grant must constitute a significant part of the total budget. The funds should be used primarily for field-based activities. Applications must be submitted through the online applications section of this website. The project must have a minimum duration of 12 months. They accept proposals all year.

Conferences

Joint Conference of the Raptor Research Foundation, The Peregrine Fund and the NRN

4-8 October 2020, Boise, Idaho, USA

www.raptorresearchfoundation.org/conferences/upcoming-conferences/

Mark your calendar today. You don't want to miss this conference.



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