

expedição até o acampamento mais alto. Embora tenha precisado se deslocar em lombo de burro enquanto as outras pessoas iam a pé, ele chegou lá. Nesta viagem o apoio de Barbara Brown foi mais uma vez muito importante. O que mais me impressionou neste convívio foi sua mente jovem, fértil e criativa. Hipóteses e explicações fluíam de sua cabeça sem parar, à medida que as descobertas se acumulavam. Com o desaparecimento de Philip Hershkovitz (1909-1997) encerra-se um período na mastozoologia Neotropical que se caracterizou pela tentativa individual de conhecer globalmente a diversidade dos mamíferos baseando-se na morfologia, na biogeografia e com sólida base de nomenclatura zoológica.

Três pesquisadores de museu destacam-se neste período. Oldfield Thomas foi o mais prolífico (1090 trabalhos publicados, 2900 novos gêneros, espécies ou subespécies descritos), mas Ángel Cabrera e Philip Hershkovitz realizaram um trabalho mais profundo, mais abrangente e com ênfase no aspecto evolutivo. Cabrera morreu em 1960 e, nesse momento, a mastozoologia estava começando a incorporar conhecimentos de outros campos emergentes da Biologia, particularmente a sistemática filogenética, a citogenética, a biologia molecular e também a ecologia, ficando cada vez mais difícil o conhecimento individual de toda a biodiversidade de mamíferos de uma região. Hershkovitz foi, assim, o último dos grandes pesquisadores que conseguiu, individualmente, ter uma visão global da diversidade de nossos mamíferos.

Philip Hershkovitz foi, portanto, uma pessoa admirável que nos deixou um exemplo a ser seguido, pelas novas gerações, de força de vontade, perseverança, dedicação à ciência, de mente pronta a procurar explicações, e simultaneamente, de sensibilidade para a cultura e outros aspectos da natureza humana.

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## Articles

### RECENT OBSERVATIONS OF NICARAGUAN PRIMATES AND A PRELIMINARY CONSERVATION ASSESSMENT

Published information on the status of primate populations in Nicaragua is scarce. No recent accounts were cited in the Mesoamerican Primate Action Plan (Rodríguez-Luna *et al.*, 1996a). Nicaragua is one of three Central American countries (along with El Salvador and Honduras) for which no primate field studies were located in an extensive literature search (Rodríguez-Luna *et al.*, 1996b). Based on general distributions, Nicaragua's primate fauna is expected to include one subspecies of howler monkey (*Alouatta palliata palliata*), one or two subspecies of capuchin (*Cebus capucinus limitaneus* and possibly *C. c. imitator*), and two subspecies of spider monkey (*Ateles geoffroyi geoffroyi*, *A. g. frontatus*) (Konstant *et al.*, 1985;

Wolfheim, 1983). One of these taxa (*A. g. frontatus*) is categorized as Vulnerable and the rest as Lower Risk according to the Mace-Lande classification (Rodríguez-Luna *et al.*, 1996b; Rylands *et al.*, 1995). Because recent published information on any of these primates in Nicaragua is lacking, we report sightings of nonhuman primates and information collected from residents during our recent travels (CC, RB, RM and SM: November-December, 1996; MM: November 1996-May 1997). The local people referred to the howlers as "congo" or "mono congo," the *Cebus* as "mono carablanca" (white-faced monkey), and the spider monkey as "mono colorado" (red monkey) (Querol *et al.*, 1996).

The information below is keyed to numbers in Fig. 1; numbers (N#) in parentheses refer to protected areas listed in the Mesoamerican Primates Action Plan (Rodríguez-Luna *et al.*, 1996a).

Area #1, Selva Negra, is located at 12°60'N, 85°55'W, about 15 km north of Matagalpa. The owners of the Selva Negra Hotel and its cloud forest preserve descended from German immigrants who founded the adjacent Hammonia Coffee Plantation in 1889. Nature observation is actively promoted and trail maps are provided to tourists. The owners have protected the forest for years and are trying to acquire more of the connected forest. From what we saw from the top of the ridge (the present boundary of the privately protected property), the cloud forest beyond is patchily distributed. The mantled howler (*A. palliata*) population at Selva Negra appears moderately dense. We saw three different groups and heard at least several more based on the directions of their howling bouts. One group seen in a huge fig tree in the forest comprised at least 20 individuals including four adult males (one perhaps sub-adult) and two infants, one less than one month old. A second group of at least 4-5 was seen on a steep slope near the top of the ridge. A third group of at least 13, including

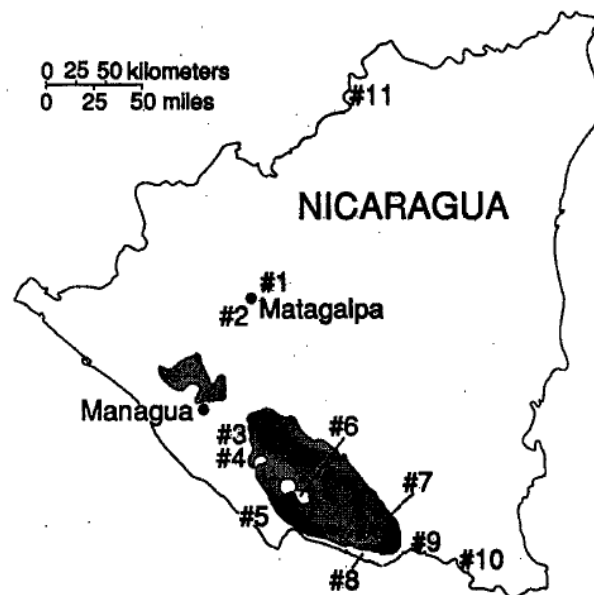


Fig 1. Localities visited during expeditions from November - December 1996 (CC, RB, RM and SM) and November 1996 - May 1997 (MM).

two adult males, one subadult male, and two infants, were in trees next to an agricultural clearing. The howlers were dark brownish-black with very long golden hairs on their sides.

The owner of the coffee plantation and hotel (E. Kühl) said that although many howlers had died in the yellow fever epidemic of the 1950s the population on his property has been recovering. He also said that a neighbor's forest does not have howlers (we suspected that their absence was due to hunting). A popular travel guide mentioned the presence of howlers here but also erroneously reported that spider monkeys are in the Selva Negra forest (Keller *et al.*, 1994). According to the owners no wild spider monkeys have been seen there. Rather, the spider monkeys are caged near the dining room of the hotel. These spider monkeys were pets given to the owners' mother while the owners were in the U.S. during the revolution (E. and M. Kühl, pers. comm.). The spider monkeys appeared to represent at least two species or subspecies (some very dark and others reddish), and their origin was unknown. The region is within the distribution of *Ateles geoffroyi frontatus* or *A. g. geoffroyi* (see Konstant *et al.*, 1985).

Area #2, forest patches near Matagalpa along the highway toward Managua. Some people said there were howlers there, but others argued for their absence. Our assessment, as viewed from a bus, was that the habitat could support howlers but they would be vulnerable to hunting.

Area #3, Laguna de Apoyo, near Masaya (N2). About 11 howlers were seen in a very large tree and then two others in a closer, smaller tree were seen from a trail that passed through a farm and headed up the drainage below the town of Catarina and above the lake. Another group was heard howling from the same trail. A local woman explained that residents see the howlers often and sometimes encounter a "white-faced monkey," but she could not identify it as either a capuchin or a spider monkey from photos shown to her. Based on published distribution maps, Masaya forests could potentially include *Ateles geoffroyi* but no *Cebus* species (Konstant *et al.*, 1985; Rodríguez-Luna *et al.*, 1996a; Wolfheim, 1983).

Area #4, Mt. Mombacho Volcano Reserve (N27), near Granada. Some local people said there were howlers on Mt. Mombacho. An ecologist working for AID also reported the presence of howlers (Byron Walsh, pers. comm.). In May 1997, howlers were heard by MM on Mt. Mombacho.

Area #5, San Juan del Sur/Rivas. Howlers were reported by the bus attendant to be in the forest between San Juan del Sur and Rivas "in the morning." The report seemed credible, as the forest closer to the sea seemed to be suitable howler habitat. However, we did not hear any howling on our two morning walks at San Juan del Sur in December 1996. In April 1997, MM saw two howler monkeys in a tree over the dirt road between a beach south of San Juan del Sur and the main road to San Juan del Sur.

Howlers were also reported to be in an area called Velen de Rivas, probably in the general vicinity of Area #5 (Byron Walsh, pers. comm.). Closer to Rivas, forest is scarce and agricultural and grazing land predominate.

Area #6, Isla de Ometepe, Ometepe Island, Lake Nicaragua. This 8-shaped island is formed by two impressive volcanoes joined into a single island by lava flows. Its wildlife, including howler and white-faced monkeys, are mentioned in a travel guide (Keller *et al.*, 1994) and showcased in a small museum in Altagracia which displayed photos of *Alouatta palliata*. The museum staff said that there were only two monkey species on the island. Although we never saw any, we presume that the "white-faced" monkey refers to *Cebus capucinus* although published maps would place Ometepe within the distribution of *Ateles geoffroyi* and outside of the distribution of *Cebus*.

An active conservation program exists on the island, including signs encouraging the local people to preserve trees. Although there is considerable farming and grazing on the lowlands, native forest strips are preserved to the lake shore where "peñas", old lava flows, create a jumbled rocky substrate too difficult to clear. Extensive forests grow up the slopes of the volcanoes, except where obliterated by landslides and lava flows. On the Volcán Concepción side of Ometepe, we heard howlers in a peña area near Pul, a few kilometers west of Altagracia, as well as up the volcano slopes on the outskirts of Altagracia. A local farmer said that white-faced monkeys and occasionally howlers raid corn but not bananas. On another day we saw one howler in a tree by the road between La Unión and Urbaite. In the isthmus of Ometepe Island, at Santo Domingo, we saw in a peña area on two successive days a troop of at least six howlers, including one adult male and a 4-6 month-old infant. White-faced monkeys also were reported to occur in the Santo Domingo peña.

On the Volcán Maderas side of Ometepe Island we visited Hacienda Magdalena, near Balgüe. Hiking in forest on slopes of the volcano, we saw two different howler groups and heard others; one group included an infant. Our guide at Hacienda Magdalena said that howler monkeys are never hunted but occasionally white-faced monkey mothers are in order to obtain infants for pets. The white-faced monkeys are found higher up the slopes of Maderas and tend to run away from people, he reported. On another day, we drove along the dirt road skirting the south-east coast of Volcán Maderas. From the road we saw seven different howler groups in approximately 25 km, between Punta El Congo (Howler Point) and San Pedro, where the road was washed out by landslides from the volcano. In most cases, a farm or small village was within sight of the howlers, and the monkeys appeared to be very habituated. The two largest of the seven groups were 10 and 11 individuals (more could have been present). Infants in the groups were of various ages: less than one month, several months of age, and around one year old. Most groups were near the lake shore but one was about 200 m from the lake. One group was in same tree as a huge boa constrictor that was coiled up, apparently asleep.

Area #7, Solentiname Archipelago, southeastern Lake Nicaragua (included in N32a). Several howlers were released onto a small island between Mancarrón and San Fernando islands. The island is more than half forested and includes at least one house and a small farm. The howlers reportedly came from the southern shore of Lake Nicaragua, probably near Area #8 (Juan Antonio Ricci, pers. comm.). Several were released approximately 25 years ago, and the current population is estimated to be around 30 howlers. From a boat we saw a troop of at least 12 individuals including three infants in the part of the island with natural forest, located only a few 100 m from Mancarrón. About 100 m away from them was a solitary adult male. All of these howlers looked very healthy. We heard them howling from Mancarrón on several occasions during our stay. No monkeys are apparently native to the Solentiname Archipelago, yet these islands are included in the maps of the Mesoamerican Primate Action Plan as protected areas for *Alouatta p. palliata* and *Ateles g. geoffroyi* (Rodríguez-Luna *et al.*, 1996a, pp.58 and 63).

Area #8, Papaturro wildlife area (included in N32a). The Papaturro River flows from Costa Rica. The river's mouth is marshy, with flooded forest and palms. A narrow strip of riparian forest flanks the river. Farther upstream, there is terra firma forest, farms, and recent deforestation. We saw and heard howlers all along the approximately 10 km of river traveled by small motor boat. We saw at least four different troops and a solitary howler (probably an adult female), and we heard at least five additional troops howling. Some were in the riparian trees by the marsh and others in terra firma forest. In Papaturro there are also supposed to be *Cebus* and spider monkeys. *Cebus* are said to run away when they see people.

Area #9, Río San Juan, San Carlos to El Castillo de la Concepción (some areas included in N32a and b). We saw one group of howlers on the south bank and saw three groups, and heard a fourth, on the north bank. One of the boat attendants reported that he regularly saw *Cebus* in the mornings as they came to the river to drink. At Sábalo, on the north shore, new development including logging seems to be occurring in the area. There is some deforestation in the vicinity of El Castillo, which is on the south bank and is only reachable by boat, and the north bank across from El Castillo is almost completely deforested. On the return trip several days later, we saw howlers on the north bank, several kilometers west of Sábalo. Farther west, howlers were seen in a thin strip of trees separating the river from marsh vegetation along the south bank. Close to San Carlos, howlers were seen on the north bank. Two more howler groups were seen along the river from San Carlos to Los Chiles, Costa Rica.

Area #10, Refugio Bartola/Reserva Indio-Maíz (included in N32 b or c). The Bartola River joins the Río San Juan a few kilometers east of El Castillo. Here, Costa Rica is on the south bank of the San Juan. The Río Bartola forms the eastern boundary of Refugio Bartola, one of several research areas established by Güises Montaña Experimen-

tal (Querol *et al.*, 1996). The Bartola River is the western boundary of the large Indio-Maíz reserve (c. 300,000 ha), which extends north of the Río San Juan to its mouth in the Caribbean. This lowland humid forest reserve is said to be relatively undisturbed and is very remote. We traveled most of the marked trails in Refugio Bartola. We glimpsed one howler in the Refugio and heard them several times, both in the Refugio, and across the rivers in Costa Rica and in the Indio-Maíz reserve. We saw four to seven different spider monkeys on three occasions during three days at Bartola. As we arrived by boat, we saw an adult, a juvenile and possibly a third spider monkey in a tree next to the Río San Juan, less than 200 m west of the Río Bartola. While hiking in the forest, we saw an adult female and very small infant spider monkey about 50 m from the Río Bartola; two hours later we saw an adult and medium-to-large juvenile about 300 m from the location of the female and infant, and about 350 m from the river. These spider monkeys were distinctly reddish on the back and on the top of the tail; the ends of the limbs were dark. The local name, "mono colorado," means "red monkey." The face of a pet spider monkey at the Refugio closely resembled a published photograph of *Ateles geoffroyi* (Rowe, 1996, p.114, left column). *Cebus* are also present, although we did not see them. *Alouatta palliata*, *Ateles geoffroyi*, and *Cebus capucinus* were "seen daily at close range" by students in a field ecology course held at Bartola in April and May, 1994 (Cody, 1994) and were listed among the mammals of Río San Juan (Querol *et al.*, 1996).

Area #11, Bosawas Biosphere Reserve (N31). This immense reserve, more than 1,000,000 ha, is located along the north-central border of Nicaragua. The area is remote and almost exclusively accessed by river travel. Four or five individual howler monkeys were seen by MM in a tree over the Río Coco, on the Honduran side, several hours by boat upriver from San Carlos. Howlers were also heard along the Coco upriver a short distance from Raiti. Bosawas should also contain one or two subspecies of capuchin (*Cebus capucinus limitaneus* and *C. c. imitator*) (Rodríguez-Luna *et al.*, 1996a). It is unclear from published distribution maps whether *Ateles* is expected to exist in Bosawas (Konstant *et al.*, 1985). The indigenous Miskitos hunt monkeys within the Reserve for food.

We can offer only a preliminary assessment of the conservation status of Nicaraguan primates as relatively few areas were visited and we were unable to collect detailed information on the degree of protection provided. Mantled howlers were seen in a variety of habitat types, including those in close proximity to human settlements. The presence of this species in so many places suggests that it is of "Lower Risk" status in Nicaragua. In comparison, mantled howlers may be extinct in nearby El Salvador (Crockett, in press). The various ages of howler infants seen indicate year-round births. The lack of strongly seasonal breeding appears typical of howler species, although howlers tend to give birth less often in the wet season (Crockett and Rudran, 1987; Fedigan and Rose, 1995). We can make no

definitive statement about the status of *Cebus capucinus* in Nicaragua, although it definitely exists in one or two very large reserves, relatively protected by their remoteness (Río San Juan-Bartola-Indio-Mañíz area and probably Bosawas). Because we never actually saw *Cebus capucinus*, we could not verify its presence in several areas where "white-faced" monkeys were reported, although its presence seems likely in the southwestern part of Nicaragua, west of published distributions. Spider monkeys also occur in at least one large reserve (Bartola-Indio-Mañíz area). The identification of the subspecies seen in Bartola was not verified. It is supposed to be *A. g. geoffroyi*, but is redder than a published illustration (Konstant *et al.*, 1985).

Because Nicaragua is the largest nation in Central America, it has an important role in the conservation of the region's flora and fauna. The recent election of a new president, Arnoldo Alemán, is likely to be accompanied by new economic development. One rumored development is a major rail line to transport goods from the Pacific to the Caribbean, as an alternative to the Panama Canal. Such a massive project could have a major impact on the relatively large forested areas remaining in eastern Nicaragua. It is important to determine the status of potential areas for nature protection before critical areas are lost, and to conduct more systematic censuses of the primates and other fauna. For the moment, Nicaragua still has sufficient numbers of wild primates to be observed by tourists and primatologists on vacation.

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## TWO HOWLER SPECIES IN SOUTHERN PIAUÍ, BRAZIL?

In a review of the distribution of the red-handed howler monkey, *Alouatta belzebul*, in northeastern Brazil, Coimbra-Filho *et al.* (1995) brought to light the overlooked record made by Neiva and Penna (1916, p. 106), who observed groups of black howler monkeys with yellowish hands at Angico, left margin of the Rio Parahim, municipality of Parnaguá, state of Piauí, and also reported collecting one individual (p. 202) whose whereabouts are unknown. This record is the southernmost for the species in northeastern Brazil, and apparently the first for Piauí, although Ihering (1914) suspected its presence in the forested northern region.

From the description made by Neiva and Penna (1916) there can be little doubt as to the identity of the howlers they observed, although a specimen would be desirable. Parnaguá lies in a transition area between the Cerrado and Caatinga domains, although still dominated by