Short Articles

Distribution and Conservation of the Spider Monkey (*Ateles hybridus*) in the Coastal Range of Northern Venezuela

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Introduction

The distribution of spider monkeys in Venezuela is known from the works of Handley (1976), Mondolfi and Eisenberg (1979), and Bodini and Pérez-Hernández (1987). *Ateles belzebuth belzebuth* (cf. Bodini and Pérez-Hernández, 1987) occurs in southern Venezuela; *Ateles hybridus* (cf. Collins and Dubach, 2000) has a patchy distribution in western and northwestern Venezuela. The latter was also recorded in south and southeastern Miranda State (Mondolfi and Eisenberg, 1979; Ochoa *et al.*, 1995) and in San Julian village (Robinson and Lyon, 1902), Vargas State. Congdon (1996) monitored four spider monkey troops at Caparo Forestry Reserve, Barinas State, and recently, the Venezuelan Wildlife Service reported the monkey's presence near the village of Mene de Mauroa, Falcón State in northwestern Venezuela (Boher-Bentti, 1998). These findings suggest a discontinuous distribution, although this may only be due to forest destruction and fragmentation with changes in land use, human encroachment, and hunting (Rudran and Eisenberg, 1982; Mittermeier, 1986a, 1986b; Mittermeier and Cheney, 1987). The purpose of this paper is to report new observations on the presence and distribution of spider monkeys in northern Venezuela.

Methods

Study Area
Fieldwork was conducted mainly in the Guárenas-Guátire region, about 40 km east of Caracas. The area is about 615 km^2. The elevation ranges from about 400 m to 1800 m. According to the Holdridge Life Zones System (Ewel *et al.*, 1976), the main vegetation types are tropical dry forest, tropical humid premontane forest, and very humid tropical montane forest. Annual mean temperature and total yearly precipitation recorded at Guárenas are 23.5°C and 852 mm (Guevara-Díaz, 1983). The southern slope of El Avila National Park (10°27'-10°37'N, 66°12'-67°01'W) is partly within the northern range of the region. Annual mean temperature varies from 24°C to 29°C, and at El Avila total yearly rainfall is 600-1400 mm. The elevations at El Avila vary from sea level to 2,765 m. The principal vegetation types found in the national park are tropical dry forest, humid and very humid premontane forest, and humid and very humid low montane forest.

On July 7, 1997, while conducting a survey near the town of Araira, one of us (HJBF) discovered a young spider monkey being kept as a pet by the owners of the "Hacienda Capayita" farm close to Araira, Miranda. This finding encouraged us to investigate the occurrence of spider monkeys in the region.

We first inquired about the history of the young monkey, the site where it was caught, date and time of capture, and the size of troop sighted. We took body measurements and noted the pelage and its behavior. We also interviewed farmers living in or around seven villages close to Araira and we conducted a two-day survey in Guatopo National Park (09°57'-10°14'N, 66°15'-66°43'W) and its borders, Barlovento Region, Miranda.

Results

Capture Site of Infant
On August 8, 1997, early in the morning a troop of around 20 spider monkeys was sighted in an evergreen forest at an elevation of 1100 m at the "Hacienda El Limón". This site is located within El Avila National Park, 30 km north of Guatopo National Park in the northern coastal range of Venezuela. A female infant was captured and taken home for nursing. Assuming she was a dependent infant, we estimate an age of around 12 to 18 months at the time of her capture.

Description
Mona, as she was called, was kept by the Biord-Marinez family. External body measurements in millimeters (August 8, 1997) were as follows: total length 1,340, head and body length 480, hind foot 185, and ear 42. Dentition fully erupted. General coloration light brown; whitish triangular patch on the forehead; light blue eyes; black face; whitish whiskers; small black ears; hair on forehead directed forward; upturned hairs on nape. Underparts whitish on chest and abdomen. Forelimbs light brown. Vestigial nailless thumb on each hand. Hind limbs light brown on and around the knee joint contrasting with a lighter color ventrally. Dorsal surface of tail light brown, whereas the ventral surface was lighter brown.

Distribution
In addition to the "Hacienda El Limón", peasants from seven villages around Araira town also reported the presence of spider monkeys. All villages are located to the east and southeast of El Avila National Park and to the north and northwest of Guatopo National Park. We confirmed the presence of this monkey on all of these locations (Table 1). Troops of red howler monkey (*Alouatta seniculus*) and capuchin monkey (*Cebus olivaceus*) were also sighted in the area.

Recently (May 15, 1999), farmers sighted a troop of spider monkeys at the "Hacienda Las Pavas", near Araira. The ranger of Guatopo National Park sighted a troop of spider monkeys at La Macanilla (Table 1) at about 07:00 hours on May 25, 1999. During July 1999, rural people sighted spider monkeys close to the Río Taguaza, 6.5 km southwest of Caucagua town and at the Chorrerones site close to the Río Cuira, 8 km southwest of Panaquire town. Both localities are close to the northern and eastern boundaries of Guatopo National Park. They also called the spider monkeys "mono frontino". A group of six spider monkeys was sighted close to the Río Taguaza by rural hunters sometime between January and May 1999. They shot three to eat.

Table 1. Localities for *Ateles hybridus* in northern Venezuela. a = Robinson and Lyon 1902; b = Mondolfi and Eisenberg 1979; c = Ochoa *et al.* 1995; d = this study. [1]The first locality is in Vargas State, the others are in Miranda State.

Location	Coordinates	Date & Ref.
San Julian, southeast of La Guaira[1]	10° 35' N-66° 51' W, 400-800 m	1901, a
Guatopo National Park, 2 km S of Los Alpes	10° 10' N-66° 30' W, 300 m	1974, b
Guatopo National Park, 4.5 km SE of Los Alpes	10° 08' N-66° 29' W, 300 m	1975, b
Guatopo National Park, SIMAB Biodiversity Monitoring Plot	10° 01' N-66° 27' W, 850 m	1993, c
Quebrada El Machete	10° 30' N-66° 26' W, 1000 m	1997, d
Brazo Grande	10° 31' N-66° 23' W, 800 m	1997, d
Brazo Chiquito	10° 30' N-66° 24' W, 600 m	1997, d
Fila Mirador	10° 25' N-66° 29' W, 800 m	1997, d
Hacienda El Limón	10° 31' N-66° 27' W, 1100 m	1997, d
Fila del Viento	10° 29' N-66° 32' W, 800 m	1997, d
Fila Juan Torres	10° 29' N-66° 21' W, 800 m	1997, d
El Salmerón	10° 27' N-66° 22' W, 600 m	1997, d
Forests close to Río Taguaza	10° 13' N-66° 25' W, 40 m	1999, d
Chorrerones site next to Río Cuira	10° 10' N-66° 18' W, 400 m	1999, d
La Macanilla Ranger's Post, Guatopo National Park	10° 07' N-66° 31' W, 800 m	1999, d
Hacienda Las Pavas	10° 24' N-66° 27' W, 1000 m	1999, d

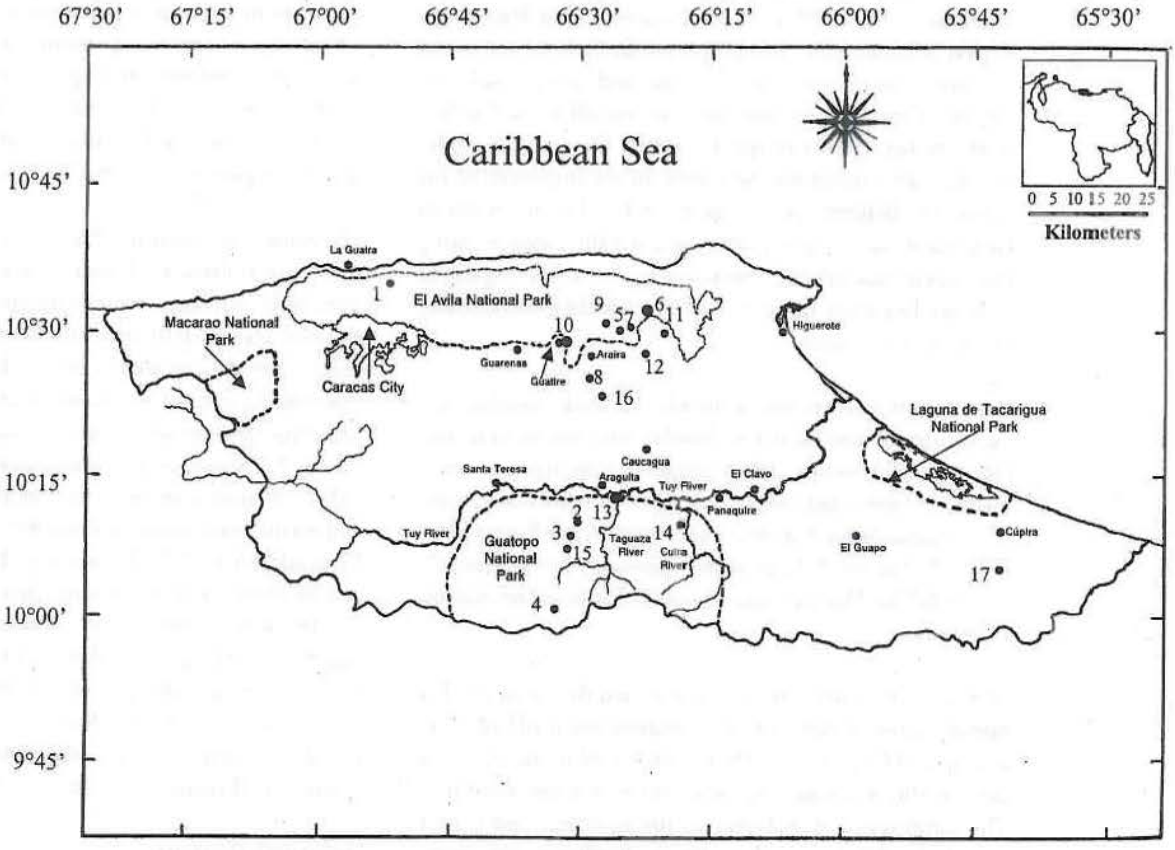

Figure 1. Map showing *Ateles hybridus* localities and national parks in the States of Miranda and Vargas, northern Venezuela. 1. San Julian, 2. Guatopo National Park, 2 km S of Los Alpes, 3. Guatopo National Park, 4.5 km SE of Los Alpes, 4. Guatopo National Park, SIMAB Biodiversity Monitoring Plot, 5. Quebrada El Machete, 6. Brazo Grande, 7. Brazo Chiquito, 8. Fila El Mirador, 9. Hacienda El Limón, 10. Fila El Viento, 11. Fila Juan Torres, 12. El Salmerón, 13. Forests close to the Río Taguaza, 14. Chorrerones site next to the Río Cuira, 15. La Macanilla Ranger's Post, Guatopo National Park, 16. Hacienda Las Pavas, 17. 7 km S of Cúpira.

Figure 1 shows the distribution of the spider monkey in Miranda State. The new records (Table 1) are significant and represent an extension of the distribution of *A. hybridus* for northern Venezuela. The elevation of all sites varies from 40 m to 1,100 m at El Avila National Park.

Discussion

Distribution

The geographic distribution of *A. hybridus* was considered disjunct in northern Venezuela (Mondolfi and Eisenberg, 1979; Mittermeier, 1986a, 1986b). Our findings suggest that its range is less disjunct than has been assumed, and in fact was once continuous from northern to northwestern Venezuela. Habitat destruction, hunting, and human encroachment have resulted in the gaps in its distribution. Habitat modification or destruction caused by agriculture and cattle ranching, lumber, oil and mining extraction, construction of dams and roads, and other human activities have affected northern Venezuela more severely than in the south (Bisbal, 1988).

Little information is available regarding the hunting of spider monkeys by indigenous or rural people in Venezuela. They are hunted for food by Yékuana and Yanomamo people in southern Venezuela (Ojasti, 1993). In the lowlands of the Barlovento Region, Miranda State, rural people usually hunt the red howler monkey (*Alouatta seniculus*) for food, and capture capuchin monkey (*Cebus olivaceus*) juveniles to keep or sell as pets (Cordero R. and Boher, 1988; Cordero R., 1990). Occasionally spider monkeys are hunted for their meat in the highlands of the region (R. Bellotta, pers. comm. 1999). In the region of Guárenas-Guátire rural people occasionally capture young monkeys to raise as pets. Nowadays, however, hunting might no longer be a severe threat to the survival of the spider monkey in northern Venezuela.

It is therefore worth investigating whether spider monkeys still inhabit the forested habitat enclosed by the network of natural protected areas, which include national parks, natural monuments, and protected zones along the coastal cordillera region of Venezuela. Seven National Parks range in size from 15,000 to 122,500 ha, while 12 protected zones vary in size from 214 to 276,000 ha. There are also two natural monuments totaling 11,908 ha.

Mondolfi and Eisenberg (1979) reported the presence of *A. hybridus* at two distant locations, Guatopo National Park and 7 km south of Cúpira (10°10'N-65°42'W), Miranda State. The latter locality marks its range limits in northeastern Venezuela. The sightings of *A. hybridus* in the northern and eastern boundaries of Guatopo indicate that its distribution may extend uninterrupted from Guatopo National Park to Cúpira along the highland forested habitats of the Barlovento Region mountain range in the Serranía del Interior of Cordillera de la Costa. Changes in land use have affected the highlands less than the lowlands.

We agree with Fernández-Badillo and Ulloa (1990) that the spider monkey might exist in the Henri Pittier National Park (10°14'-10°32'N, 67°24'-67°52'W), Aragua State, because good quality habitat exists in the highlands there. It is also likely that this monkey is present in other protected areas in northern Venezuela, but this remains to be confirmed by surveying the network of protected areas in northern Venezuela. We are therefore formulating a proposal to search for spider monkey populations in national parks and other protected areas, and determine their relative abundance and distribution in order to draw up a conservation program for northern Venezuela.

Conservation and Management in the Coastal Range Region

Habitat destruction is the major threat to the survival of spider monkey populations in northern Venezuela. Hunting pressure is probably low; rural people hunt spider monkeys only occasionally and urban hunters do not hunt them at all because they are not considered game animals in Venezuela.

Little information is available on population and troop size and how many spider monkey populations still remain in protected and unprotected areas. Eisenberg *et al.* (1979) estimated a population density of roughly 5.6 ind/km², based on transect surveys and a mean group size of 3.5, based on two sightings for Guatopo National Park. This is a rather low density compared to the 15 to 18 ind/km² and troop size of 18 reported for *A. belzebuth* in Colombia (Klein and Klein, 1976). Congdon (1996) reported an average troop size of 14 (six to 20) for four troops of *A. hybridus* at Caparo Forestry Reserve (7°26'N-70°40'W, 140 m a.s.l.), Barinas State, whereas we found a group of 20 in this survey. It is likely that Eisenberg *et al.* (1979) sighted temporary subgroups (Van Roosmalen and Klein, 1988).

The worst-case scenario is that spider monkey populations are small and isolated by habitat fragmentation. They are thus threatened with extinction by random demographic fluctuations and environmental stochasticity. This being the case, it is likely that we are dealing with metapopulations of spider monkey subdivided into small populations sometimes linked by dispersal. Spider monkeys are large, frugivorous canopy-dwellers of primary forests. They have low reproductive rates: Gestation varies from 225 to 250 days, inter-birth intervals are greater than 36 months, and maturity is reached at about five years of age (Klein, 1971; Klein and Klein, 1976; Robinson and Janson, 1987). Robinson and Redford (1991) pointed out that the population density of Neotropical primates varies with diet and body mass, and suggested that frugivore-herbivores require larger protected areas for maintaining viable populations than other trophic groups. Fruit sources in mature forests are widely dispersed, and population numbers are probably limited by bottlenecks of fruit availability (Robinson and Ramirez, 1982).

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References

Bisbal E., F. J. 1988. Impacto humano sobre los hábitat de Venezuela. *Interciencia*, 13(5): 226-232.

Bodini, R. and Pérez-Hernández, R. 1987. Distribution of cebid primates in Venezuela. In: *Studies in Neotropical Mammalogy: Essays in Honor of Philip Hershkovitz*, B. D. Patterson and R. M. Timm (eds.), *Fieldiana Zoology, n. s.* 39: 231-244.

Boher-Bentti, S. 1998. Nuevo Registro del Mono Araña (*Ateles belzebuth hybridus*) en el Estado Falcón, Venezuela. Unpublished Report, PROFAUNA, Ministerio del Ambiente y Recursos Naturales (MARNR), Caracas.

Collins, A. C. and Dubach, J. M. 2000. Biogeographic and ecological forces responsible for speciation in *Ateles*. *Int. J. Primatol.* 21(3): 421-444.

Congdon, E. R. 1996. A Preliminary Study of Distribution, Habitat Use, and Activity Patterns of Primates within Caparo Forestry Reserve, Venezuela. Cleveland Metro Park Zoo, and University of the Andes, Mérida, Venezuela. Report to PROFAUNA, MARNR, Caracas.

Cordero R., G. A. 1990. Aprovechamiento de la fauna silvestre en Barlovento, Estado Miranda, Venezuela. *Vida Silvestre Neotropical* 2(2): 70-74.

Cordero R., G. A. and Boher, S. 1988. Notes on the biology of *Cebus nigrivittatus* and *Alouatta seniculus* in northern Venezuela. *Primate Conserv.* (9): 61-66.

Eisenberg, J. F., O'Connell, M. A. and August, P. V. 1979. Density, productivity, and distribution of mammals in two Venezuelan habitats. In: *Vertebrate Ecology in the Northern Neotropics*, J. F. Eisenberg (ed.), pp.187-207. Smithsonian Institution Press, Washington, DC.

Fernández-Badillo, A. and Ulloa M., G. 1990. Fauna del Parque Nacional Henri Pittier, Venezuela: Composición y diversidad de la mastofauna. *Acta Científica Venezolana*, 41: 50-63.

Guevara-Díaz, J. M. 1983. *Geografía de las Regiones Central y Capital.* Editorial Ariel-Seix Barral Venezolana, Caracas.

Handley, C. O., Jr. 1976. Mammals of the Smithsonian Venezuelan Project. *Brigham Young University Science Bulletin, Biological Series*, 20(5): 1-89.

Klein, L. L. 1976. Observations on copulation and seasonal reproduction of two species of spider monkeys, *Ateles belzebuth* and *A. geoffroyi*. *Folia Primatol.* 15:233-248.

Klein, L. L. and Klein, D. J. 1976. Neotropical primates: Aspects of habitat usage, population density, and regional distribution in La Macarena, Colombia. In: *Neotropical Primates: Field Studies and Conservation*, R. W. Thorington, Jr. and P. G. Heltne (eds.), pp.70-78. National Academy of Sciences, Washington, DC.

Mittermeier, R. A. 1986a. Primate conservation priorities in the Neotropical region. In: *Primates: The Road to Self-sustaining Populations*, K. Benirschke (ed.), pp.221-240. Springer Verlag, New York.

Mittermeier, R. A. 1986b. Strategies for the conservation of highly endangered primates. In: *Primates: The Road to Self-sustaining Populations*, K. Benirschke (ed.), pp.1013-1022. Springer Verlag, New York.

Mittermeier, R. A. and Cheney, D. L. 1987. Conservation of primates and their habitats. In: *Primate Societies*, B. B. Smuts, D. L. Cheney, R. M. Seyfarth, R. W. Wrangham and T. T. Struhsaker (eds.), pp.478-490. The University of Chicago Press, Chicago.

Mondolfi, E. and Eisenberg, J. F. 1979. New records for *Ateles belzebuth hybridus* in northern Venezuela. In: *Vertebrate Ecology in the Northern Neotropics*, J. F. Eisenberg (ed.), pp.478-490. Smithsonian Institution Press, Washington, DC.

Ochoa G., J., Aguilera, M. and Soriano, P. 1995. Los mamíferos del Parque Nacional Guatopo (Venezuela): Lista actualizada y estudio comunitario. *Acta Científica Venezolana*, 46: 174-187.

Ojasti, J. 1993. Utilización de la fauna silvestre en América Latina: Situación y perspectivas para un manejo sostenible. *Guías-FAO, Conservación* 25. FAO, Rome.

Robinson, W. and Lyon Jr., M. W. 1902. An annotated list of mammals collected in the vicinity of La Guaira, Venezuela. *Proc. U. S. Nat. Mus.* 24: 135-162.

Robinson, J. G. and Ramirez C., J. 1982. Conservation biology of Neotropical primates. In: *Mammalian Biology in South America*, M. A. Mares and H. H. Genoways (eds.), *Special Publication Series. Pymatuning Laboratory in Ecology* 6: 329-344. University of Pittsburgh, PA.

Robinson, J. G. and Janson, C. H. 1987. Capuchins, squirrel monkeys, and atelines: socioecological convergence with Old World primates. In: *Primate Societies*, B. B. Smuts, D. L. Cheney, R. M. Seyfarth, R. W. Wrangham and T. T. Struhsaker (eds.), pp.69-82. The University of Chicago Press, Chicago.

Robinson, J. G. and Redford, K. H. 1991. Determinants of local rarity in Neotropical primates. In: *A Primatologia no Brasil - 3*, A. B. Rylands and A. T. Bernardes (eds.), pp.331-346. Sociedade Brasileira de Primatologia, Fundação Biodiversitas, Belo Horizonte.

Roosmalen, M. G. M. van and Klein, L. L. 1988. The spider monkeys, genus *Ateles*. In: *Ecology and Behavior of Neotropical Primates*, Vol. 2, R. A. Mittermeier, A. B. Rylands, A. F. Coimbra-Filho, and G. A. B. da Fonseca (eds.), pp.455-537. World Wildlife Fund, Washington, DC.

Rudran, R. and Eisenberg, J. F. 1982. Conservation and status of wild primates in Venezuela. *Int. Zoo Yearb.* 22: 52-59.