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Primates of Serranía de las Minas (Upper Magdalena Valley, Colombia)

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Primate populations have declined and disappeared from many localities of the Colombian Andes as a result of habitat loss and hunting pressure. The original forest cover of this mountainous region has been cleared by 70% (Etter et al. 2006), even though there has been a recent recovery of the area (Sánchez-Cuervo et al. 2012). Additionally, hunting practices have extirpated populations from otherwise suitable areas (Defler et al. 2003). These threats have resulted in smaller and isolated populations, with a higher risk of extinction, scattered across this mountain system (Gómez-Posada et al. 2010).

As ecosystems in the Colombian Andes are rapidly transformed, detailed information on primate populations is urgently needed to inform conservation planning initiatives (Defler et al. 2003). The Upper Magdalena Valley, which includes the interandean lowlands and corresponding slopes of the Central and Eastern Andes of Colombia, has high significance for primate conservation. The Andean and Subandean forests of this region are still largely continuous, extending across to lowland forests in the Amazon basin, potentially allowing genetic flow for some species. Five species of primates, two of them threatened, have been recorded in this area (Defler 2003). Despite its primatological relevance, these mammals have been subject to a few studies in this region (Stevenson et al. 2010). Considering that a landscape approach has gradually been implemented to conserve the forests in this region, a thorough understanding of primate species occurrence within it is pivotal to advise decision makers and practitioners. Here we present records of primates from Serranía de las Minas, a poorly studied mountain ridge in the Upper Magdalena Valley.

Serranía de las Minas is a mountain ridge in the Upper Magdalena Valley on the eastern flank of the Central Andes of Colombia (Figure 1). This mountain system has a west-east alignment and rises from 860 masl in the Upper Magdalena Valley up to "cerro Pan de Azúcar" (4800 masl) in the Central Andes, with independent peaks over 2500 masl (e.g. Cerro Rucio, Cerro Pelado). The whole area encompasses 101000 ha, of which approximately 50% remains with forest cover, mainly above 1800-2000 m of elevation (E. Fuentes unp. data).

Four localities were surveyed as part of a Rapid Ecological Assessment (Table 1). All sites correspond to mostly Subandean forest (Cuatrecasas 1984) with a mean canopy height ranging 20 to 30 m. The dominant plant families across all localities are Melastomataceae, Lauraceae, Rubiaceae, and Myrsinaceae (D. Eusse unp. data). The local livelihood portfolios combine a mixture of small-scale farming, cattle ranching, as well as selective logging and sporadic hunting. The conservation status of the localities visited varies according to their accessibility and vicinity to the buffer zone of Puracé National Park on the west. The road between the Oporapa and La Argentina municipalities on the eastern foothills of Cerro Pelado marks the limit between the core forest track in the western section (i.e. Campoalegre, El Palmar, and Cerro Pelado. Table 1, Figure 1) and those more disturbed forests on the east (i.e. La Maituna. Table 1, Figure 1).

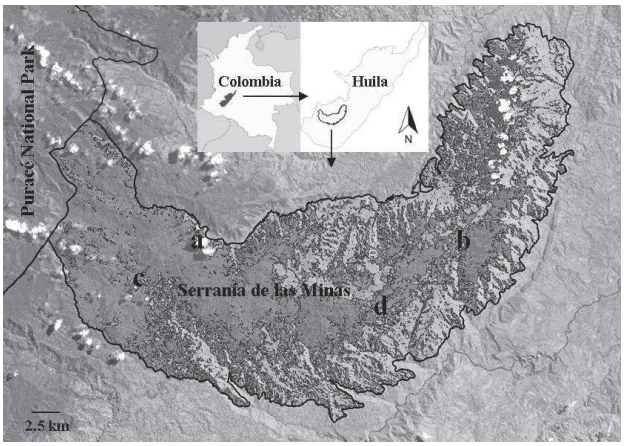

Figure 1. Location of expedition sites in Serranía de las Minas, Upper Magdalena Valley, Huila Department, Colombia: a) Campoalegre, b) La Maituna, c) El Palmar, and d) Cerro Pelado. (dark gray = forested areas; light gray = deforested areas).

Records were made *ad libitum* while conducting bird surveys using binoculars (8x40 mm), aural detections, and a tape recorder (SONY TCM 5000-EV; Sennheiser hypercardioid microphone). All recorded vocalizations were deposited in the Environmental Sounds' Collection of "Instituto de Investigación de Recursos Biológicos Alexander von Humboldt" (Colombia). Surveys were carried out from dawn to dusk along existing trails, mostly on ridges and riversides. Primates were not actively sought by indirect clues such as roosting trees and scats. Open-ended interviews about the regional fauna, and informal conversations, with local people in all localities provided additional information on primate occurrence and interactions with humans (e.g. crop raiding, hunting).

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Table 1. List of localities surveyed where primates were recorded in Serranía de las Minas, Upper Magdalena Valley, Huila Department, Colombia.

Locality	Survey dates	Coordinates	Altitude (masl)
a. Campoalegre (Loro River, La Argentina)	15-27 May 2004 and 19 September 2005	2º9'51.5''N; 76º11'24.5''W	2130-2500
b. La Maituna (La Maituna River, Tarqui)	7-18 July 2004	2º9'8.7''N; 75º57'17.9"W	2000-2400
c. El Palmar (Granates River, Saladoblanco)	2-14 October 2004	2º7'23.4''N; 76º14'13.9''W	2000-2100
d. Cerro Pelado (Cerro Pelado, La Argentina)	29 November - 9 December 2004	2º5'38.8''N; 76º2'00''W	2180–2300

The primate records presented in this note are the first ones reported for Serranía de las Minas; however, all the registered species have already been reported in other localities of the Upper Magdalena Valley. A total of three species belonging to two different families were recorded (Table 2). The brown capuchin monkey has been previously recorded in the municipality of Inzá, Cauca Department, as well as in San Agustín, Finca Merenberg Reserve, and Puracé and Cueva de los Guácharos National Parks (Hernández-Camacho & Cooper 1976, Gaulin & Gaulin 1982, Castaño-Uribe & Cano-Correa 1998, Vargas et al. 2014). The Colombian woolly monkey has recent records from Puracé and Guácharos National Parks (Defler 1996, Defler 2003, Vargas et al. 2014) and historical ones from Moscopán River in the 1930s (Fooden 1963). The red howler monkey is known to occur in Finca Merenberg Reserve, as well as in Puracé and Cueva de los Guácharos National Parks (Gaulin & Gaulin 1982, Castaño-Uribe & Cano-Correa 1998, Vargas et al. 2014).

Table 2. List of primate species recorded in Serranía de las Minas, Upper Magdalena Valley, Huila Department, Colombia (see Table 1 for localities). Tape recording collection codes: 1BSA14885; 2BSA14883; 3BSA14882

Family	Species	Locality	Type of record
Cebidae	Brown capuchin monkey (*Sapajus apella*)	d	Visual and tape recorded[1]
Atelidae	Colombian woolly monkey (*Lagothrix lagothricha lugens*)	a, c	Visual and tape recorded[2]
	Red howler monkey (*Alouatta seniculus*)	a, b, c	Visual and tape recorded[3]

Among the species recorded, only the Colombian woolly monkey is of conservation concern. This taxon, listed as Critically Endangered globally (A3cd, Stevenson & Link 2008) and Vulnerable nationally (A2acd, Defler et al. 2006), has a restricted distribution along the Eastern and Central Andes of Colombia in well conserved continuous forest from lowlands to highlands (Defler 2003). In particular, the populations from the Upper Magdalena Valley are of high conservation priority, since they represent a distinctive evolutionary lineage, play an important role as seed dispersers in Subandean forests, and their habitat has been subject to extensive deforestation (Mantilla-Meluk 2013, Ramírez et al. 2014). The major threats to this species include hunting and habitat loss (Stevenson & Link 2008). Within Serranía de las Minas, hunting of this species was not detected (EGC & CJI pers. obs.), whereas habitat loss and fragmentation may explain its apparent absence on the eastern section of it past the Oporapa-La Argentina road on the foothills of Cerro Pelado.

Conversely, the brown capuchin and red howler monkeys are listed as Least Concern both globally and nationally (Rodriguez-Mahecha et al. 2006, Boubli et al. 2008, Rylands et al. 2008). These two primate species are relatively tolerant to habitat disturbance and capable of exploiting a wide array of vegetation types (Hernández-Camacho & Cooper 1976, Defler 2003, Arroyo-Rodríguez & Dias 2009). Notwithstanding the fact that some sections of the forest in Serranía de las Minas have been cleared and fragmented, both species seem to occur widely there based on our observations and local farmers' knowledge. Moreover, the brown capuchin monkey is reportedly culled by farmers in Serranía de las Minas due to crop raiding, whereas the red howler monkey does not seem to be hunted (EGC & CJI per. obs.).

Despite biodiversity in Serranía de las Minas faces multiple threats due to farmland expansion, some initiatives could support protection of primate populations. This region has been recognized as an Important Bird Area by BirdLife International (CO141, BirdLife International 2012), demonstrating its conservation value for other taxonomic groups. The upper part of Serranía de las Minas, towards the Central Andes, is part of the buffer zone of Puracé National Park and contains a Regional Protected Area (28645 ha) established in its core by the "Corporación Autónoma Regional del Alto Magdalena" in 2006. Even though this protected area still has governance and compliance challenges that need to be addressed (C. Fajardo pers. comm.), it is a definite first step to facilitate

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the protection of this region. Not only it controls the exploitation of the remaining forests, but also provides assistance and livelihood diversification opportunities to the local farmers.

Further surveys of primates in the region are warranted in order to inform conservation plans. Based on the known distribution of Neotropical primates (Emmons 1997, Defler 2003), records from adjacent locations (i.e. Puracé National Park. Castaño-Uribe & Cano-Correa 1998), and knowledge of local farmers, the total primate richness in Serranía de las Minas may reach five species. The Colombian night monkey (*Aotus lemurinus*) was probably overlooked during the field surveys presented here, as they were mostly conducted at daytime. This species is listed as Vulnerable at global (A2c, Morales-Jiménez et al. 2008) and national (C1, Defler & Rodríguez-Mahecha 2006) levels. Perhaps the squirrel monkey (*Saimiri sciureus*) also occurs in this mountain ridge, albeit at lower elevations than those surveyed here (Hernández-Camacho & Cooper 1976), and likely at lower densities than all other diurnal primate species recorded (Vargas et al. 2014). Knowledge on population densities of all the primate species present in the Upper Magdalena Valley, including Serranía de las Minas, should be improved, as this parameter varies spatially and has only been appraised so far in Guácharos National Park (Vargas et al. 2014). Likewise, the knowledge of the area of occupancy of all primate species in the Upper Magdalena Valley needs to be updated and improved because clearing has happened in areas with historical records, and some well forested areas remain poorly studied.

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References

ARROYO-RODRÍGUEZ, V. & P. A. D. DIAS. 2009. Effects of habitat fragmentation and disturbance on howler monkeys: A review. American Journal of Primatology 71:1-16.

BIRDLIFE INTERNATIONAL. 2012. Important Bird Areas factsheet: Serranía de las Minas. Website: http://www.birdlife.org. Accessed 11 October2012.

BOUBLI, J.-P., et al. 2008. Alouatta seniculus. IUCN Red List of Threatened Species, Version 2012.1, IUCN. Website: hhttp://www.iucnredlist.org. Accessed 10 May 2014.

CASTAÑO-URIBE, C. & M. CANO-CORREA. 1998. El Sistema de Parques Nacionales Naturales de Colombia. Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales de Colombia, Bogotá, Colombia 497.

CUATRECASAS, J. 1984. Aspectos de la vegetación natural colombiana. Perez-Arbelaezia 2:155-285.

DEFLER, T. R. 1996. The IUCN conservation status of Lagothrix lagothricha lugens Elliot 1907. Neotropical Primates 4:78-80.

DEFLER, T. R., et al. 2003. Conservation priorities for Colombian primates. Primate Conservation 19:10-18.

DEFLER, T. R. 2003. Primates de Colombia. Conservación Internacional. Bogotá, D.C., Colombia 543.

DEFLER, T. R., et al. 2006. Churuco Lagothrix lagothricha. Pp. 220-224 in Libro rojo de los mamíferos de Colombia (Rodríguez-Mahecha, JV, et al. eds.), Conservación Internacional and Ministerio de Ambiente, Vivienda y Desarrollo Territorial, Bogotá, Colombia.

DEFLER, T. & J. V. RODRÍGUEZ-MAHECHA. 2006. Mico de noche andino Aotus lemurinus. Pp. 210-214 in Libro rojo de los mamíferos de Colombia (Rodríguez-Mahecha, JV, et al. eds.), Conservación Internacional and Ministerio de Ambiente, Vivienda y Desarrollo Territorial, Bogotá, Colombia.

EMMONS, L. H. 1997. Neotropical rainforest mammals, a field guide. Second edition. The University of Chicago Press, Chicago, US 307.

ETTER, A., et al. 2006. Regional patterns of agricultural land use and deforestation in Colombia. Agriculture, Ecosystems and Environment 114:369-386.

FOODEN, J. 1963. A revision of the woolly monkeys (Genus Lagothrix). Journal of Mammalogy 44:213-247.

GAULIN, S. J. C. & C. K. GAULIN. 1982. Behavioral ecology of Alouatta seniculus in Andean Cloud Forest. International Journal of Primatology 3:1-32.

GÓMEZ-POSADA, C., et al. 2010. Densidad y composición de grupos en tres poblaciones de Mono Aullador Rojo (Alouatta seniculus) en Valle y Cauca, Colombia. Boletín Científico Museo de Historia Natural 14:79-91.

HERNÁNDEZ-CAMACHO, J. & R.W. COOPER. 1976. The nonhuman primates of Colombia. Pp. 35-69 in Neotropical primates: field studies and conservation (Thorington, Jr, RW & PG Heltne, eds.), National Academy of Sciences, Washington, D.C., US.

MANTILLA-MELUK, H. 2013. Subspecific variation: An alternative biogegraphic hypothesis explaining variation in coat color and cranial morphology in Lagothrix lugens (Primates: Atelidae). Primate Conservation 26:33-48.

MORALES-JIMÉNEZ, A. L. & S. DE LA TORRE. 2008. Aotus lemurinus. IUCN Red List of Threatened Species, Version 2012.1, IUCN. Website: hhttp://www.iucnredlist.org. Accessed 10 May 2014.

RAMÍREZ, M. A., et al. 2014. Seed dispersal by woolly monkeys in Cueva de los Guácharos National Park (Colombia): An Amazonian primate dispersing montane plants. Pp. 103-114 in High Altitude Primates (Grow NB, et al. eds.), Springer-Verlag, New York, US.

RODRÍGUEZ-MAHECHA, J. V., et al. (eds.). 2006. Libro rojo de los mamíferos de Colombia. Conservación Internacional and Ministerio de Ambiente, Vivienda y Desarrollo Territorial, Bogotá, Colombia 430.

RYLANDS, A. B., et al. 2008.Cebus apella. IUCN Red List of Threatened Species, Version 2012.1, IUCN. Website: hhttp://www.iucnredlist.org. Accessed 10 May 2014.

SÁNCHEZ-CUERVO, A. M., et al. 2012. Land cover change in Colombia: Surprising forest recovery trends between 2001 and 2010. PLoS ONE 7:e43943.

STEVENSON, P. & A. LINK. 2008. Lagothrix lugens. IUCN Red List of Threatened Species, Version 2012.1, IUCN. Website: hhttp://www.iucnredlist.org. Accessed 10 May 2014.

STEVENSON, P., et al. 2010. Conservation of Colombian primates: An analysis of published research. Tropical Conservation Science 3:45-62.

VARGAS, S. A., et al. 2014. Population density and ecological traits of highland woolly monkeys at Cueva de los Guácharos National Park, Colombia. Pp.85-102 in High Altitude Primates (Grow NB, et al. eds.), Springer-Verlag, New York, US.