

## **Observations of Terrestrial Behavior in the Peruvian Night Monkey (*Aotus miconax*) in an Anthropogenic Landscape, La Esperanza, Peru**

Authors: Shanee, Sam, and Shanee, Noga

Source: Neotropical Primates, 18(2) : 55-58

Published By: Conservation International

URL: <https://doi.org/10.1896/044.018.0205>

---

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at [www.bioone.org/terms-of-use](http://www.bioone.org/terms-of-use).

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

---

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

in the area. The possibility that the animal was kept in captivity by the local human population cannot be ruled out, as the collector did not state whether the single collected specimen belonged to a larger group of individuals or was found alone. As more specimens become available, a more comprehensive study about geographical variation in pelage among distinct populations of *M. emiliae* would be important for understanding whether the variation found within the species warrants its division into separate specific taxa or not.

## Acknowledgements

I am grateful to Dr. José de Souza e Silva Júnior and Dr. Suely Marques-Aguiar at MPEG. M. Fialho, for the correct information about his locality of *M. emiliae*. Dr. Mario de Vivo for the advising and Juliana Gualda Barros, collection manager at MZUSP. Rafael S. Marcondes, for critically reading the manuscript. Research was funded by CAPES.

**Guilherme Siniciato Terra Garbino**, Museu de Zoologia da Universidade de São Paulo, Seção de Mastozoologia, Caixa Postal 42694. CEP 04299-970. São Paulo, SP, Brasil. E-mail: <gstgarbino@hotmail.com>

## References

- Alperin, R. 1993. *Callithrix argentata* (Linnaeus, 1771): considerações taxonômicas e descrição de subespécie nova. *Bol. Mus. Para. Emílio Goeldi, Sér. Zool.* 9(2):317–328.
- Ávila-Pires, F.D. de. 1986. On the validity of and geographical distribution of *Callithrix argentata emiliae* Thomas, 1920 (Primates, Callitrichidae). In: *A primatologia no Brasil*—2. M.T. de Mello (ed.), pp. 319–322. Sociedade Brasileira de Primatologia, Brasília.
- Ferrari, S.F. and Lopes, M.A. 1992. A New species of marmoset, genus *Callithrix* Erxleben, 1777 (Callitrichidae, Primates) from western Brazilian Amazonia. *Goeldiana Zoologia* 12:1–13.
- Ferrari, S.F., Sena, L., Schneider, M.P.C. and Silva Júnior, J.S. 2010. Rondon's marmoset, *Mico rondoni* sp. n., from southwestern Brazilian Amazonia. *Int. J. Primatol.* 31: 693–714.
- Fialho, M.S. 2010. Contribuição à distribuição do gênero *Mico*, (Callitrichidae, Primates) no Médio Teles Pires, Jacareacanga, Pará. *Neotrop. Primates* 17(1): 31.
- Ivanauskas, N.M., Monteiro, R. and Rodrigues, R.R. 2008. Classificação fitogeográfica das florestas do Alto Rio Xingu. *Acta Amazonica* 38(3): 387–402.
- Pimenta, F.E. and Silva Júnior, J.S. 2005. An Update on the Distribution of Primates of the Tapajós-Xingu Interfluvium, Central Amazonia. *Neotrop. Primates* 13(2): 23–28.
- Roosmalen, M.G.M. van, Roosmalen, T. van, Mittermeier, R.A. and Rylands, A.B. 2000. Two new species of marmoset, genus *Callithrix* Erxleben, 1777 (Callitrichidae, Primates), from the Tapajós/Madeira interfluvium, South Central Amazonia, Brazil. *Neotrop. Primates* 8(1): 2–18.

- Rylands, A. B., Coimbra-Filho, A. F. and Mittermeier, R. A. 2009. The systematics and distributions of the marmosets (*Callithrix*, *Callibella*, *Cebuella*, and *Mico*) and callimico (*Callimico*) (Callitrichidae, Primates). In: *The smallest anthropoids: the marmoset/callimico radiation*. S.M. Ford, L. Porter and L.C. Davis (eds.), pp. 25–61. Springer, New York.
- Thomas, O. 1920. On mammals from the lower Rio Amazonas in the Goeldi Museum, Pará. *Ann. Mag. Nat. Hist.* 9(6):266–283.
- Vieira, C.O. da C. 1955. Lista remissiva dos Mamíferos do Brasil. *Arq. Zool.* 8(11): 354–374.
- Vivo, M. de. 1985. On some monkeys from Rondônia, Brasil (Primates: Callitrichidae, Cebidae). *Papéis Avulsos de Zoologia, São Paulo* 4: 1–31.
- Vivo, M. de. 1991. *Taxonomia de Callithrix* Erxleben, 1777 (Callitrichidae, Primates). Fundação Biodiversitas, Belo Horizonte.

---

---

## OBSERVATIONS OF TERRESTRIAL BEHAVIOR IN THE PERUVIAN NIGHT MONKEY (*AOTUS MICONAX*) IN AN ANTHROPOGENIC LANDSCAPE, LA ESPERANZA, PERU

Sam Shanee  
Noga Shanee

## Introduction

The Peruvian night monkey (*Aotus miconax*) is one of the least studied of all Neotropical primate taxa. *A. miconax* is endemic to northeastern Peru (Aquino and Encarnacion 1994) and its entire range lies within the 'tropical Andes biodiversity hotspot', an area characterized by its high levels of species endemism and threats to conservation (Myres et al. 2000). This species has not been the focus of previous behavioral studies and is only known from *ad libitum* observations and collection localities in the departments of Amazonas, Huánuco and San Martín (Thomas 1927a; 1927b; Butchart et al. 1995; Cornejo et al. 2008). These same departments have some of the highest rates of deforestation in Peru (Elgregen 2005; INEI 2007). Deforestation in the area is fuelled by immigration of people from the central and northern highlands looking for land for small scale agriculture, cattle ranching and timber extraction (Garland 1995; Schjellerup 2000; Shanee 2010). In many areas this has caused the complete loss of large areas of forested land (Shanee et al. 2007; Shanee 2010). In other areas patterns of land use and ownership have caused the isolation of many small patches of forest forming an anthropogenic landscape mosaic (Shanee 2010). *A. miconax* is listed as Vulnerable by the IUCN (Red List categories A2c) and Endangered under Peruvian law (Decreto Supremo 34–2004-AG). *A. miconax* lives in small family groups of 2–6 individuals (personal observation). Like other night monkey species these groups generally comprise a heterosexual pair and their off-spring. The diet of night monkeys

is primarily frugivorous although leaves, buds and insects also figure in their diet (Ganzhorn and Wright 1994; Fernandez-Duque 2003). Fruiting figs (*Ficus spp.*) are a preferred food source in all studied *Aotus* species (Fernandez-Duque 2007).

Terrestriality has been recorded in other species of neotropical primates. Most commonly terrestriality has been observed in populations of *Cebus spp.* using stone tools to open hard shelled fruit (Fleagle 1999; Waga et al. 2006) and at dry season waterholes (Freese 1978). Terrestriality has also been observed in populations of *Ateles spp.* (Campbell et al. 2005) at dry season water holes as well as to access salt-licks and other scarce resources. A similarly wide range of terrestrial behaviors has been observed in *Brachyteles spp.* (Mourthe et al. 2007).

We aimed to gather basic ecological data on this little known species. We conducted night follows and *ad libitum* data collection to monitor the behavior of a group of *A. miconax* in a mosaic landscape of forest patches and cultivated land, to better understand the interactions between night monkeys and their habitat in an anthropogenic environment. The work will aid ongoing conservation efforts for *A. miconax* and other endangered primates in the northeast of Peru.

## Methods

### Study site

Our observations took place in the *Centro Poblado La Esperanza* (S 05°39'46", W 77°54'32"), Amazonas department, Peru. Habitat in the area is comprised of disturbed primary and regenerating secondary montane and pre-montane cloud forests interspersed with pasture and plantations. In areas closer to human settlements this landscape becomes decreasingly forested with isolated forest patches ranging in size from ~ 0.5 ha to ~ 10 ha surrounded by cattle pasture and small cultivated plots of corn, potatoes, beans and other vegetables for local sale or local consumption. The area lies on the eastern slopes of the Andes with elevations between 1800 and 2400 meters above sea level. Terrain is very rugged with steep valleys separated by high mountain ridges. Temperatures fluctuate between approximately 25 °C in the day and can reach as low as 6 °C before dawn. Rainfall is heavy year round with a drier season during June–November. Average monthly rainfall is 1500 mm.

### Habituation

We conducted group follows on a habituated group of *A. miconax*. When the group was identified it was already well habituated to the presence of humans due to the proximity of the village of La Esperanza and nearby houses (three houses bordered the patch). Local residents frequently pass through the forest patch on their way to their fields and many use the patch as a source of firewood for their homes. We furthered the habituation process between January 2008 and the start of the study period while testing

methodologies and preparing transects for the study. No dedicated habituation program was implemented as this was deemed unnecessary.

### Study group

At the start of the study period the group consisted of 5 individuals (2 adults, 2 sub-adults/juveniles and one infant). One individual was born in April 2010, for a group of 6 individuals (3 adults, 2 sub-adults/juveniles and one infant) at the end of the study period.

### Data collection

Observations took place between 18:00–22:00 hours and 03:00–06:30 hours for five nights each month between December 2009 and November 2010. Our night follows were conducted on the days preceding, during and after the full moon. Group follows were made by one to three trained observers using red light LED headlamps (Silva) as well as conventional light flashlights. The focal group lives in a small ~ 1.4 ha isolated forest patch (S 05°42'17", W 77°54'14"). Trails were cut in a 10 × 10 meter grid; all intersections were tagged with high visibility flagging tape. We also recorded *ad libitum* data from observations of *A. miconax* while conducting other research in the same area, since the initiation of the project in October 2007.

## Results

We observed terrestrial behavior during a four day period whilst carrying out group follows; we also inferred terrestrial behavior from two *ad libitum* observations. The first *ad libitum* observation was made on the 27<sup>th</sup> February 2008. A lone adult female was found in a patch of eucalyptus trees (*Eucalyptus globulus*) just outside the village of La Esperanza. The trees, located next to a house on the edge of the main highway (*Carretera Fernando Belaunde Tierry*), were over 100 meters from the nearest forest patch and ~20 meters from the next nearest trees. In the morning the patch of trees was surrounded by dogs trapping the individual until we were able to remove her from the tree and release her in a nearby forest patch.

The second *ad libitum* observation was made on the 11<sup>th</sup> August 2010. Again a lone adult female was found behind a house in the village of La Esperanza. The individual was heard vocalizing continuously for 15 minutes. The trees where this individual was observed were >300 meters from the nearest forest patch. A discontinuous line of trees runs from this forest patch almost to the village but is broken in places, with one gap of >15 meters and one gap of ~6 meters, where the individual had to descend to the ground to cross. Other less substantial gaps also exist in this line but were probably crossed by leaping from one tree to another.

During group follows on the nights of 20<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup> and 23<sup>rd</sup> of November 2010 we observed a group of 6 individuals leaving the forest patch where they live to gain access to

a fruiting fig tree (*Ficus* spp.). On all occasions the group left the forest in the undergrowth and crossed ~5 meters of open ground before climbing a neighboring tree to gain access to the fig. On each occasion the group stayed in the tree for 15–25 minutes before returning to the forest by leaping from neighboring trees into the undergrowth on the border area of the home patch, thus avoiding crossing open ground again. On one occasion the group returned to the same tree, crossing open ground, twice in the same night.

## Discussion

We found no published records of terrestrial behavior in any *Aotus* species although similar behavior has been reported for *A. a. azarai* in Argentina (M. Svensson & E. Fernandez-Duque pers. comm.), and probably exists in other areas where habitat is similarly fragmented. The highly disturbed and fragmented habitat of *A. miconax* at La Esperanza is representative of forests in much of this species range where anthropogenic pressures on remaining forests are increasing. The ability of primates to cope in anthropogenic landscapes is becoming more and more important to their survival as human populations continue to grow, particularly for those with restricted ranges and in areas of high human population density (Marsh 2003). Our first two observations were probably individuals dispersing from their natal groups, although solitary individuals are reported to be common in populations of *A. a. azarai* in Argentina (Fernandez-Duque 2004) and *Aotus* spp. in Colombia (Villavicencio-Galindo 2003).

Our observations on *Aotus* diet at this site show a relatively high reliance on buds and leaves, accounting for 30% of their diet (Shanee and Shanee in prep). This is more than for most other night monkey species (Fernandez-Duque 2007). High consumption of leaves has also been observed in the cathemeral *A. a. azarai* (Fernandez-Duque 2007). Increased leaf consumption could be a strategy developed to cope with reduced availability of fruiting species in smaller patches or less productive forest types. The home patch of the focal group contains other fruiting trees, including figs. However, only two other food species were seen to be fruiting at the time, *Styrax* sp. and one unidentified species. Both of these have smaller, less fleshy fruits than figs and so are probably less desirable to *A. miconax*.

The forests of La Esperanza are home to three other primate species: *Oreanax flavicauda*, *Ateles belzebuth* and *Cebus albifrons* (Shanee and Shanee 2010), however only *Aotus miconax* has been observed so close to villages or in such small forest patches (> 50 ha). In part this is probably because of their smaller body size, nocturnal habits and undesirability to hunters. There are however reports from local people of *O. flavicauda* crossing open ground between forests and in one incident an individual of this species was captured by a local man in a semi-isolated patch of ~30 ha when it

tried to enter a coffee plantation (A. Mego-Rodriguez, pers. comm.).

Terrestrial behavior in primarily arboreal primates' such as *Aotus* may leave individuals at greater risk to predation (Isbell 1994; Mourthe 2007). The risk of attack or predation by domestic animals such as dogs and possible opportunistic capture by hunters will be especially great in areas with relatively high human population densities such as La Esperanza. Even with these increased risks many species of neotropical primate demonstrate occasional terrestriality (Freese 1978; Dib et al. 1997; Fleagle 1999; Campbell et al. 2005; Waga et al. 2006; Mourthe 2007). Several populations of *Cebus* spp. regularly descend to the ground to open dry or hard shelled fruits (Waga et al. 2006), a resource that would be unavailable without access to stone 'tools'. Similarly, *Cebus* spp., *Ateles* spp. and *Brachyteles* spp. have all been observed descending to the ground to access dry season waterholes and otherwise un-available resources (Freese 1978; Port-Carvalho et al. 2004; Campbell et al. 2005; Mourthe et al. 2007). In the 12 months of our study the focal group was only observed descending to the ground during a single four-day period to access an otherwise un-available resource. This occurred during the dry season when fruit is scarce.

In one study Dib et al. (1997) reported that groups of northern muriqui (*Brachyteles hypoxanthus*) descend to the ground to cross areas of pasture between isolated forest patches. Terrestriality in dispersing females has also been observed in *Brachyteles* (Lemos de Sa 1988 cited by Dib et al. 1997). If individuals need to disperse from groups in isolated patches then occasional terrestriality becomes a necessary behavior to avoid inbreeding and intragroup conflicts. The solitary *Aotus* females we observed were probably dispersing from their natal groups. Our observations suggest that conservation of *A. miconax* and other primates in similar landscapes can be aided by the preservation of connectivity between forest patches. Through better planning when converting forest to pasture or plantations, arboreal food sources close to forest habitat could be conserved. Understanding the reasons for, and risks and benefits involved in, terrestrial behaviors in *Aotus* spp. will greatly aid in conservation assessments and planning for this and other species.

## Acknowledgments

We wish to thank Alejandro Mego-Rodriguez, Nestor Allgas-Marchena, Thiago Pereira and Julio Cachay for their help in the field and INRENA/DGFFS for permission to work in Peru (Permits: N° 122–2008-INRENA-IFFS-DCB; N° 102–2009-AG-DGFFS-DGEFFS and N° 384–2010-AG-DGFFS-DGEFFS). This work was funded by Primate Conservation, Apenhuel Primate Conservation Trust, La Vallee des Singes/Le conservatoire pour la protection des primates and Wild Futures/The Monkey Sanctuary Trust. We also wish to thank all the authorities and



members of the *Comunidad Campesina Yambrasbamba* for their help and permission to work in the area.

**Sam Shanee**, Neotropical Primate Conservation, 203 Callington Road, Saltash, Cornwall, PL12 6LL. <samshanee@gmail.com>, **Noga Shanee**, Neotropical Primate Conservation, 203 Callington Road, Saltash, Cornwall, PL12 6LL and Durrell Institute of Conservation and Ecology, University of Kent, Canterbury, Kent CT2 7NS, UK. <nogashanee@gmail.com>

## References

- Aquino, R. and Encarnación, F. 1994. Primates of Peru. *Primate Report*. 40: 1–127.
- Butchart, S.H.M., Barnes, R., Davies, C.W.N., Fernandez, M. and Seddon, N. 1995. Observations of two threatened primates in the Peruvian Andes. *Primate Cons.* 16: 15–19.
- Campbell, C. J., Aureli, F., Chapman, C. A., Ramos-Fernandez, G., Matthews, K., Russo, S. E., Suárez, S. and Vick, L. 2005. Terrestrial behavior of *Ateles* spp. *Int. J. Primatol.* 26: 1039–1051.
- Cornejo, F. M., Aquino, R. and Jimenez, C. 2008. Notes on the natural history, distribution and conservation status of the Andean night monkey, *Aotus miconax* Thomas, 1927. *Primate Cons.* 23: 1–4.
- Dib, L. R. T., Oliva, A. S. and Strier, K. B. 1997. Terrestrial travel in muriquis (*Brachyteles arachnoides*) across a forest clearing at the Estação Biológica de Caratinga, Minas Gerais, Brazil. *Netrop. Primates*. 5: 8–9.
- Ellegren, J. J. 2005. La Deforestación en el Perú. [Online] retrieved on 1 August 2008 [www.conam.gob.pe/documentos/Taller-Analisis-Ambiental/La-Deforestacion-en-el-Peru.pdf](http://www.conam.gob.pe/documentos/Taller-Analisis-Ambiental/La-Deforestacion-en-el-Peru.pdf)
- Fernández-Duque, E. 2003. Influences of moonlight, ambient temperature and food availability on the diurnal and nocturnal activity of owl monkeys (*Aotus azarai*). *Behav. Ecol. Sociobiol.* 54: 431–440.
- Fernández-Duque, E. 2004. High levels of intrasexual competition in sexually monomorphic owl monkeys. *Folia Primatol.* 75(suppl. 1): 260.
- Fernández-Duque, E. 2007. Aotinae: Social monogamy in the only nocturnal haplorhines. In: *Primates in perspective*, C. J. Campbell, A. Fuentes, K. C. MacKinnon, M. Panger and S. K. Bearder (eds), pp.139–154. Oxford University Press, Oxford, UK.
- Fleagle, C. H. 1999. *Primate adaptation and evolution*. Academic Press, London.
- Freese, C. H. 1978. The behaviour of white faced capuchins (*Cebus capucinus*) at a dry-season waterhole. *Primates*. 19: 275–286.
- Ganzhorn, J. U. and Wright, P. C. 1994. Temporal patterns in primate leaf eating: the possible role of leaf chemistry. *Folia Primatol.* 63: 203–208.
- Garland, E. B. 1995. The social and economic causes of deforestation in the Peruvian Amazon basin: Natives and colonists. In: *The social causes of environmental destruction in Latin America*. M. Painter and W. H. Durham (eds.), pp 217–246. University of Michigan Press, Michigan.
- INEI, Instituto Nacional de Estadística e Informática. 2006. [Online] Retrieved on 1 August 2007 from: <http://www.inei.gob.pe/>
- Isbell, L. A. 1994. Predation on primates: ecological patterns and evolutionary consequences. *Evol Anthropol.* 3: 61–71.
- Marsh, L. K. 2003. The nature of fragmentation. In: *Primates in Fragments*, L. K. Marsh (ed.), pp.1–10. Kluwer Academic, New York.
- Mourthe, I. M. C., Guades, D., Fidelis, J., Boubli, J.P., Mendes, S.L. and Strier, K.B. 2007. Ground use by northern muriquis (*Brachyteles hypoxanthus*). *Am. J. Primatol.* 69: 706–712.
- Myers, N., Mittermeier, R. A., Mittermeier, C. G., daFonseca G. A. B. and Kent, J. 2000. Biodiversity hotspots for conservation priorities. *Nature*. 403: 853–858.
- Port-Carvalho, M., Ferrari, S. T. and Magalhaes, C. 2004. Predation of crabs by tufted capuchins (*Cebus apella*) in eastern Amazonia. *Folia Primatol.* 75: 154–156.
- Schjellerup, I. (2000), 'La Morada. A case study on the impact of human pressure on the environment in the Ceja de Selva, northeastern Peru', *AMBIO*. 29: 451–54.
- Shanee, N., Shanee, S. and Maldonado, A. M. 2007. Conservation assessment and planning for the yellow tailed woolly monkey (*Oreonax flavicauda*) in Peru. *Wildlife Biol. Practice*. 3: 73–82
- Shanee, S. 2010. Distribution survey and threat assessment of the yellow tailed woolly monkey (*Oreonax flavicauda*; Humboldt 1812), North Eastern Peru. *Int. J. Primatol.* DOI 10.1007/s10764-011-9507-x
- Shanee, S. and Shanee, N. 2010. Population density estimates for the critically endangered yellow tailed woolly monkey (*Oreonax flavicauda*) at La Esperanza, north-eastern Peru. *Int. J. Primatol.* 32: 691–707.
- Thomas, O. 1927a. The Godman-Thomas expedition to Peru. On mammals collected by Mr. R. W. Hendee in the province of San Martin, N. Peru, mostly at Yurac Yacu. *Ann. Mag. Nat. Hist.*, Ser. 9, 19: 361–375.
- Thomas, O. 1927b. The Godman-Thomas expedition to Peru. On mammals from the upper Huallaga and neighbouring highlands. *Ann. Mag. Nat. Hist.*, Ser. 9, 20: 594–608.
- Villavicencio-Galindo, J. M. 2003. Distribución geográfica de los primates del género *Aotus* el departamento Norte de Santander, Colombia. In: *Primatología de Nuevo Mundo*. V. Pereira-Bengoa., F. Nassar-Montoya. and A. Savage (eds). Centro de Primatología Araguatos, Bogotá.
- Waga, I. C., Dacier, A. K., Pinha, P. S. and Tavares, M. C. H. 2006. Spontaneous tool use by wild capuchin monkeys (*Cebus libidinosus*) in the Cerrado. *Folia Primatol.* 77: 337–344.