Neotropical Primates

A Journal of the Neotropical Section of the
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October 20, 2009

Angela Maldonado
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Dear Angela,

RE: Manuscript entitled: Possible evidence of male dispersal in common woolly monkeys (*Lagothrix lagotricha*)

Thank you for submitting your manuscript for review and publication in *Neotropical Primates*.

In light of the comments of the reviewer editor, which are appended below, and my own reading, your paper will be accepted for publication pending final changes. These changes are outlined below.

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Thank you again for submitting your work to *Neotropical Primates.*

Sincerely,

Liliana Cortes Ortiz
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All comments, modifications and suggestions have been made directly to the manuscript. Please review the attached file in which modifications have been done using track changes. Also, we request that you accept the suggested changes and complete or modify the manuscript according with the particular comments highlighted by the reviewer. Thanks.

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Complete Title:

Possible evidence of male dispersal in common woolly monkeys (*Lagothrix lagothricha*)

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Abstract:

Although genetic evidence indicates some male dispersal in the genus *Lagothrix*, no direct observation of this behavior has ever been achieved. Here we report the acceptance of a reintroduced three-year-old male into an existing wild group. This event supports previous inferences on male dispersal by showing that a foreign male can be accepted into a wild group. Nonetheless, direct evidence for a wild sub-adult male leaving its natal group and immigrating into another group is still lacking.

Keywords:

Reintroduction, Rehabilitation, Primate social organization

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Introduction

Primate social organization is generally considered to have evolved from the ecological necessity of cooperative behavior for survival, and several models have been proposed to account for variation observed in different species (Wrangham, 1980; van Shaik, 1989; Isbell, 1991). One of the common aspects between all models is the importance of female philopatry, which provides the opportunity of forming coalitions among related females, and the same could be said about male philopatry (Isbell and Young, 2002). In the cases when male philopatry and female dispersal is observed it seems unlikely for a male to be accepted into an existing group, given the consequent decrease in reproductive success that this would implicate for local males. It is therefore of extreme importance to ascertain the patterns of dispersal that occur in a given species in order understand its social structure.

The genus *Lagothrix* contains four closely related species, similar enough to be considered subspecies for a long time (Groves, 2005). *Lagotrhix spp.* are known to have female dispersal (Nishimura, 2003; Di Fiore and Campbell, 2007), but genetic evidence suggests that male dispersal also occurs (Di Fiore and Fleischer, 2005). Even though several groups have been observed for long periods of time, enough to report female dispersal (Stevenson *et al.*, 1994; Nishimura, 2003; Di Fiore and Campbell, 2007), no observations of male dispersal have ever been recorded. Solitary adult males of *Lagotrhix poeppigii* have been observed trying to join existing groups, but have been expelled by resident males (Di Fiore and Fleischer, 2005). Here we report the acceptance of a newcomer three-year-old male into an existing group of *Lagothrix lagothricha*. This observation should however be interpreted with caution since it comes from a captive raised individual reintroduced to the wild.

Observations

In 1996 an infant male woolly monkey (*L. lagothricha*) between 5 and 8 months old, was confiscated when it was kept as a pet. Its origin is not certain, but according to the information available it appears that it was taken from the wild in the Putumayo region, Colombia. The regional environmental authority had no adequate infrastructure to keep this individual, so the infant was given to Angela Maldonado, who, in raising the individual, kept it until 1998 in her household, in Bogota, Colombia. The woolly monkey had a scar in its lower lip, which presumably was generated during its capture from the wild. Feeding consisted on fruit and vegetables, and it was taken every weekend to nearby forests in order to allow a normal climbing behavior.

On April 2nd 1998 Maldonando took the captive raised woolly monkey to the Caparu Biological Station in Vaupes, Colombia (for a more detailed description of the site refer to Defler and Defler, 1996), where a semi captive free-ranging group of primates was kept for rehabilitation and reintroduction purposes. The group consisted of eight common woolly monkeys (*Lagothrix lagothricha*, four adult females, one sub-adult female, two infant females, and one juvenile male), two white-fronted capuchins *(Cebus albifrons albifrons*: one male and one juvenile female), one sub-adult female long-haired spider monkey (*Ateles belzebuth*), and three mottled-faced tamarins (*Saguinus inustus*: two adult females and one subadult male). The group foraged freely in the station area, and was fed once daily.

On the 3rd of April 1998, a wild group of woolly monkeys passed near the station, and in response, the captive raised male did an aggressive display, including branch shaking. Although an adult male stopped and observed the new male, and some other members of the group paid attention to the display, they made no aggressive display, and continued on their way, seemingly unperturbed. The captive raised male followed the group until dusk and then returned to the station.

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When first introduced to the primate group of the Caparu Biological Station, the captive raised male was approximately 3 years old, and interacted normally with the other individuals of the group for his age. He was, however, rejected by one of the adult woolly females, and after this interaction he was always subjected to aggressive behavior from all of the adult females. This caused the captive raised male to run into the forest and remain alone for one night on two occasions. The aggressive female was the lowest ranking in the group, had no offspring in the group, and had the most aggressive behavior towards humans.

On April 12, after 3 days of enforced separation from the aggressive female by the Caparu staff, the two individuals were allowed near each other again and the aggression was repeated. This time the male ran into the forest and did not return to the station. He was observed foraging the next day with a wild group, and observations were repeated on April 14. That day the male answered and approached the observer. On April 26 the same group was encountered, and when called by its pet name the male answered, but did not approach the observer. Maldonado then left the Amazon station and returned to Bogota. The male was observed once during the month of May by one of the field assistants at the station and answered when called but did not approach the observer. It is not known if the group it joined was the same that tolerated the aggressive display on the 3rd of April, but that is likely, given the group's home range.

Just over one year later, on June 26, 1999, Maldonado followed a wild group of woolly monkeys, which was presumably the same one (given its home range) into which the captive raised male had integrated.

A male came particularly close to her during the observations and answered when called by its pet name, but because of the change of size she was unable to recognize it unequivocally. She then followed the male until its identity was confirmed by observing the scar in its lower lip.

Discussion

The present case shows that a social mechanism exists for the acceptance of a new male into an existing group of *Lagothrix lagothricha*, and thus supports Di Fiore and Fleischer's (2005) molecular data suggesting some level of male dispersal. However, the "dispersed" wild born male upbringing differed significantly from wild individuals, remaining isolated from conspecifics for an important part of its infancy. The fact that the introduced male was not an adult might implicate that only juvenile or subadults can be accepted into existing groups, but this remains to be determined. To our knowledge, observations of sub-adult or juvenile males dispersing from their natal groups are therefore the only lacking evidence to confirm the existence of male dispersal in *Lagothrix*.

Acknowledgments

The authors would like to thank S. Bennett for her invaluable assistance during fieldwork, T.R. Defler and D. Gonzalez for the logistic support. We also thank A. Nishimura, P. Stevenson, S.K. Bearder, L. Cortes and one anonymous reviewer for their valuable comments on this manuscript.

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