BRIEF REPORT

Adoption of Infant Howling Monkeys (Alouatta palliata)

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During 3 years of continuous field observations on mantled howlers (Alouatta palliata Gray) in Costa Rica we observed five infants without mothers in the main study group. Four of these infants solicited care and two were adopted (one permanently, one temporarily) by lactating females. The other two were carried but not adopted. The fifth neither solicited nor received care. An infant must solicit care to receive care, and female howlers apparently can suckle more than one infant at a time.

Key words: mantled howlers, adoption, Alouatta palliata, Costa Rica, solitary infants

INTRODUCTION

Adoptive behavior directed toward unweaned primates by conspecifics has been observed in both captive and free-ranging groups [see review by Blaffer Hrdy, 1976; also, Goodall, 1971; Hamilton et al, 1981; Marsden & Vessey, 1969; Palthe & Van Hoof, 1975; Rhine et al, 1980]. The interaction can range from mere interest, to caretaking activities, to long-term adoption involving suckling. Interactions with infants by group members other than the mother will be presented elsewhere and this report will deal specifically with the situation when an unweaned infant is in a group which does not include its mother. We report five such instances, two in which the solitary infant was adopted and three in which it was not. In one case of adoption the mother was temporarily out of the group and in the other four cases the fate of the mother was unknown.

METHODS AND RESULTS

The occurrence of five solitary infants took place at different times in two groups of free-ranging howling monkeys (Alouatta palliata Gray) living in riparian forest on Hacienda La Pacifica, Guanacaste Province, Costa Rica. The main study group has been observed since 1970 (eg, Glander, 1980, 1981) and was observed by MRC from November 1978 through September 1980. All adult animals and most immatures have been captured routinely and marked with collars and tattoos, and records have been kept on birth, death, and migration. The secondary study group was observed in 1976 and 1977.
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[Jones, 1980] and was also observed by MRC from December 1978 through September 1980.

Pippin, a 4½-month-old female, became a solitary infant after a routine capturing and marking session of the main group. Pippin and her mother Purple were captured on November 22, 1979, and were released together with the group the next morning. When the group traveled, Purple remained behind. Pippin lost called and unsuccessfully solicited attention from two adult females. The next day Pippin slept in contact with and remained within a meter of the dominant male. Infants of this age still depend on their mothers for the major portion of their sustenance and are not completely weaned until about 15 months of age.

On November 24th, Yolo, a 13-month-old female, was captured and kept overnight. Before she was released the next morning, Pippin was observed suckling from Yellow, Yolo's mother. Although Yellow rejected solicitations by Pippin that same afternoon, the next morning she suckled four times. Pippin solicited all suckling and sleeping bouts and followed Yellow whenever she traveled. The next day Pippin suckled three times and was rejected once. During these 3 days Yolo also solicited and suckled from her mother.

The next day the group traveled to where Purple had stayed behind and Pippin returned to her after 5 days separation. Two months later, when Purple developed a sore at the base of her tail, Yellow carried Pippin frequently but did not nurse her. Yellow continued to carry Pippin intermittently for several months, even after she had been rejected by her mother as part of the weaning process.

Goblin (approximately 4 months old, sex unknown) was another solitary infant who was not the offspring of any permanent female member of either the main or secondary study group. Goblin was first seen in February 1979, when it spent 4 days with the main group. At first Goblin was chased by the adult group members, but eventually received some attention (holding, carrying, playing) from all group members except the dominant male. Goblin actively solicited these interactions by approaching all group members repeatedly, resisted being pushed off the dorsal riding position, and, when rejected, immediately tried to return. Goblin was not observed suckling while in the main group and left on the fourth day to join the secondary study group. After April 1979, Goblin was almost always seen with one female and her offspring who was 2 months younger than Goblin, and was often observed in the ventral suckling position on this female. Goblin was last positively identified with this female in October 1979, at which time Goblin was about 1 year old.

Three other infants temporarily joined the study groups. The first was on February 1, 1973 when the main and secondary groups were in adjacent trees. When the secondary group left, Yellow carried an unknown female infant. This infant, who was about 3 months old, then solicited and was carried by all adults in the group. A short time later she fell 15 m into a mud puddle. She made no sound and was ignored.

The next situation occurred 2 days later when the groups were again close. An infant the same size as the above infant vocalized, initiated interactions, and was carried by adults in the secondary group. When the group moved, the infant stayed with the main group. Although several females approached it and Yellow carried it for 4 hr, it had disappeared by the next day.

On March 21, 1980, a solitary animal about 4 months of age joined the main group. Unlike the other solitary infants this one did not approach any animal other than the dominant male. It made very few vocalizations and avoided other animals. Except for one juvenile, no group member showed interest in it. By the next morning it had disappeared. It did not solicit or receive care.

**DISCUSSION**

The mere presence of a solitary infant does not lead to care-giving behavior by group
members. Observations of infants raised in the group reveal the same lack of response: an infant who falls out of a tree and is silent is not rescued; a vocal infant is retrieved from the ground, from a play group, or from being left behind. An infant has to solicit care to invoke a response from other howlers.

It should come as no surprise, therefore, that a solitary infant would actively initiate caretaking. An unweaned infant should solicit care from a lactating female despite the presence of suckling offspring. Pippin and Goblin were cared for by lactating females with offspring and both survived beyond weaning. As a group without a lactating female is uncommon, it would appear that if an infant were persistent, it could successfully solicit and receive care and suckling.

Why a group member would care for an infant that is not its own is less clear. A female could be learning to mother [Lancaster, 1971] or priming herself for an impending birth [Blaffer Hrdy, 1977]. The observed adoptions, however, involved lactating females who had suckling offspring and presumably had to assume additional lactation burden. If the female were related to the solitary infant she might be preserving shared genes by increasing a relative’s chance for survival [Hamilton, 1964]. Although Goblin came from outside of both groups and Pippin’s mother was an immigrant, there is gene flow between groups through male and female migration [Clarke, 1981; Glander, 1980]. Thus, the chance of helping a relative who is not a group member is higher than that in a social system where there is a low rate of migration. Additionally, caretaking to the extent of nursing could be an artifact of good mothering practices, e.g., a mother who is solicitous toward her own young is more solicitous toward any young howler. Ten years’ data indicate that Yellow, the most frequent caretaker, also has the highest survival rate for her own offspring. Perhaps a successful howler female increases her inclusive fitness by solicitous care of her own offspring as well as other infants to whom she might be related.

Adoption, then is presumed to be beneficial for the solitary infant, but it may also be relatively low-cost behavior for the adopter with potential gain if the adoptee is a relative [West Eberhard, 1975]. Despite the small sample size, the variability of response to a solitary infant (i.e., adoption, temporary adoption, caretaking, or complete lack of interest) is intriguing. It appears that infant transfer between groups would be more successful in species which exhibit relatively high between-group relatedness, but that a specific adoption is contingent on the persistence of the infant and the permissiveness of the potential adopter.

CONCLUSIONS
1. Solitary infants must solicit care to receive care.
2. Response to solitary infants is variable and may involve long-term or temporary adoption, caretaking behaviors, mild interest, or no interest at all.
3. Adult females can nurse more than one infant at a time, and they may be increasing their inclusive fitness by solicitous care of their own offspring and others to whom they might be related.

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