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## A FAILED IMMIGRATION ATTEMPT BY A MOUSTACHED TAMARIN, *SAGUINUS MYSTAX*

Mojca Stojan-Dolar  
Camilo Flores Amasifuén  
Eckhard W. Heymann

### Introduction

Dispersal, i.e. leaving the natal group or home range and immigrating into a different group or new area, is a critical stage in the life of organisms and often associated with high risks of mortality (Pusey and Packer, 1987; Weisser, 2001). Successful dispersal and immigration into a new group do not only depend on the survival in the transitional phase

of leaving the old and arriving in a new group, but also on whether or not an individual becomes integrated into a new group. Depending on age, sex, dominance or reproductive position within a group, established group members may resist immigration attempts.

While in most primates, dispersal is mainly or exclusively by members of one sex (Pusey and Packer, 1987), the flexible mating system of tamarins – which includes polyandry and monogamy (Goldizen, 1988) – implies that both sexes may disperse. In fact, dispersal of both sexes has been recorded in several tamarin species (Goldizen et al., 1996; Savage et al., 1996; Löttker et al., 2004). However, the actual events surrounding immigrations are rarely directly observed. Here we report a failed immigration attempt into a group of moustached tamarins, *Saguinus mystax*, small cooperatively breeding primates, where both males and females in a group help to care for twin litter produced by a single breeding female.

### Group observation

The observation was made at the Estación Biológica Quebrada Blanco (EBQB) in north-eastern Peru (for details of the study site see Heymann, 1995) during a study on vigilance behaviour (Stojan-Dolar and Heymann, 2010a, b). The observed group consisted of an adult male, the breeding female and three offspring of different ages: another adult male, an adult female and a juvenile female. The group had lost an adult male, and two 2-month old infants about six weeks before the observed event. The male who disappeared was often observed to transport infants, as were the adult offspring who were still in the group. The group was usually associated with a group of seven saddle-back tamarins, *Leontocebus nigrifrons* (previously *Saguinus fuscicollis nigrifrons*). The group was one of three *S. mystax* study groups at EBQB regularly under observation since February 2006 by MSD. It was usually followed from the sleeping tree in the morning to the sleeping tree in the evening for six observation days per month. An observation block started on 21 February 2007.

On 21 February 2007, the *S. mystax* group spent notably more time in locomotion than usual. The *L. nigrifrons* individuals were not present during that day. At 1452 h, the group entered a sleeping tree. At this moment we realized the presence of an unknown adult male who was vocalizing from a distance of about 20 m from the sleeping tree. Two group members (who could not be unequivocally identified due to restricted visibility) rapidly exited and re-entered the sleeping tree two times but did not move towards the strange male. Tamarins usually do not exit the sleeping tree once all the group members have entered. At 1500 h, the unknown male moved away. At 1502 h, the group left the sleeping tree, and moved towards another sleeping tree which they entered at 1509 h. The unknown male returned at 1511 h and started vocalizing again. At 1514 h, the entire

group exited the sleeping tree and ran towards the strange male, who retreated slightly. There was a lot of vocalizing, but it was not possible to observe whether physical contact between the group members and the new male occurred. Group members were moving in different directions before coalescing again and re-entering the first sleeping site at 1524 h. The unknown male moved off and was not seen again, neither on this nor on the following days. The composition of the group did not change during the following 5 months when continuous observations of the group were stopped.

### Discussion

The failed immigration attempt is interesting for two reasons. First, immigrations appear to be more successful when newcomers fill a vacancy in a group after an individual has died, dispersed or disappeared. In the *S. mystax* population at EBQB, a new female successfully immigrated into a group after the death of the reproductive female (Löttker et al., 2004). She was initially met with some aggressive resistance but, became integrated into the group within two days. In *Leontopithecus rosalia*, 75% of successful immigration events were replacements of the breeding individual, where 5 out of 6 were males (Baker and Dietz, 1996). As the observed group had also recently lost an adult male, the group members could be expected to show less resistance to accept a newcomer. Second, in several mammal species the presence of helpers increases survival probability of offspring (Jennions and Macdonald, 1989; Clutton-Brock et al., 2001). In callitrichids the number of helpers in a group appears to increase reproductive success (Garber et al., 1984; Koenig, 1995; Culot et al., 2011). However, the observed group had 4 adults, which already exceeded the average for this population ( $2.5 \pm 0.7$  adults per group,  $n = 8$  groups, Löttker et al. 2004). The relative contribution of an additional helper may not offset increased male competition for access to the breeding female. By losing a group member, other individuals may have increased their fitness. This is in line with the notion that despite specific characteristics of the callitrichid cooperative mating system, immigration into groups with more helpers is more difficult (Schaffner and French, 1997).

Immigration is a rare event and observations are thus necessarily anecdotal. However, only through the accumulation of this kind of information can patterns eventually emerge that can provide insights into mechanisms of immigration.

**Mojca Stojan-Dolar**, Abteilung Verhaltensökologie & Soziobiologie, Deutsches Primatenzentrum, Kellnerweg 4, D-37077 Göttingen, Germany and Department of Biology, Biotechnical Faculty, University of Ljubljana, Jamnikarjeva 101, SI-1000 Ljubljana, Slovenia, E-mail: <mojca.stojan@arnes.si>, **Camilo Flores Amasifuén**, Estación Biológica Quebrada Blanco, Río Tahuayo, Loreto, Perú and **Eckhard W. Heymann**, Abteilung Verhaltensökologie &

Soziobiologie, Deutsches Primatenzentrum, Kellnerweg 4, D-37077 Göttingen, Germany.

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## BIOACOUSTICS OF THE BLACK-HEADED NIGHT MONKEY, *AOTUS NIGRICEPS*

William D. Helenbrook  
Leigh Preston  
Noah A. Linck  
Megan Quirk  
Jessica A. Suarez

### Introduction

Only three studies have assessed *Aotus* vocalizations (known as either owl or night monkeys). None of these studies have assessed the black-headed night monkey (*A. nigriceps*) found in southeastern Peru, northern Bolivia, and central-western Brazil, nor have they focused on bioacoustics of *Aotus* spp. in the wild. Of these three captive-based studies, 13 different call types have been described in *A. lemurinus* (Andrew 1963; Moynihan 1964) and *A. azarae* (Kantha et al. 2009). Most of these calls are distinct from one another; however, there are some inconsistencies in naming that need to be addressed, as described in Table 1. First, the Trill described by Andrew (1963) has similar structure and bandwidth to the Scream described by Moynihan (1964). Moynihan does describe a Low Trill which is distinct from the Trill in Andrew (1963), and the Low Trill described by Kantha et al. (2009) does not resemble structure, bandwidth, or call duration of the Trill in Andrew (1963) or the Low Trill in Moynihan (1964). Therefore, we suggest that the Trill in Andrew (1963) is structurally distinct from the Low Trill in Moynihan (1964), and the Low Trill in Kantha et al. (2009) appears to be a distinct call from the other two studies. Secondly, one of the representative Squeaks described by Andrew (1963) is very similar to the Gruff Grunt (Moynihan 1964). Each has numerous harmonics, a similar descending frequency across the exact call duration, and a very similar bandwidth. Therefore, the Gruff Grunt should be renamed Squeak, as it was previously described in Andrews (1963). Thirdly, the Squeak described by Moynihan (1964) is structurally similar to the Twitter described by Andrews (1963) and should be renamed. Fourth, neither the Long Scream nor the Short Scream described by Kantha et al. (2009) appear to be similar in structure, bandwidth, or duration to the Scream in Moynihan (1964) and should potentially be renamed. Fifth, the Moan described by Moynihan (1964) is not similar to the Moan in Kantha et al. (2009) in structure, bandwidth, or duration. The low frequency band is structurally similar to a variant Low Trill described by Moynihan 1964, though the quality of the spectrogram in Kantha et al. (2009) makes it difficult to confirm this possibility. And finally, the Gulp described by Kantha et al. (2009) is similar to the Gulp in Moynihan (1964); however, the bandwidth in the