Overmarking in a neotropical passerine bird: the Lance-tailed Manakin

Ari Degenhart, Dr. Pearl Rivers, Dr. Emily DuVal

Florida State University, Department of Biological Science

Introduction

Overmarking is a behavior involving one individual leaving a scent mark to cover the scent of another (Jordan et al., 2011). While well-studied in mammals, little is known about avian involvement in overmarking. To address this, we investigated the chemical signaling behavior of the Lance-tailed Manakin (*Chiroxiphia lanceolata*). Pairs of male Lance-tailed Manakins perform cooperative courtship displays on a perch, which they work together to maintain. We hypothesized that part of this maintenance might include overmarking the scents of other individuals, due to previous research in this system finding that the males responded to chemical changes on the perch (Rivers & DuVal, In Revision). To test this, we analyzed videos of males at the display perch and recorded their behavioral responses to the chemical changes. We broke down the different types of maintenance behaviors involving bill touches on the perch and recorded the frequency of bill touches for each individual male.

Methods

- Analyzed videos of display perch recorded in Panama by the DuVal Lab in 2019; scanned frame by frame using Movie Studios Platinum 13.0 to determine identifying color bands and bill touch behaviors
  - Bill touch behavior types: swipes (quick back and forth motion), wipes (bill wiped along length of perch), and pecks/bites
- Constructed four generalized linear models with negative binomial error distributions, which included:
  - social status of individual (alpha, beta, or juvenile)
  - type of group involved (solo alpha, solo beta, alpha-beta pair, mixed age groups)
  - one of the recorded behavior types (swipes, wipes, or pecks/bites) as the response variable for each
  - one comparing the frequencies of each type of bill touch

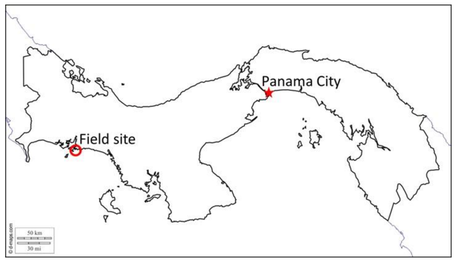
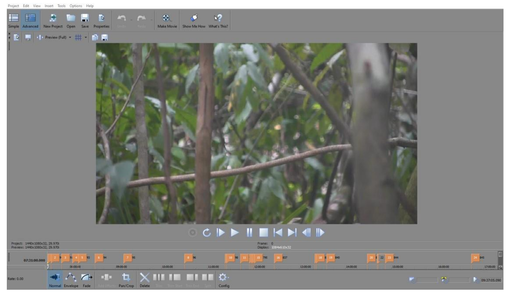


Figure 1. Location of the DuVal Lab field site where videos were recorded in 2019.

Results

Figure 2. (a) A pair of adult male Lance-tailed Manakins on a display perch; the left one is doing a bill touch. (b) A juvenile male Lance-tailed Manakin perched on a display perch.

Figure 3. A screenshot of the video analysis process done using Movie Studios Platinum 13.0. Bouts of activity involving maintenance and displays with no females present were previously flagged for analysis. We scanned bouts frame by frame, recorded the identity of each individual, flagged bill touches and their types, labelled by associated individual, and recorded count.



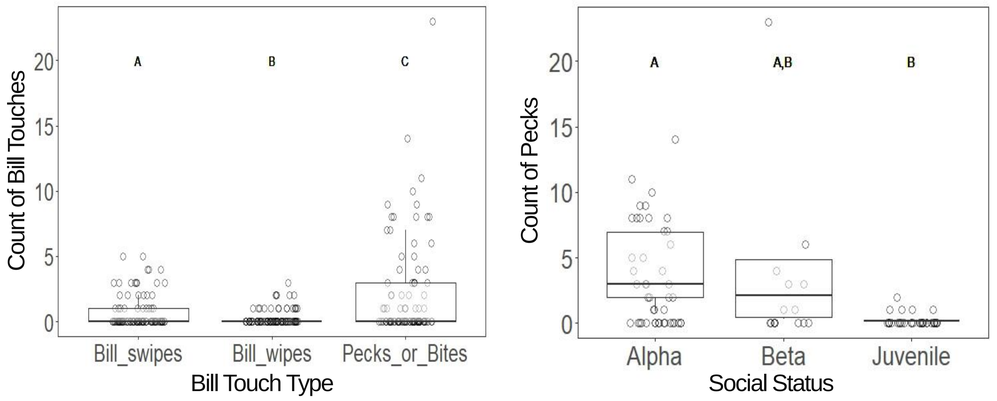


Figure 4. (a) There were significant differences in frequency among the three types of bill touches recorded ($\chi 2 = 38.01$, df = 2, p-value <0.0001). Pecks and bites were the most frequent type of bill touch recorded and occurred significantly more frequently than either bill wipes ($p < 0.0001$) or bill swipes ($p = 0.008$). (b) The number of pecks or bites performed by an individual was significantly predicted by individual social status ($\chi 2 = 9.64$, df = 2, p-value = 0.008). Alpha males pecked significantly more than juvenile males ($p = 0.007$), but there was not difference in pecking behavior between alphas and betas ($p = 0.56$) or between betas and juvenile males ($p = 0.52$). The type of group present at the display perch was not a significant predictor of pecks or bites ($\chi 2 = 7.63$, df = 3, p-value = 0.054).

The number of bill wipes was not related to either social status ($\chi 2 = 1.98$, df = 2, p-value = 0.37) or group type ($\chi 2 = 1.64$, df = 3, p-value = 0.65). Similarly, the number of bill swipes was not predicted by social status ($\chi 2 = 4.89$, df = 2, p-value = 0.09) nor group type ($\chi 2 = 2.62$, df = 3, p-value = 0.45).

Discussion

The data we analyzed shows pecking the display perch to be the most frequent behavior among adult male Lance-tailed Manakins, while swiping the perch to be the most frequent behavior among juvenile males (although not at a significant value, p-value = 0.09). While not at significant values, pecking was observed at a higher rate while either adult was alone at the perch than in the presence of other males, and juvenile males contributed the most to the counts of each bill touch type recorded during bouts where mixed groups were present at the display perch.

The data does not seem to suggest pecking is indicative of overmarking behavior; however, it may suggest some involvement of overmarking in bill wiping and swiping since these were observed at a higher rate by juveniles in the presence of other males, for which further data collection may yield significant values (the first site had far fewer juvenile visits relative to the second site, so juvenile data is less abundant). If overmarking is involved, then the observed trend of higher swiping and wiping behaviors by juvenile males relative to adult males (p-value = 0.09) follows a similar trend to that of overmarking studied in wild banded mongooses (Jordan et al., 2011).

Video analysis and data collection are still ongoing, and further research must be conducted for more definitive results.

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References

Jordan, N. R., Mwanguhya, F., Furrer, R. D., Kyabulima, S., Rüedi, P., & Cant, M. A. (2011). Scent marking in wild banded mongooses: 2. intrasexual overmarking and competition between males. Animal Behaviour, 81(1), 43–50. https://doi.org/10.1016/j.anbehav.2010.07.009

Rivers, P. R., & DuVal, E. H. (In Revision). Chemical Cues in the Mating Behavior of a Highly Polygynous Bird. Behavioral Ecology and Sociobiology.