Ketterson / Nolan Research Group Collection

This document is part of a collection that serves two purposes. First it is a public archive for data and documents resulting from evolutionary, ecological, and behavioral research conducted by the Ketterson-Nolan research group. The focus of the research is an abundant North American songbird, the dark-eyed junco, *Junco hyemalis*, and the primary sources of support have been the National Science Foundation and Indiana University. The research was conducted in collaboration with numerous colleagues and students, and the objective of this site is to preserve not only the published products of the research, but also to document the organization and people that led to the published findings. Second it is a repository for the works of Val Nolan Jr., who studied songbirds in addition to the junco: in particular the prairie warbler, *Dendroica discolor*. This site was originally compiled and organized by Eric Snajdr, Nicole Gerlach, and Ellen Ketterson.

Context Statement
This document was generated as part of a long-term biological research project on a songbird, the dark-eyed junco, conducted by the Ketterson/Nolan research group at Indiana University. For more information, please see IUScholarWorks (https://scholarworks.iu.edu/dspace/handle/2022/7911).

April 25, 2000

GOALS 2000
EXTENDED PHENOTYPE AND FEMALES

1. Extended phenotype: male neighbors

- Compare T-levels in control males with and without T-neighbor (Team??)

2. Extended phenotype: females

- Complete project on effect of male's treatment on movements by females when they are fertile by analyzing already collected data (Neudorf). **

- Compare females mated to T- and C-males with respect to cell-mediated (wing web swelling) and humoral immunity antibody titers to SRBC (Casto, Parker-Renga). **

- Collect plasma and feces from nest building and laying females to document hormone levels during laying (Team?).

- Compare effect of male's treatment on sex ratio of female's offspring. This requires bleeding nestlings when quite young, measuring survival during the fledgling stage, and measuring rate of return of male and female nestlings (Team, is this worth pursuing??)

We requested permission to capture 40 female dark-eyed juncos and 30 males dark-eyed juncos in the vicinity of Mountain Lake Biological Station (MLBS) between 25 April and 15 May 2000, prior to the time when eggs hatch. Males and females will be housed separately in aviaries at MLBS. Some females (n=10) will be treated with one 10 mm implant of testosterone, some with one 5 mm implant (n=10)(or the amounts could be 2mm and 5mm), and some will be controls with empty implants (n=20). We will observe (and videotape?) their behavior, collect a blood sample to ascertain that the implants worked, and compare their attractiveness to males in a round of mate choice trials using well established protocols (Enstrom et al. Anim. Behav. 1997, Hill et al. Behav. Ecol. 1999).

After having determined whether dose of T influences female attractiveness to males, we will then ask whether testosterone enhances attractiveness of males to T-treated females in the same way that it have been shown to enhance male attractiveness to control females (Enstrom et al. Anim.Behav. 1997). This will require that we treat half of the males (n=15) with two 10mm implants of T and half (n=15) with empty implants and then conduct mate choice trials to compare male attractiveness to the females that have and have not been treated with T.

Work will be carried out at MLBS by Diane Neudorf, a former postdoctoral student and now Assistant Professor of Biology at Sam Houston University, Joel McGlothlin (an NSF REU-supported undergraduate from Vanderbilt University who has been selected for the REU program at Mountain Lake), Val Nolan, and Ellen Ketterson.

- dose dependent behavioral responses, e.g., threshold for song, relationship to song rate, also relationship to cort, food consumption, etc.
- dominance interactions with other females. Bigger flocks? Bigger aviaries?

Give a male direct access to a T- and a C-female in one of our side rooms and see which female he directs more courtship too (compare to zebra finch paper and egg in relation to courtship???)

3. Extended phenotype: offspring

- Compare offspring of T- and C-males with respect to cell-mediated and humoral immunity. For cell-mediated immunity, measure response (wing-web swelling) to a foreign antigen PHA; for humoral immunity, measure ability of females to form antibodies against sheep red blood cells (SRBC) (Casto, Paker-Renga) **

- Compare nestling mouth coloration as an indicator of relative condition as a possible signal of nestling hunger of T- and C-nestlings (Clotfelter, Schubert). **

- Complete manuscript reporting an earlier project on behavior of fed and deprived nestlings from T- and C-nests (Ketterson). **

4. Constraints: the female project

- Assess how T affects female aggressiveness and attractiveness, beginning with measurement of the dose response of females to T (e.g., how long after treatment do females begin to sing? Do they sing more with bigger dose? Are songs of similar structure as male long range song? Are T-females more aggressive?). As a pilot project, begin to assess whether T interrupts incubation by free-living females? Alters the behavior of the mates of females)(Neudorf, McGlothlin). **