# 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).

May 15, 1995

*Team Junco 95*: Kris Bruner, Dave Enstrom, Jenniufer Hill, Anne Houtman, Steve Hudman, Tracey Kast, Sharon Lynn, Ellen Ketterson, Val Nolan Jr., Michele Rosenshield, EricSnajdr, Charles Ziegenfus.

**In a sentence, our goal is to continue our efforts to quantify the effects of testosterone on the male phenotype (behavior and physiology) and to relate any differences found to Darwinian Fitness (survival and reproduction).**

Testosterone and phenotypic traits related to adult survival in dark-eyed juncos: corticosterone, blood, muscle mass, and parasites.

*Background*

Based on the literature and several observations on juncos, there are reasons to predict that elevated testosterone might initially enhance the condition of male juncos, but that with prolonged exposure, it would have detrimental effects if it influenced the immune system and enhanced susceptibility to disease organisms.

Literature: Hamilton and Zuk, Ligon et al., Zuk et al., Zuk, Folstad and Karter, but see Hart, Moore, etc. for cautions.

T may affect immune system, either directly or indirectly via corticosterone, see literature.

T-male juncos have elevated corticosterone which could influence immune status. They also have higher corticosteroid binding protein

T-males had higher leukocyte counts than controls in the summer of 94, meaning not clear.

T-males sometimes differ in their hematocrit readings, sometimes not

*Objectives for 95:*

1. With respect to cort, measure response to handling stress in T- and C-males (bleed minimum 10 males of each treatment, do females too for comparison, catch at fledging or when seen entering nets of traps).

2. Measure heterophil to lymphocyte ratios from blood smears and possibly using hemocytometer, early and late.

3. Measure hematocrit from blood samples, early and late.

3. Measure field metabolic rate (???).

4. Compare muscle mass (visual inspection), early and late.

5. Measure hematozoa in blood from blood smears.

6. Identify coccideal species from feces and learn about relative incidence of infection.

7. Any differences in avian foot pox?

Testosterone and phenotypic traits related to reproductive success in dark-eyed juncos: mate choice, sperm reserves, copulation frequency and refilling rate, behavior towards nest and offspring

*Background*

Testosterone apparently enhances mating effort at the cost of parental effort. T-males have larger home ranges, are more attractive to captive females, sing more both in the wild and in captivity. On the other hand, they feed their offspring less frequently and they are less likely to discover a stuffed nest predator placed near their nests.

*Objectives 95:*

1. Relative importance of plumage traits and T-dependent behavior to female mate choice (JAH).

2. Temporal variation in sperm reserves and their relation to copulatory frequency (TK).

3. Behavior at the nest - allocation of time to parental behavior.

a. male present during incubation? perform systematic nest checks,

b. Inter-feeding intervals and load size differ with treatment? nest watches and food provisioning,

c. nature of nestling vocalizations by young of T- and C-males, e.g. louder in young of T-males?

<u>Testosterone and fitness: rates of EPFs in the all-T study area on WVN; return rates of adults, juveniles, and nestlings; special attention to the males returning from last year.</u>

1. Are EPFs more frequent in a neighborhood of all T-males?

2. Are the males that have been treated with T for more than one year less likely to return or do they show greater signs of aging, e.g., avian foot pox?

3. Are offspring of T- and C-males equally likely to return to breed on the study area? (map all adults)

*Timing*

Implanting

Now to May 15th-20th continue to run nets and traps and to capture targeted males that are not implanted

Evening catching

Now to June 1st, catch birds to bleed for smears and hematocrit and to hold overnight to collect feces.

Mornings

catch males at fledging for sperm and to do cort stress tests (or smears and hematocrit if conditions not right for stress test)

catch males at traps for stress tests

observe and record at nests with nestlings

mate choice trials

trials re copulatory frequency

Afternoons

Map, find nests, handle data, band and bleed young or weigh, do systematic nest checks during incubation to see if male present

Refilling rates for sperm reserves (?).