# 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).

IMPLANT SCHEME, from 1992, updated and modified April 10, 1994

## *1. Warnings*

*A basic warning*. We do not want our manipulations of the birds to interfere with our measurements of paternity. Once we think that the females may be fertile, it is quite important to **MINIMIZE THE LENGTH OF TIME** the birds remain in traps and/or are kept off territory. This will become more and more important as the season progresses. We do not want neighbors inseminating females whose mates are sitting in traps! We also don't want neighbors inseminating females because the territorial male doesn't feel well as a result of his having been bled or implanted. We need to employ sound judgment *every* time we handle a bird AND, probably even more importantly, we need to keep complete notes about what we do and when we do it every time we interfere with the birds' lives.

An important consequence of this need to prevent experimenter-induced EPFs is to **MINIMIZE THE USE OF BAIT.** This too will call for sound judgement. We need to catch the birds, but we don't want to alter their behavior with our bait (frequency of EPFs, time of clutch initiation). This is practically an impossible task - all I can do is stress the importance of using our heads. One way to think about it: if you are tempted to leave more bait than is necessary, because it will save you from having to come back to bait tomorrow, don't leave more bait, come back tomorrow.

## 2. *Implant scheme*

Concerns that must be met when determining an implant scheme include (1) how we should structure the experimental study area in terms of the spatial juxtaposition of T- and C-males, (2) how to treat males that were also treated in 1993, and (3) which areas to set aside as control-control areas without compromising sample sizes in the experimental portions of the study area.

### (a) Spatial juxtaposition of T- and C-males

To test whether experimentally modified phenotypes have higher or lower fitness than controls, we might have chosen to have areas of just controls, just T-males, and areas where the treatments were evenly distributed, so that the treatments could "compete" against one another. That way we would have been able to quantify how C-males compare to one another, how T-males

compare to one another, and how the T-males compare with C-males. [It still would certainly be a good idea to enlist the services of a modeller in order to assess the effect of varying the proportions of T- and C-males on the relative success of the two phenotypes.]

The reality is that given the heterogeneity of our study area and the number of juncos available to us, we cannot have three types of study areas. Furthermore, we have to treat some of the males before we know where they will be settling to breed, *and* we need to take a structured approach to the treatment of returning males. Consequently, we have relatively little control over the treatment groups of neighbors.

This is really a serious problem, and one that we have given a lot of attention to in the past, but it is not one that we have solved to our total satisfaction. When we assign treatment at random, as we have always done, blocking by age, sub-portion of the study area, and capture site, we always end up with little clusters of males that are biased toward one treatment or the other, but are not pure colonies of either one.

Thus for young males, i.e., first-year birds that have never had territories before, we originally assigned treatment at random for each capture site within each portion of the study area (Hotel, WVS between WPR and the Hotel, WVS between the station and WPR, WPR, The Station, Jungle Trail, made up a list and flipped a coin to determine treatment for groups of 5 or 10). This was the method in 89, 90, and 91. However we then decided that we would be even more likely to get an even distribution of males according to treatment if we blocked by smaller areas (traditional capture sites) and alternated treatments, so we have done that from 92 on.

(b) treatment of birds that have not been treated before:

We will treat *first-year males* as follows:

Please set up a separate data sheet for each portion of the study area (WVS, WPR, Hotel, Station, WVN, JT). Then for each sub-location within the area, add capture sites to the data sheet as we catch birds at the sites. As we catch and treat birds, we will assign them T- and C- alternately within each capture location. The first bird in a new capture location will receive the opposite treatment as the first bird in the location that preceded it. Some capture sites will generate lots of captures, some very few.

So as examples, if first new male caught on WVS is at the boat house, then flip a coin to decide if it is T or C. The next bird at that site will get the opposite treatment. The first bird at the next site at which a bird is caught, e.g., WVS tag 56, will get the opposite treatment as the first bird caught at the boat house. Within tag 56 and the boathouse, you alternate. For each new portion of the study area, you flip to decide how to begin.

(c) Returning adult males that were treated in 1993

For adult males that bred on the study area last year, we will give them the same treatment from the one they received in 1993. Thus for old adult males, look them up in the implant log from 1993 (or the computer). Note their treatment in 93, and give them the opposite. Record treatment on the summary list.

One problem that might come up is birds that were treated in 1993 whose implants were not removed in 1993. See if the implants are still present and remove them. Put them is a labelled container (bag). I ask that you make careful notes about the condition of the birds' molt. This is especially important if they were T-males in 1993. Please take pictures!! If the returning male was a T-male in 1993 and we did NOT take the implant out, then please do not make him a T-male again. Make an exception for such birds and make them controls. This is out of kindness to them.

(d) Old adults that are unbanded or that are banded but did not breed on the study area in 1993.

Please do not implant these birds unless you catch them twice after a gap of one week. In that case, implant them. This is hard to keep track of, but it also will not involve very many birds. One way to do it is to make a sheet for them in the implant log, so when you look them up you can tell whether they have already been caught and how much time has passed since they were caught.

(3) *Relative size of experimental and control-control areas.*

I would like to implant on WVN to War Spur and on WPR but not all the way to the end. Let's go to the point where the Jungle Trail leaves WPR. Bald Knob, 714, and the Golf Course can serve as control-control areas.