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, most recently updated and modified April 18, 1995

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.

update 95: As we have found this to be a really early spring, we cannot hope to preclude experimenter-induced epfs. There are too many females with nests and brood patches already. But we need (1) note all recaptures of implanted birds in the implant logs so we know which males have been held off territory. And we need to work as quickly as we can without getting too stressed out.

An important consequence of this need to prevent experimenter-induced EPFs is to **MINIMIZE THE USE OF BAIT**. This too will call for sound judgment. 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 (a) how we should structure the experimental study area in terms of the spatial juxtaposition of T- and C-males, (b) how to treat males that were also treated in 1993 and 1994, (c) which areas to set aside as control-control areas without compromising sample sizes in the experimental portions of the study area, and (d) whether to establish an all T 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. The reality is that given the heterogeneity of our study area and the number of juncos available to us, we don't have the resources to create three types of study areas. To meet this problem I hope to enlist the services of a modeller to assess the effect of varying the proportions of T- and C-males on the relative success of the two phenotypes.

As it is, we have a mix of T- and C-males, and we attempt to distribute them at random across the study area. To do this, we block by age, subportion of the study area, and capture site. One problem is that we ordinarily treat some males before we know where they will settle to breed. Consequently, we have less control than we would like over who settles next to whom.

The procedure for young males, i.e., first-year birds that have never had territories before, was originally to assign 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 only) and alternated treatments, so we have done that from 92 on.

For old males that had been treated in earlier years, our first method was to alternate treatment between years: C in year 1, T in year 2, C in year 3, or vice-versa. Beginning in 1993, we decided to give any bird that returned the same treatment in years 2 or 3 that it had received the year before. Thus we now have birds on the study area that have been C- or T-males three years running.

(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.

note: we repeated this in 1995

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 1994

For adult males that bred on the study area last year, we will give them the same treatment from the one they received in 1994. 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.

A problem that will come up occasionally is a bird that was treated in 1994 and whose implants were not removed. See if the implants are still present and remove them. Put them is a labelled container (bag). Make careful notes about the condition of the birds' molt. This is especially important if they were T-males in 1994. Please take pictures!!

In 1994 my instructions were that if a returning male was a T-male in 1993 and we had NOT taken his implants out, then we should not make him a T-male again as a kindness to them. This year we have met only one such bird and I did implant him again. The main reason is that we are otherwise likely to end up with too few T-males on the study area.

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

Please do not implant these birds unless you catch them twice after a gap of one week. In that case, implant them. Another exception is if they were caught in late summer on the study area suggesting that their territories are really close, so we might find their nests this year.

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*.

In 1994 we implants on WVN to War Spur (but not very many birds), 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 served as control-control areas.

In 1995 we are implanting all the way to the end of WPR. 714 will be control-control. I would like to do WVN as an all T-study area. This is a first, but I think it is worth a try.