

## 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>).

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## IMPLANT SCHEME, updated and modified April 18, 1998

### 1. *Warning*

*A basic warning.* We do not want our manipulations of the birds to interfere with our measurements of paternity. Once we think females may be fertile, it becomes very 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 or whose mates are feeling woozy as a result of having been bled or implanted.

We can't eliminate the risk entirely, so we need to employ sound judgment *every* time we handle a bird AND, perhaps even more importantly, we need to keep complete notes about each interference with the birds' lives in the implant logs and later in the nest logs.

Experimenter-induced EPFs can also be kept to a minimum if we **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 any more than we can help it. 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 the day after tomorrow, don't leave more bait, come back sooner.

### 2. *Implant scheme:*

Concerns that were addressed in determining this implant scheme included (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, 1994, 1995, 1996, and 1997, (c) which areas to set aside as control areas or sources of captives without compromising sample sizes in the experimental portions of the study area, and (d) where to establish an all-T and an all-C 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 have not felt up until now that we had the resources to create three types of study areas.

We elected to have an equal 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, sub-portion of the study area, and capture site. One problem is that we treat 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 beyond the stream crossing to the straight away, The Station, Jungle Trail). To do this we 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 were treated in earlier years, our first method (1987-1993) was to alternate treatment between years: C in year 1, T in year 2, C in year 3, or vice-versa. Beginning in 1994, we decided to give any bird that returned the same treatment in subsequent years that it had received the year before (check this). Thus we now have birds on the study area that potentially have been C- or T-males 4 years running. The reason for the change is this. The first method allowed us to treat males as independent statistical events because their treatment differed between years, but it left no opportunity to assess whether repeated exposure to T might affect lifetime reproductive success. Thus we made the change.

#### (b) First-year males (A,Y)

Please set up a separate data sheet for each portion of the study area: WVS between WPR and hotel, WVS between station (green tank) and WPR, WPR before stream crossing, Hotel, Station, WVN (beyond green tank), and JT. Then for each sub-location within the area, note capture sites. As we catch and treat birds, we will flip to determine the treatment of the first bird caught at a location (T or C) whose treatment was not pre-determined because it was implanted last year. Thereafter we will assign T- and C- alternately to new birds within each capture location. 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 the boathouse (that was not implanted in an earlier year) will get the opposite treatment. The kind of implant to be given the first bird caught at the next site, e.g., WVS tag 56, will also be determined at random by tossing a coin. Thereafter, within tag 56 and the boathouse, you alternate. For each new capture site, you flip to decide how to begin.

(c) Returning adult males that were treated in 1997

For adult males that bred on the study area last year, we will give them the same treatment as the one they received in 1997. Thus for old adult males, look them up in the implant log from 1996 (or the computer).

A problem that will come up occasionally is a bird that was treated in 1997 and whose implants were not removed. See if the implants are still present and remove them. Put them in a labelled container (bag). Make careful notes about the condition of the birds' molt(!) This is especially important if they were T-males in 1997. Please take pictures and make a photographic record!!

Another category of exceptions includes males that were implanted in an earlier year but not in 1997. If a bird was implanted in 96 but not in 97, that means we missed it last year. It may never have been caught or it may have turned up after the dates when we quit implanting and so become a control-control (unimplanted). If it was implanted as T in 96 and not followed in 97, make it a T in 98. If it was implanted as T in 96 and a control-control in 97, make it a C. If it was implanted as C in 96, then make it a C in 97.

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

Please do not implant unbanded old adults birds until you catch them twice after a gap of at least several days, ideally one week. We don't implant them at first capture because they tend to disperse to their breeding sites of earlier years, which are usually off the study area. Thus we are unable to remove their implants, which is bad for their health. On the other hand, if they show themselves to be living close by being caught repeatedly, we should go ahead and implant them. After April 25 you should simply implant them at first capture.

Some already banded adults were caught on the study area for the first time late last summer, suggesting that their territories are really close to our study site but not on it. Treat birds like this similarly to the birds caught only in early spring. That is, implant them only if they are caught more than once after a gap.

This sounds hard to keep track of, but it involves only a few birds. To determine which category a banded adult bird is in, first look it up in the 97 implant log. That will tell you whether it was caught in 97 and whether we implanted it. If that does not work, then look for it in the "All birds list." This should help you determine its history.

Even if you do not implant a bird, please enter it onto an implant sheet and note why you did not implant it. This will allow you, if you recapture the bird, to determine easily whether it has already been caught and also how much time has passed since it was caught.

Another category is old adult birds banded as juvs but that we did not implant in an earlier year. Treat birds like these the same way you treat unbanded AO males. Require that they be caught twice after a gap, unless it's after April 25, in which case you should implant them.

(e) Targeted males

For males caught by targeting, note location and compare it to the two closest sites where nets and traps are located. Flip a coin. If it's heads give the birds the treatment that would be due next for the location closer to the station. If it is tails, give it the treatment that is due next for the location that is farther from the station. Be sure to note having done this on the list where we record implant order.

(f) Relative size of experimental and control-control areas.

In 1994 we implanted on WVN to War Spur (but not very many birds), and on WPR (not all the way to the end but to the point where the Jungle Trail leaves WPR). Bald Knob, 714, and the Golf Course served as control-control areas. In 1995, we implanted all the way to the end of WPR. 714 was control-control, and WVN was an all T-study area. In 1996, WVN from the green tank North to War Spur was an all T area; 714, the golf course, and Bald Knob were again control-control, and we mixed treatments on WVN/WVS from the green tank to south of the hotel to the power cut, jungle trail, WPR to just beyond where JT

cuts off (to the start of the straight away that leads to the second gate, but not to the second gate), Dolingers, and the Hotel. We did in 1997 as we had in 1996. In 1998 we will do as in 96 and 97 except I would like to mix implants on the lower reaches of Bald Knob Road and Golf Course Road and the areas just south of the hotel. I think would also like us to implant the birds along 714, control only, and I would like to extend the T-T study area further north of War Spur to increase the size of the group.