

Factors Influencing Meadowlark Nest Site Selection

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ABSTRACT

Meadowlarks nest in grasslands throughout the plains states and are not adapting well to the diminishing habitat by nesting in what is most common. Advances in farming and crops coupled with general loss of preferred nesting habitat have these birds on the decline. Recognizing the "ideal" nesting sites for these birds can help in preserving them. Geographical location, food availability, possibility of flood, past disturbance, and plant species composition are taken into account when choosing a nest site. Undisturbed sites would likely hold more insects, have a more "natural" plant species composition, and also harbor more nesting birds (Alcorn, 1991). Determining which factors matter most can give us an index of fitness for meadowlark nesting sites.

INTRODUCTION

Meadowlarks nest throughout the southern plains states in grasses anywhere from ankle-deep to several feet tall. Kansas hosts both the Eastern meadowlark (*Sturnella magna*) and the Western meadowlark (*Sturnella neglecta*) with ranges overlapping and some possible hybridization (Johnsgard, 1979). Both species were chosen for this study because their nesting habits are very similar and field identification between the two species relies mainly on song and is therefore very difficult (Thompson and Ely, 1992). As a general rule, the Eastern prefers shorter grasses than the Western, but individual preferences and the variations of types of grasslands, means that both species commonly nest in the same field (Johnston, 1964).

The male will start many nests during the courtship and mating time. These are domed nests of coarse grass lined with finer grasses and some feathers placed in a natural or scraped depression. Meadowlarks are usually monogamous (Johnsgard, 1979), but sometimes one male will mate with two or three females. After mating, the female chooses one of the started nests and settles in, laying 3-7 cream-colored, brown-speckled eggs during late May and early June (Lanyon, 1994). The male will tend the female on the nest during incubation which lasts 13 to 15 days. If the first clutch of eggs is destroyed, or the conditions are favorable, a second clutch may be laid. The young are altricial (born without feathers and in a very helpless state), and fledge in about two weeks (Alcorn, 1991).

Destruction of grassland habitat from a century of clearing the land for farming and land development has decreased the frequency of these birds in the United States. Implementation of the Conservation Reserve Program and a better understanding of natural resources has helped in recent years (Hays and Farmer, 1991). The more we know about these birds' nesting habits and habitat needs, the better we can understand how to manage for them.

I proposed to determine a difference in meadowlark nesting densities and locations comparing elevation, plant composition, insect populations, and soil moisture. The study site has been in the Conservation Reserve Program for nine years (Pesch, 1995), and the control site is still in native prairie vegetation with little past

disturbance (Southern Pacific Railroad, 1995). The first site is slightly flooded in very wet years, and the control site doesn't tend to hold water.

Correlating environmental variables with nesting densities and locations can help determine what is best for managing meadowlarks and their preferences in nesting sites (Granfors, 1993). The vegetation usually differs in places where flooding is prevalent, but there are places on my study sight where the occasional flooding is too brief to kill the grasses, insect populations or otherwise significantly disturb the characteristics of common meadowlark nesting sites.

MATERIALS AND METHODS

A portion of SE 1/4 of Section 21-Township 19S-Range 4W was used as the test site. This is part of the McPherson Valley Wetlands complex and has been enrolled in the CRP program for eight years. The area is predominated by big and little bluestem (*Andropogon*), switchgrasses (*Panicum*), some Indiangrass (*Sorghastrum*), dropseed and few herbaceous plants. This area is on the edge of a historic wetlands-to-upland transition area.

The control site was a strip of relatively undisturbed native prairie approximately 40 meters by 1000 meters in N 1/2 of Section 24-Township 19S-Range 3W. The vegetation here is similar to the test site, but there are more herbaceous plants and the plants don't appear as densely populated.

Nest Location: Two all terrain vehicles (ATVs) were used to pull a 50 foot chain/rope drag between them. Two people walked along behind the drag to mark the possible nest sites with wire flags where meadowlarks flush. Since both sexes and species of meadowlarks are very similar and not readily identifiable in flight, any and all meadowlarks were flagged. After this initial locating procedure, I would locate the nests near the flags and mark the found nests with different colored flags for location and measurements later.

Elevation: The comparative elevation was measured at each nest from a known elevation on the mile road adjacent to the test site. The elevation was not measured in the control site.

Plant Population Composition: The plant population composition of the test and control sites would be determined in one square meter superimposed over the nest. A plant species composition was determined in each test site in three random 1m² quadrats.

Insect Populations: Insect populations were sampled in the test and control sites, using a simple net-sweep method. A 16 inch net on a 4 foot handle was used to sweep the vegetation taking equal sweeps at equal distances at each site. The insects were killed by spraying them with 70% ethyl alcohol and identified in the lab.

Soil moisture: Soil moisture was determined by collecting soil samples from each site with a 1 inch diameter probe from the surface to 8 inches deep into the soil. The samples were taken to the lab and weighed in their sealed collection bags. The samples in their bags were dried in a 105 degree celcius oven for 60 hours. The dried samples were measured and the percent of moisture by weight was determined. Generalized soil types are known for the area, and crude soil typing was done on the samples.

RESULTS

The results I obtained on the nesting site selection is not conclusive because I was unable to efficiently find any meadowlark nests in either the test or control sites. Observations before the start of my study indicated that there were many birds in the area, but pin-pointing their nests during the relatively short time they are on them proved to be a problem. Domes of coarse grass are built up over the nests, and I would assume that the nesting birds just froze on the nests, hiding from the chain drag rather than flying. I added more weight to the drag hoping that I could find an optimum weight that would disturb the birds enough to make them fly, but not too heavy as to destroy the nests. A propane scare cannon and an air horn were used in an attempt to scare the birds by noise. Many attempts were made with the altered chain drag, horn, and the cannon, but nothing worked. Typical spring weather and the fact

Table 1. Soil Moisture in Test Site.

Sample #	Comparative Elevation From Parking Lot	Soil Moisture Percentage	Soil Type
1	-9"	20.17	GO ^a
2	-5"	17.10	GO
3	+3"	16.39	GO
4	+5"	17.46	GO
5	+16"	14.28	LA ^b
6	+23"	11.66	LA
7	+20"	16.76	LA
AVG	7.57"	16.26	

^aGoessel silty clay; slow permeability, dark grey color, holds water well.

^bLadysmith silty clay loam; slow permeability, not as slow as Goessel, dries faster and has better run-off than Goessel (Rott, 1983).

that the birds are on the nest only about two weeks left me with nothing to measure.

The other factors in this study were still measured. The soil moisture in the test site was taken along a transect heading due north from the southern edge of the site. The ground has a slight slope from the south to the north of approximately +2 feet in the 1/4 mile being studied. Table 1 shows that soil moisture here was found to increase conversely in relation to elevation.

The soil samples in the control site were taken along the length of the narrow study site. No elevation measurements were taken to compare with the soil moisture. The soil moisture here was found to be very similar to the test site. There was less difference between the averages of the two sites(1.63%) than variations within sites. The soil type was different in the control, but not drastically. The only obvious gross differences between the soil types were color and clay content.

The insect sweeps were done in hopes of finding more meadowlark food in the same place I would find more nesting birds. The test site sample showed a little more diversity than the control site with 5 and 4 different types of insects respectively. The control had three grasshoppers as opposed to one in the test site. Of the insects gathered, grasshoppers are one of the meadowlarks' preferred foods, but they have been known to eat just about anything(Lanyon, 1994).

DISCUSSION

Nest density was expected to be less in the regions where flooding is possible and conditions for nesting like food and vegetation are less favorable. The limits of this study were the mere size needed to generalize about the fit of a habitat for nesting meadowlarks. The determination of elevation and associated flood susceptibility verses nesting location and density may also reflect the differences of vegetation and insect life in these areas. The site may not be much different from a guaranteed dry site, but it takes very little flooding to destroy a nest of eggs or young.

The methods of locating the meadowlarks were altered many times in attempts to find them effectively. Propane scare cannons, air horns and added weight to the chain didn't work either. The meadowlark nests are very well camouflaged and built up to hide the mother and her eggs. I feel that the meadowlarks just hid as

Table 2. Soil Moisture from Control

Sample #	Soil Moisture Percentage	Soil Type
1	20.31	CR ^a
2	14.90	CR
3	14.51	CR
4	16.40	CR
AVG	16.53	

^aCrete silty loam; slow permeability, available water capacity high.

the drag passed over them. An ideal method that would scare the birds, yet not damage the eggs was not found.

The differences in the two sites was noted on other parameters. Differences in average soil moisture were only .27% and vegetation was found to be very similar. Insect populations differed only slightly with the control site having more favorable food found in my test. This insect population test was too small to get any significant results.

This project was very time sensitive and I ran out of time for finding the meadowlarks on nests. I can say that I saw more around the test site than the control site when scouting out the areas and planning my project. Hearing that even experienced ornithologists with small armies of students have problems locating meadowlark nests came a little too late.

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