Grassland Bird Productivity Study Progress Report-

Prairie Ridge State Natural Area

Wildlife Preservation Fund

Large Grant - 1998

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Activity Summary. From April through July of 1998 our research group has monitored the success of over 450 grassland bird nests, including 124 Eastern Meadowlark and 130 Dickcissel nests at Prairie Ridge State Natural Area, Jasper County, Illinois. These data represent the third consecutive year of grassland bird nest success monitoring at Prairie Ridge. Adult female Eastern Meadowlarks and Dickcissels were collared with radio transmitters and/or color banded to monitor seasonal nesting effort. Both species appear to be very persistent renesting species. Juvenile Eastern Meadowlarks were also radio-tagged to document survival and dispersal. Mortality within 1 week of fledging was high (65%). However, movements for up to three weeks post-fledging were typically less than 200 m.

Methods.

Nest Monitoring. Nests of Eastern Meadowlarks were located by foot searches of 2 to 5 people walking through grasslands to flush incubating and brooding females off of nests. Rarely, nests were located (in all stages) without flushing a female from the nest area. Early in the season (prior to mid-May), a 20 m rope was occasionally used by dragging it through thin and/or shorter grass cover to flush incubating or brooding females. Dickcissel nests, likewise, were located by foot searches to flush incubating or brooding females. Much more frequently, nests without an adult present (in all stages) were visually located in the vegetation. Also, female Dickcissels carrying nesting material, food for nestlings, or giving a sharp alarm *chip* (often indicating a nest in the incubation or laying stage) were observed from a distance (typically 50-100 m) and followed to their

nests. These searches also resulted in the location of nests of other species including Red-winged Blackbirds, Field, Sparrows, and Grasshopper Sparrows. When nests were located, a marker flag was placed 10 m north of the nest bowl and indicated on field maps to facilitate relocation. Nests were placed on a rotational check so as to be monitored twice per week. Nest searches and monitoring were suspended during periods of inclement weather (heavy dew, precipitation, very cold temperatures, *etc.*) to minimize exposure of eggs and nestlings and avoid abandonment of nests. At each nest check, number of eggs/nestlings present, behavior/presence of adults, approximate age of nestlings, and nest condition (if inactive) were noted.

Marking and Following Adult and Juvenile Birds. Adult Eastern Meadowlark and Dickcissel females were captured off of nests during incubation or brooding by flushing them into 12 x 4 m nylon mist nets. The birds were removed immediately, banded with U.S. Fish and Wildlife Service permanent metal leg bands and a unique combination of colored plastic leg bands, weighed and measured. Dickcissels' tails were marked with permanent ink markers to allow identification at a distance in the field (Note: this mark was lost within 60 days with the normal annual molting of the tail feathers in mid-summer). Adult Eastern Meadowlarks were given a collar-type radio-transmitter (see Fig. 1). Transmitters weighed 1.5 to 2.0 g, or about only 2% of the bird's body weight. Juvenile Eastern Meadowlarks were banded like the adults, and fitted with a harness-type radio-transmitter (Fig. 2), which looped under the bird's legs with the radio resting on the synsacrum (lower back). These transmitters were more

time consuming to put on (less concerning for a nestling versus an incubating female) but allowed for unrestricted growth of the nestling. These harnesses weighed 0.9 to 1.3 g, or about 3% of the fledgling's body weight. Marked Dickcissels were visually followed twice per week for as long as they could be located within the study area; Eastern Meadowlark adults were followed twice per week when nesting (concurrent with nest checking) and once or twice per week between successive nest attempts. Juveniles with radio-transmitters were tracked twice per week until mortality of the bird or radio (60 to 90 days) occurred.

Results.

Nesting Success. A total of 124 Eastern Meadowlarks and 130 Dickcissel nests were monitored. Percent nests fledging young was 42% for Dickcissels and 38% for Eastern Meadowlarks (daily survival rates calculated for 1996 and 1997 are a more conservative and much more accurate measure of success than % nests fledging and will soon be available for 1998). Successful Eastern Meadowlark nests fledged an average of 3.3 young; successful Dickcissel nests fledged an average of 3.0 young.

Abandonment rates were similar to rate observed on previous years (4% in Dickcissels and 8% in Eastern Meadowlarks). Most abandoned Eastern Meadowlark nests were from April when cold temperatures and/or heavy rainfall may have contributed to nest abandonment.

Record cold temperatures, accompanied with rain showers from 4-9 June, were timed with the early peak of nest hatches for Dickcissels. Daily nest losses

in incubating clutches and the very earliest clutches with young over 5 days old were normal (about 5 % daily); however, just over 70% of nests hatching in this period or with naked nestlings just a few days old experienced partial or complete brood losses.

Renesting/Seasonal Fecundity. Weather conditions in April, May and June were poor in Jasper County, with near-record rainfall each month. However, we were able to capture and radio-tag 15 adult female Eastern Meadowlarks. Five of these transmitters failed or were lost (aerial searches failed to detect these signals within a 15-mile radius). All other transmitters were relocated after having been removed by the birds. Through intensive recapture efforts, we did follow 7 Eastern Meadowlarks between successive nest attempts. Six banded Dickcissel females were followed between nesting attempts; others apparently emigrated from the study area before nesting or as soon as nest depredation occurred. Given the observed dates of recapture/observation, known duration of multiple nesting attempts and calculated time between successive nests (time of locating a new nest site, breeding, and nest building between failure date of previous nest and first egg laid in next nest attempt), we estimated that adult female Eastern Meadowlarks nested an average of 3.4 times per season (mid-April to early-July) and fledged an average of 3.6 young. Dickcissel females were estimated to have nested an average of 2.8 times per season (mid-May to late-July) and fledged an average of about 2.8 young.

Juvenile Survival and Dispersal. Radio transmitters were fitted to the fledglings in 5 nests in June and July. Two-thirds (66%) of the juveniles died within one

week of fledging; however, over the following 30 days, no mortality was observed. Surviving juveniles were observed making flights of several hundred meters, but were located within about 200 m of the nest site on successive dates.

Discussion.

While nesting success in 1998 is not yet directly comparable to 1996 or 1997 data at this point, success in 1998 appears intermediate to 1996 (a fair nest success year) and 1997 (a very good nest success year). Nest survival rates of 95% per day or better are believed to be adequate to allow for population growth. Nest success in 1997 and 1998 was in this range; reproduction in 1996 likely was inadequate to maintain population levels.

The observed weather-related nest mortality of Dickcissels was an unusual phenomenon. Female Dickcissels receive no assistance from the males in feeding young until after they fledge. Females with young nestlings were required to brood almost continuously through this period because of cold and rain, yet the nestlings also required frequent feedings for normal growth and to avoid starvation. Apparently, females often were not able to meet both of these demands due to the extreme weather situation.

Also enforceable were the problems encountered with the adult female Eastern Meadowlark radio transmitter design. Eastern Meadowlarks have a comparatively wide head between the chin and crown (Fig. 1), leaving considerable "play" around the neck when in place. The birds were apparently able to put their feet into this space and gradually stretch the collar material

enough to pull the collar off. Trials are underway on the University of Illinois campus using adjustable collar attachments to avoid this problem in 1999. The recovered radio-transmitters will be equipped with new batteries, a new collar design and be re-used in 1999.

Differences in seasonal fecundity between Eastern Meadowlarks and Dickcissels were fairly large, with Meadowlarks fledging about one more young per season than Dickcissels. This is partially an artifact of Dickcissels apparently being "single-brooded," or only nesting until one clutch fledges. Eastern Meadowlarks continue nesting after successful nest attempts. Dickcissels may "compensate" for their reduced fecundity by prolonging parental care. Some banded Dickcissels were observed feeding young birds for up to 6 weeks after fledging.

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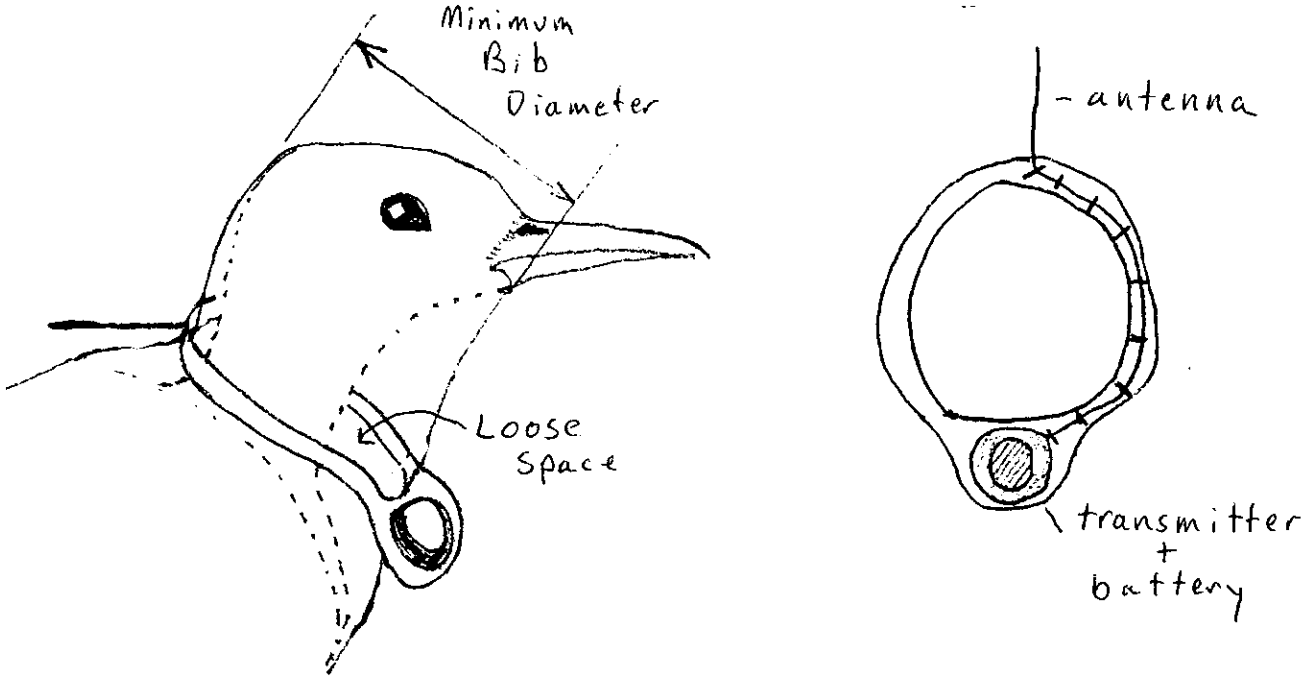

Fig 1. Design of fixed-diameter bib-type radio transmitters for Eastern Meadowlarks.

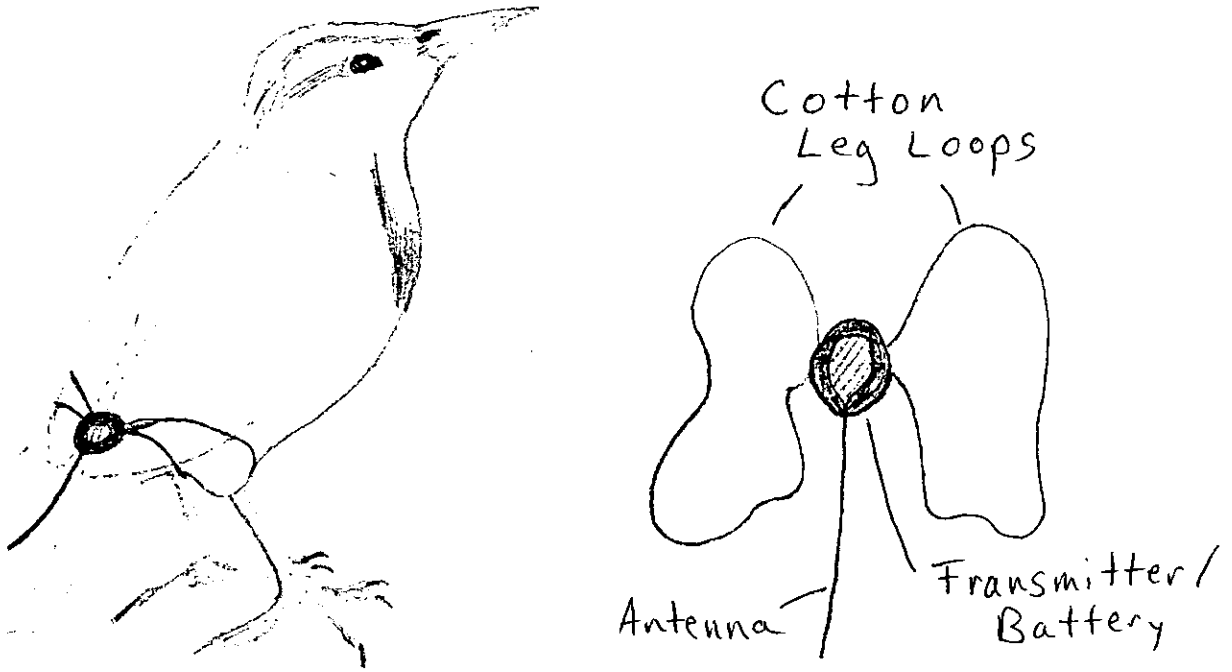

Fig 2. Harness Design for juvenile Eastern Meadowlark radio transmitters.