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Introduction

Red-winged blackbirds (RWBL) are a polygynous species, and disruptions to either territorial behavior or reproductive fitness of the males has potential to lower annual productivity of several females. A reduction in the number of fledglings produced per territory could ultimately result in lower damage to grain crops, at least on a local scale. It is thus feasible that socially acceptable nonlethal methods, including reproductive inhibition through either physical or chemical means, may accomplish a reduction in crop damage.

Scientists at the USDA, Wildlife Services' National Wildlife Research Center have shown that reproductive inhibition is an effective method for reducing local populations of some bird species. None of the studies, however, have had to meaningfully incorporate loss of statistical power through predation events on nests or eggs. We expect a crippling reduction in sample size (i.e., nests, eggs, nestlings, and fledglings) to occur over the course of any field experiment intended to measure the effects of reproductive inhibition on RWBL. Thus, developing a methodology to reduce predation of nests is a preliminary yet necessary step in the process of conducting any subsequent field-level tests.

We assessed the efficacy of 2.54-cm x 2.54-cm woven wire cylinders (measuring 366-cm height x 183-cm diameter) for reducing mammalian predation on nests of RWBL. If effective at reducing nest predation, we will use these exclusion devices to enhance sample sizes in future experiments designed to assess effects of reproductive inhibition by chemical or physical methods on annual productivity of RWBL.

Methods

We located blackbird nests (RWBL, yellow-headed blackbirds, common grackles) from 18 May thru 29 June 2009 in a cattail dominated wetland in McLean County, ND. Nests were randomly designated as treated (wire cylinder) or untreated (no wire cylinder).

Treated nests were outfitted with woven wire cylinders that were centered over each nest with minimal disruption to surrounding standing vegetation (Fig. 1). To obtain evidence of potential predators, we serially selected two treated and two untreated nests and affixed a digital infrared camera to a fence post placed 1 m from each nest (Fig. 2).

Figure 1. Woven wire cylinder surrounding blackbird nest.

Figure 2. Digital infrared image of raccoon climbing woven wire cylinder.

We visited the nests two to three times per week and recorded number of eggs, chicks, cowbird eggs, latitude and longitude, and nest fate (abandoned, depredated or fledged). Nest abandonment was determined according to several possible outcomes. An abandoned nest had to be undisturbed with one or more of the following traits: no

nesting activity, no change in the number of eggs between visits and/or no hatched eggs 12 days after first discovery. Nests were categorized as fledged if they were undisturbed and contained shell fragments after previously containing chicks, or we observed young fledglings nearby a nest previously containing chicks.

RESULTS & DISCUSSION

We found 94 nests, with peak nest discovery (n=38) during 31 May to 6 June (Fig. 3). Abandoned nests (n=5) made up 5% of nests fate and all were treated with wire cylinders (Fig. 4). Possible sources for nest abandonment included, human activity (nest checking), perceived restriction of access due to presence of the wire cylinders, undiscovered predator activity near the nest, or death of the nesting female.

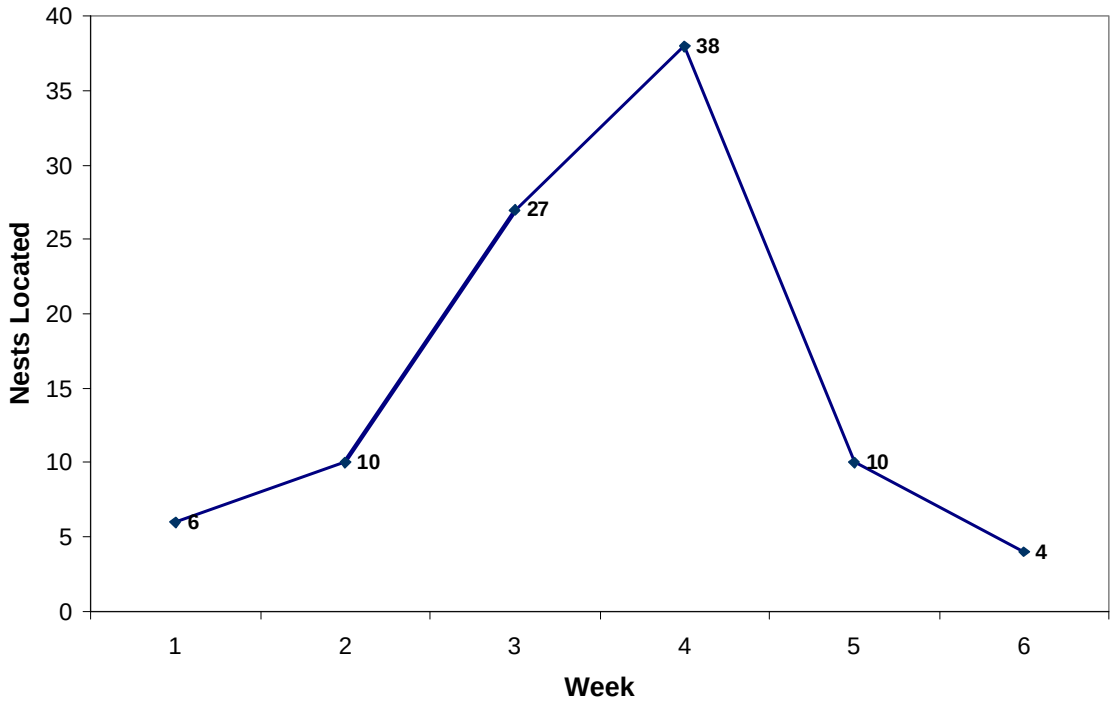

Figure 3. Nests located by calendar week from May 14, 2009 - June 19, 2009.

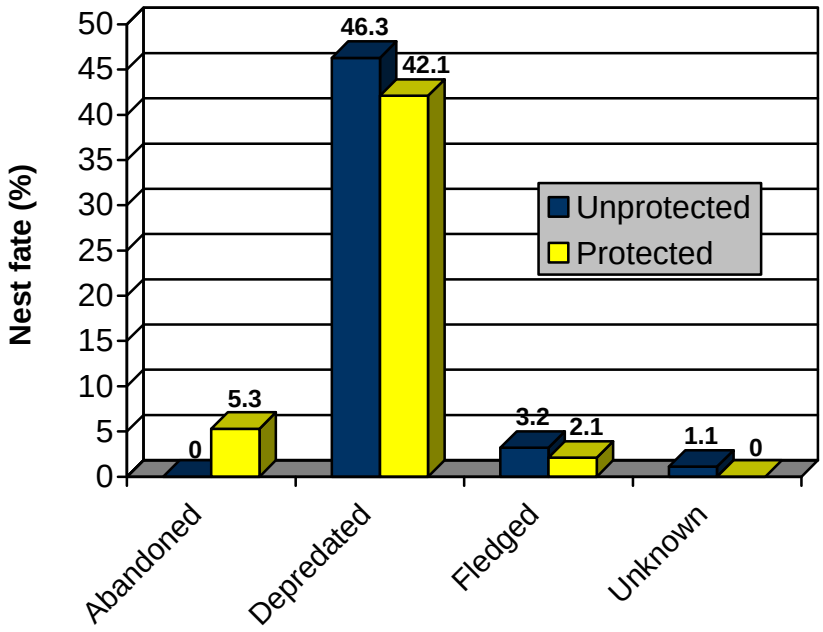

Figure 4. Nest fate percent for unprotected and protected blackbird nests in cattail wetland, McLean County, ND.

Structural examples of nest disturbance included; torn nest bowl, nest removed from cattail substrate, bent or broken stalks, and/or wire cylinder not in its original position.

Depredation of nests (n=84) accounted for 88% of total nest outcomes, allocated about equally between untreated (n=44, 52%) and treated (n=40, 48%) nests. Fledged nests comprised 5% (n=5) of the total nests with 60% (n=3) fledged from untreated nests and 40% (n=2) from treated nests.

We concluded that 2.54-cm x 2.54-cm wire was not a significant barrier because photographic evidence indicated predators were able to navigate through the wire to obtain eggs and chicks (Fig. 5). We suggest that predation rates might be reduced by increasing the diameter of the cylinder, customizing cylinder height to fit each nest based on depth and distance of nest above water, and decreasing the spacing of the wire so that predators can not reach through the mesh.

The direction of future research for reducing nest predation of RWBL should entail investigating protection of individual nests (or even a portion of the wetland itself) with an electric fence. We have derived excellent empirical results in prior studies using electric fencing to protect decoy birds used for cage trapping. Additionally, electric fencing may be more cost-effective than the costs incurred in individual manufacturing and placing of wire-cylinder protectors.

Figure 5. Photographic evidence of raccoon navigating through woven wire cylinder.