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# Evaluation of elevated bait trays for attracting blackbirds (Icteridae) in central North Dakota

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ABSTRACT

Sunflower (*Helianthus annuus* L.) became an economically important crop in North Dakota in the 1970s, providing a major source of food for post-breeding blackbirds (Icteridae). Reducing local blackbird populations with rice grains treated with an avicide is one proposed alternative for reducing sunflower damage. In fall 2007 and 2008, we evaluated the idea of attracting blackbirds to rice-baited trays attached to wire cages supplied with live blackbirds. During our observations (1011 h), we saw 3888 birds, consisting of 25 species and 12 families, on the bait trays. Blackbirds made up 90.4% of the bird observations, whereas sparrows (Emberizidae) made up 1.6% of the birds observed. Overall risk to non-target species appeared minimal. The bait trays, however, attracted a small number of blackbirds compared to the source population feeding in nearby crop fields. Our results strongly suggest DRC-1339-treated rice used on bait trays is unlikely to be a cost-effective method of reducing blackbird damage to ripening sunflower.

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## 1. Introduction

### 1.1. Sunflower and blackbirds

Sunflower (*Helianthus annuus* L.) growers in North Dakota planted an average of 50% (443,000 ha) of the U.S. crop in 2007 and 2008 (NASS, 2011). Production was estimated at 683,200 t and valued at $US325 million dollars (@US 0.475 $kg^{-1}$). From August through October, about 75 million blackbirds (Icteridae) migrate through the northern Great Plains, where dense hybrid cattail (*Typha* × *glauca*, Godr.) stands serve as roost units and nearby crops provide ample food (Peer et al., 2003; Linz et al., 2011). Roost size can vary from a few birds to >70,000 blackbirds, with wetlands containing >20,000 birds common near ripening sunflower (Linz and Homan, 2011). Blackbirds eat some insects and weed seeds but prefer ripening sunflower achenes, especially during the dough stage of development (Cummings et al., 1989; Linz et al., 2011). High-energy food is necessary to facilitate the rapid accumulation of fat reserves during annual feather replacement and prior to migration (Bonier et al., 2007).

State-wide estimates developed from field surveys and bioenergetics models show economic losses are consistently between US$5.0 and $10.0 million, but these numbers are dependent on the value of the crop (Peer et al., 2003; Klosterman, 2011). Klosterman (2011) found that 12% of sunflower fields received damage greater than 5%, a level considered worthy of expenditure on bird management tools (Linz and Homan, 2011). Under high damage scenarios, growers either abandon the crop in favor of less vulnerable crops or attempt to use nonlethal methods, often with inconsistent results (Conover, 2002; Linz et al., 2011). It is not surprising, therefore, that growers have asked federal and university scientists to find a method of reducing blackbird populations.

### 1.2. DRC-1339 avicide

In the 1960s, the U.S. Fish and Wildlife Service developed DRC-1339 (a.i., 3-chloro-p-toluidine hydrochloride, also 3-chloro-4-methylbenzenamine hydrochloride), a restricted use pesticide, to reduce European starling (*Sturnus vulgaris* L.) populations in feedlots and dairies (DeCino et al., 1966). Researchers found that DRC-1339 was highly toxic to a number of pest species including starlings, blackbirds, and corvids (Eisemann et al., 2003). On the other hand, most sparrows (Emberizidae) found around bait units are resistant to the product (Eisemann et al., 2003). Birds rapidly metabolize DRC-1399, which reduces the chances of secondary poisoning of predators and scavengers (Eisemann et al., 2003). In 1989 and 1990, Glahn and Wilson (1992) successfully tested the use of DRC-1339-treated rice grains for reducing local populations of

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blackbirds in Louisiana. Since then, DRC-1339-treated rice grains have been used operationally to protect sprouting rice in Louisiana (Cummings et al., 2005).

Learning of this apparent success in Louisiana, sunflower growers asked researchers to evaluate DRC-1339 for reducing spring migrating and post-breeding blackbirds. Linz et al. (2003) tested the use of DRC-1339-treated rice grains during spring migration in South Dakota and found that blackbirds readily accepted baits in test plots. Cost-benefit analyses showed, however, that costs outweighed the benefits of conducting an operational baiting campaign (Blackwell et al., 2003).

Even so, sunflower producers remained supportive of DRC-1339 as a management tool, reasoning that applying DRC-1339-treated rice grains directly in sunflower fields might be the solution to bird damage. To test this idea, Linz and Bergman (1996) and subsequently, Linz et al. (2000) placed DRC-1339-treated rice baits on the ground in ripening sunflower fields near blackbird roosting units. In both studies, bird damage did not differ between baited and unbaited fields. They concluded that enticing blackbirds to feed on the ground when ripening sunflower was available was a major obstacle to the implementation of this baiting strategy. Additionally, numerous granivorous non-blackbird species use ripening sunflower fields for food and cover (Hagy et al., 2010). Some of these species (e.g., ring-necked pheasants, *Phasianus colchicus* L.; mourning doves, *Zenaida macroura* L.) are susceptible to low DRC-1339 dosages (Eisemann et al., 2003).

In 2007 and 2008, we attempted to attract blackbirds feeding in ripening sunflower fields to food trays attached to the top of wire cages supplied with live blackbirds (henceforth 'bait units'). Our aim was to assess avian use of rice baits across the sunflower ripening period throughout daylight hours. These data will help provide insight into the most efficient time to bait blackbirds, as well as timing for avoidance of non-target species. We hypothesized that the decoy blackbirds would attract conspecifics, while reducing the risk of non-blackbird exposure to DRC-1339-treated baits.

## 2. Materials and methods

We selected our study area based on historical knowledge of sunflower planting patterns, crop phenology, and blackbird damage to sunflower in North Dakota. We chose Barnes, Griggs, Nelson, Ramsey, Stutsman, and Walsh counties in central North Dakota, which lie within the Prairie Pothole Region (PPR) of North Dakota (Ralston et al., 2007). The vegetation of the region was once tall- or mixed-grass prairies; however, farmers now use the land for small grains, soybean, corn, sunflower, hay, and pasture (NASS, 2011).

### 2.1. Bait sites

Our selection of bait sites was guided by the requirements of the U.S. Environmental Protection Agency label titled Compound DRC-1339 Concentrate – Staging Areas (EPA Reg. No. 56228-30). That is, baits can be applied only in noncrop "staging areas" associated with nighttime roosting units and must be at least 15.2 m from water. We dispersed the bait units across the six study counties in close proximity to ripening sunflower fields and wetlands harboring at least 5000 blackbirds.

### 2.2. Prebaiting

We simulated a blackbird-baiting program by following the requirements of the DRC-1339 Staging Area label (EPA Reg. No. 56228-30). We placed 90–180 g tray$^{-1}$ of untreated brown rice on the bait trays and checked the supply daily. Prebait must be provided for 3–7 days or until prebait is well accepted. Further, bait locations must be changed to achieve good acceptance by blackbirds species or if non-blackbird species have been observed eating the prebait. We did not use DRC-1339-treated baits during this study.

### 2.3. Bait units

From 15 August to 12 October 2007 and from 3 September to 18 October 2008, we erected bait units near ripening sunflower fields that were located within 1.6 km of blackbird roosts. In 2007, 51 bait units were associated with 24 roosts and in 2008, 22 bait units were associated with 10 roosts. These dates coincided with the onset of sunflower seed development in mid-August and initiation of sunflower harvest in mid-October. To attract blackbirds from the fields to the bait units, we captured blackbirds in mist nets and placed them in 1.2 × 1.2 × 2-m modified Australian crow (decoy) traps (2.5 × 5-cm woven wire), with a 0.5-m drop box and a single 5-cm slit for birds to enter the traps (Winter, 2010). We attached a plywood food tray (0.6 × 1.2-m), with a 5 × 5-cm wood rim, to the top of the trap.

We supplied individual cages with up to 10 decoy blackbirds that we replaced at least every 30 days. We provided the decoy birds fresh food and water daily. In 2007, we wrapped each cage with a small mesh (1.3 × 1.3-cm) wire to reduce predation of the decoy birds by mammals (largely, raccoons *Procyon lotor* L.). When available, we placed the bait units near blackbird perch sites (e.g., trees, utility wires). In 2008, we essentially eliminated mammalian predation with a two-strand 12-V electric fence placed around each cage. We also discouraged non-target bird use of the bait trays by cutting the vegetation in a 7.5 m radius around the bait units or by placing the bait units in tilled fields.

### 2.4. Avian monitoring

We randomly visited the bait units each day between 0.5 h after sunrise and 1.5 h before sunset, except when there was steady rain or wind >24 km/h. We parked a vehicle about 50 m from the bait unit and, after a 10-min quiet period, recorded numbers and species of birds perched on the tray for 20–1 min observations. We took a 2-min break between each observation to record data. We used binoculars and spotting scopes to observe the bait trays. If a bird species could not be determined, we recorded genus or, in a few cases, family.

### 2.5. Statistical analysis

We calculated the mean number blackbirds, granivorous non-blackbird species, and non-granivorous species observed on the bait trays during 20–1-min observations collected over 1 h. We calculated means and standard errors for date and time intervals. Date intervals were set at 7-day intervals from 3 September to 18 October and time intervals were sunrise to 2 h post sunrise, 2 h–4 h post sunrise, 4 h post sunrise to 4 h prior to sunset, 4 h prior to sunset to 2 h prior to sunset, and 2 h prior to sunset until sunset. We used Kruskal–Wallis tests to examine the null hypotheses that numbers of blackbirds, granivorous non-blackbirds, and non-granivorous birds were similar among date and time intervals.

## 3. Results

### 3.1. 2007

In 2007, we observed the bait trays for 534 h and recorded 968 individual birds, comprised of 12 species (Table 1). Of these

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