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Introduction

Ripening sunflower fields in the northern Great Plains provide blackbirds with easily accessible sources of high-energy food. As many growers can attest, blackbirds can be nearly impossible to discourage from foraging in favored fields. Repellents sometimes can be effective feeding deterrents, especially if alternative foraging sites are readily available.

Background Information

Cage Feeding Studies – During late-summer 2003, we screened five insecticide formulations for feeding repellency using individually caged red-winged blackbirds. Lorsban®-4E (a.i., chlorpyrifos) showed the best potential as a bird repellent. Further testing of Lorsban revealed that compared to the untreated group, which ate an average of 10.1 g of achenes per 3 hr, birds fed Lorsban-treated achenes at the 50% rate (0.57 ml/kg) ate 58% ($\overline{x}$ = 4.2 g) less. All other treatment groups had reductions of about 40% ($\overline{x}$ = 6.0 g).

Lorsban Field Studies – In September 2004, we tested Lorsban on planted oilseed sunflower and found that total mean damage and number of damaged heads were slightly greater in the untreated cages than in the treated cages. The amount of alternative food (cracked corn and milo) eaten was slightly greater in the treated plots. The 95% confidence limits overlapped, however, indicating no statistical difference between treatments. Even so, the consistency of the data suggested Lorsban might have some repellency.

Caffeine – Another potential repellent is caffeine. Avery et al. (2005) conducted cage feeding trials with female red-winged blackbirds and male brown-headed cowbirds and found that a treatment rate of 2,500 ppm caffeine on rice seed reduced consumption as much as 76%. Trials with mixed species blackbird flocks in a 0.2-ha flight pen resulted in just 4% loss of caffeine-treated rice compared to 43% loss of untreated rice. Field trials of a 10,000 ppm caffeine treatment in Louisiana showed that blackbirds ate <10% of caffeine-treated rice seed and >80% of the untreated seed on days 2 and 3 (Avery et al. 2005). Avery et al. (2005) suggested that improvements in formulation will be needed to make the compound practical for general agricultural spray applications.

Our next research step was to compare aqueous solutions of Lorsban®-4E and caffeine aerially sprayed on sunflower plots for blackbird repellency.

Methods

In mid-summer 2005, we purchased a 2-acre plot of planted oilseed sunflower from a local grower. Five 8 ft (w) x 8 ft (l) x 8 ft (h) aluminum-framed cages, covered with black plastic-coated netting, were placed in both the treated and untreated plots. We removed all weeds and maintained an equal number of sunflower heads in each cage.

On a clear, calm day in early September, the cage frames surrounding the treated plots were removed. Water sensitive spray cards were attached to the face and back of five randomly selected sunflower heads to gauge the amount of spray solution hitting the head. The previously caged test plots were then aerially sprayed by a fixed-wing agricultural spray plane with Lorsban®-4E at 1.75 L/ha or caffeine at 4.49 kg/ha. The cage panels were reassembled two hours after the pesticide application.

Four pre-weighed red-winged blackbirds with numbered leg bands, previously captured and held for at least two weeks prior to testing, were placed in the test cages with water and alternative food (100 g each of cracked corn and milo).

Two hours after the spray, we checked the spray cards for evidence of pesticide. On day 2 and day 6 after the pesticide application, the amount of damage to the sunflower heads in the treated and untreated cages was measured. The alternative food was removed and replaced each day with fresh food. The recovered alternative food was air-dried and later weighed. This cycle was repeated for six days.

Results and Discussion

Under the conditions of our experiment, we did not detect any statistical difference in sunflower damage (Fig. 1) or amount of alternative food (Fig. 2) eaten among caffeine, Lorsban, and untreated cages. The spray cards showed that the back of sunflower heads and leaves were thoroughly covered with the pesticides. We found, however, no evidence that the pesticide contacted the face of the heads.

Figure 1. Damage to sunflower heads (cm^2) by red-winged blackbirds placed in plots treated with caffeine or Lorsban and in untreated plots.

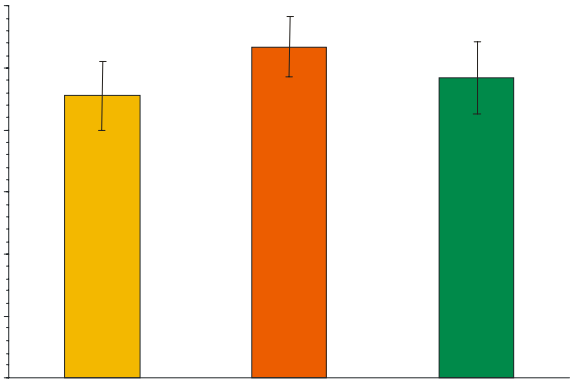
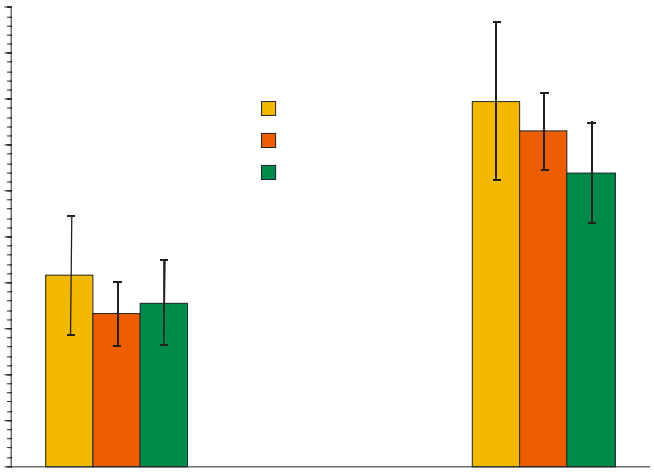


Figure 2. Amount (g) of alternative food eaten by red-winged blackbirds placed in sunflower plots treated with caffeine or Lorsban and in untreated sunflower plots.



We speculate that under field conditions, where the birds can escape a hostile environment, a bird repellent sprayed on the heads and leaves might reduce sunflower damage. We believe, however, that repellents will be more efficacious if the achenes also are sprayed.

In 2006, we plan to research more effective application techniques to improve spray coverage of the exposed seeds. Our objectives are to (1) compare spray

coverages of pesticides applied by helicopter and fixed-wing aircraft on early ripening sunflower, (2) evaluate the bird repellency of caffeine sprayed on early ripening sunflower heads in commercial fields, and (3) research application technologies in collaboration with universities and private entities to improve coverage of sunflower with bird repellents and other pesticides.

Literature Cited

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