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A REPELLENT FOR PROTECTING CORN SEED FROM BLACKBIRDS AND CROWS

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A REPELLENT FOR PROTECTING CORN SEED FROM BLACKBIRDS AND CROWS

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Abstract: Methiocarb [4-(methylthio)-3,-5-xylyl *N*-methylcarbamate] was tested as a seed treatment for repelling blackbirds and crows (*Corvus* sp.) from sprouting corn in South Carolina. The test was conducted on eight fields within a 0.25-square-mile area. Marked repellency occurred; sprout damage averaged 44 percent in the control fields and 0.3 percent in the fields treated with methiocarb.

A chemical seed treatment that will prevent birds from damaging sprouting grain long has been sought. Neff and Meanley (1956) summarized much of the research, which, before 1956, consisted primarily of testing seed treatments containing anthraquinone, lindane, dyes, coal tars, and red lead, among others. These materials showed varying degrees of effectiveness. Young and Zevallos (1960) found thiram, Drinox, and DuPont Spreader Sticker to be helpful in preventing sprout damage in Mexico by boat-tailed grackles (*Cassidix mexicanus*) and brown-headed cowbirds (*Molothrus ater*). However, all of these chemical seed treatments to prevent sprout injury by birds have been so ineffective that farmers are illegally using toxic compounds to reduce sprout damage. A need exists for a chemical that will repel birds from sprouting grain and that will meet chemical registration requirements.

Methiocarb (DRC–736, a code number assigned by the Denver Wildlife Research Center, Denver, Colorado) drastically reduced damage to corn sprouts by pheasants (*Phasianus colchicus*) in South Dakota (West et al. 1969) and by boat-tailed grackles in Texas (West and Dunks 1969). In both studies, damage was light—less than three percent in the control plots in South Dakota and nine percent in the plots in Texas. Schafer et al. (1967) reported that the TI_{50} (temporary immobilization of 50 percent of the birds tested) was 1.0 mg/kg for red-winged blackbirds (*Agelaius phoeniceus*). In a later report (E. W. Schafer 1971, unpublished report, Denver Wildlife Research Center), the acute oral LD_{50} was given as 4.6 mg/kg for redwings, 10 mg/kg for common grackles (*Quiscalus quiscula*), 24 mg/kg for bobwhite quail (*Colinus virginianus*), 10 mg/kg for mourning doves (*Zenaidura macroura*), and 56.2 mg/kg for pheasants.

Our report describes a test of methiocarb as a bird repellent on planted corn seed. The test was made in the spring of 1969 under conditions of heavy pressure by redwings, common grackles, and crows. Since sprout damage by these species is particularly prevalent in areas along the eastern seaboard wherever corn is grown next to water, these tests were conducted at Santee National Wildlife Refuge in South Carolina. Here corn is grown adjacent to the Santee–Cooper reservoir, and the damage is severe at times. The chemical methiocarb (DRC–736) was provided by Chemagro Corporation, Kansas City, Missouri. The use of trade names does not imply endorsement of commercial products by the federal government.

We thank T. W. Martin, Refuge Manager, and other personnel at the Santee NWR for their cooperation in this study, and E. L. Bradley, Jr., for the statistical analysis.

METHODS

Methiocarb was tested in a water slurry formulation consisting of 0.5 percent technical grade material and a sticker (0.0025 percent Kelzan from the Kelco Company, Los Angeles, California) applied as a coating to corn seed (approximately 1.4 mg of methiocarb per grain of seed) prior to planting. Bird damage to the treated seed was compared with damage to untreated seed in eight test fields that were within a 0.25-square-mile area. No field was located more than 300 yards from another field. All fields were between 1.5 and 3.0 acres in size except for one 8-acre field. West et al. (1969) found that the repellent effects of methiocarb were difficult to detect unless entire fields were considered as individual treatment units. Therefore, we used discrete fields as treatment units. Adjacent fields were paired; one field received the treated seed and the other the untreated. Refuge personnel planted the fields in late April.

For purposes of assessing damage, 25, 0.016-acre plots, each 100 feet long and two rows wide, were randomly chosen throughout the test fields; an exception was the 8-acre field in which 50 such plots were employed. The number of damaged sprouts was recorded for each plot 4 to 7 days after the corn had begun to sprout. Yield was determined by counting all sprouts, damage and undamaged.

To determine if nocturnal mammals contributed to the damage, sprouts on five plots in one control field were checked after bird activity ceased in the evening and again the following morning before it began. After most of the damage had ceased, counts of blackbirds in the test fields were made along an established route, five times on one afternoon and twice on the following morning.

Table 1. Sprout damage in cornfields.

Treatment and Size of Fields (acres)	Number of Sprouts in Plots	Sprouts Damaged	
		Number per 25 Plots[a]	Percent
Methiocarb slurry			
3.0	4,167	15	0.4
2.0	3,713	14	0.4
8.0	4,106	6[b]	0.1
2.0	4,836	14	0.3
Mean		12*	0.3*
Control			
2.0	1,134	795	70.1
2.5	606	292	48.2
1.5	1,949	936	48.0
3.0	4,047	397	9.8
Mean		605	44.0

[a] Plots were 0.016 acre each—100 feet long and two rows wide.
[b] A 50-plot sample was taken, but results were adjusted to number of sprouts per 25 plots for comparison with 25-plot samples in the other fields.
* Significantly different from control ($P < 0.05$).

RESULTS

The percentage of sprouts damaged in the control fields averaged 147 times the percentage damaged in fields treated with methiocarb (Table 1). Variation was greater in the treated fields than in the controls. Analysis of variance on arcsin-transformed data (Steel and Torrie 1960:158) indicated that the mean percentage of sprouts damaged in treated fields was significantly ($P < 0.05$) lower than in the control fields.

Three percent of the total sprouts were damaged overnight, a finding that Student's *t*-test indicated was not statistically significant ($P > 0.05$). Although a small amount of nocturnal mammal damage perhaps occurred, some of the increase found in the morning counts possibly was accounted for by the better light conditions that enabled more damage to be observed. The character of the additional damage found in the morning counts was not observably different from that of normal bird damage.

On the average, eight common grackles and one crow were observed in the four control fields per route, compared with three grackles and less than one crow in the four treated fields. None of these birds was observed damaging sprouts, and few instances of fresh damage were seen when the counts were made.

West et al. (1969) reported that the methiocarb treatment seemed to increase the number of corn plants. In our test, the numbers of sprouts in the treated fields were higher than those in the controls but not significantly ($P > 0.05$) higher (Table 1). In the plots of one control field, damage by wild hogs reduced the sprout number to 606.

DISCUSSION

The situation and conditions at Santee provided a good test of the repellent qualities of methiocarb. The level of damage was high. Location of each treatment field within 650 feet of a control field encouraged bird pressure that was nearly equal.

The counts of birds were inadequate to determine whether birds avoided the fields treated with methiocarb. Intensive counts and behavioral studies during the damage period should be conducted in future tests to provide clues to the mode of action of methiocarb as a repellent on corn seed.

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