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SURVEY OF EFFECTIVENESS OF AVITROL FC CORN CHOPS-99 IN FIELD CORN IN NORTHERN OHIO

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Goodhue and Baumgartner (1965) described a chemical, 4-aminopyridine (hereafter referred to as "4-AP"), that causes certain flocking birds [e.g., Red-winged Blackbirds (*Agelaius phoeniceus*), Grackles (*Quiscalus quiscula*), House Sparrows (*passer domesticus*), and Starlings (*stnrmus vulgaris*)] ingesting it to act before death in a manner (squawking, erratic flight, tremors, convulsions) that repels other birds. The 4-AP was found to be effective as a treatment on cracked corn when applied to the ground in cornfields at the rate of 1 lb per acre [1.1 kg per ha (De Grazio, et al., 1972; Stickley, et al., 1972)] and 1.3 lb per acre [1.4 kg per ha (Stickley, et al., 1976)] in the ratio of 1 treated particle for 99 untreated ones. As a result, 4-AP was registered for use on field corn by Avitrol, Inc. in April 1972 as Avitrol FC Corn Chops-99 at 1 lb per acre and at a ratio of 1 treated to 99 untreated particles. (This formulation applied at this rate and in this ratio is hereafter referred to as "FC-99.")

Since its registration in 1972, FC-99 has been used by some Ohio farmers to protect their field corn from bird damage. But dissatisfaction with the effectiveness of FC-99 has grown; some farmers claim that fields treated with FC-99 receive as much bird damage as untreated fields. Thus, we conducted a survey of field-corn fields in north-central Ohio in September 1975 to re-evaluate the efficacy of FC-99 as a bird repellent.

The survey was conducted in three areas containing most of the FC-99-treated fields in north-central Ohio (Fig. 1). These areas, Sandusky, Ottawa, and Lucas Counties, have a history of heavy blackbird damage.

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METHODS

Twenty-eight fields commercially treated with FC-99 (32 percent of the total in northern Ohio, Fig. 2) and 28 neighboring untreated fields were surveyed for bird damage during the last two weeks of September, approximately 10 days after the final application of the treatment. The survey was conducted after the peak blackbird-damage period when the corn was somewhat dented and relatively unattractive to birds. Cornfields ranged from 2 to 32 ha in size. Treated fields to be surveyed in each area were randomly selected (7 in Sandusky County, 12 in Ottawa County, and 9 in Lucas County). After assessing damage in a given treated field, the nearest untreated field was then located in a randomly-chosen direction and surveyed. Untreated fields were usually found within 1 km of the treated fields.

Treated fields received FC-99 applications approximately every six days. Of the 28 fields surveyed, 25 received three applications, two received four applications, and one received two applications.

Six plots of 20 ears each were randomly selected in every field for bird-damage assessment. Within each plot, we examined every other top ear (four ears total) down a corn-row length of seven ears in each of five adjacent rows. The percent surface area destroyed by birds was visually estimated (to the nearest percentile) for each ear.

RESULTS AND DISCUSSION

Unpaired t-tests for each county area, using field averages as the response variables, revealed no significant differences between treated and untreated fields in percent bird damage ($t = 0.36$ for Sandusky County, 0.30 for Ottawa County, and 1.47 for Lucas County; $p > 0.05$). The mean bird damage per ear for all treated fields was 1.5 percent, while that of untreated fields was 1.2 percent (Table 1). Average damage per ear for all fields was 1.4 percent. All fields except one had between 0.1 and 4.7 percent bird damage; that one (treated) had 9.2 percent damage.

Two factors may have contributed to the apparent ineffectiveness of FC-99 treatments. First, there was unusually heavy rainfall during the 6-week treatment period (2.2 times normal). This heavy rainfall disrupted the aerial application schedule and may have caused much bait to be covered or washed away. Second, bird damage (average 1.4 percent) in this traditionally high-damage area appeared to be lower in 1975 than in previous years (Fig. 2) for the same general area. (Note that the damage estimates in Fig. 2 represent county-wide averages and are not comparable to our damage estimates in 1975, which were obtained only from high-damage areas of these counties.) Dolbeer, et al. (1976) hypothesized that FC-99 treatments may be ineffective in driving flocks from fields under conditions of low-to-moderate bird pressure because too few birds ingest treated particles and react. This may have occurred in 1975. In fact, the generally low bird damage occurring in 1975 indicated that most FC-99 treatments probably were not needed in north-central Ohio.

In addition, two factors may have biased the results against FC-99 treatments. First, farmers probably requested treatments for fields they felt were most susceptible to bird damage; thus, treated fields may have had a greater potential for bird damage than did untreated fields. Second, farmers may have protected untreated fields with exploders and guns more than they did treated fields.

CONCLUSIONS

These results support the suggestion of Dolbeer, et al. (1976) that modifications are needed in the treatment form of 4-AP (i.e., higher percentage of treated particles and a more flexible application rate) to increase efficacy under conditions of low-to-moderate bird pressure. These modifications should be evaluated.

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DISCUSSION

- Question: Do you feel that if treatments are applied to the whole area you get better control than if its applied only to scattered fields?
- Stickley: We have never been able to test that theory completely. We have never been able to get every single farmer in a single area to agree to use Avitrol. So whether this is true would be very tough for me to answer. All I can say is that in 1969 we did try to treat every field in a 12 m² area, and we treated about two-thirds of the fields. We found that fields we didn't treat got the damage; the birds were not driven out of the large area.
- Question: But you got adequate control in the treated fields at that time?
- Stickley: Yes, at that time we got adequate control. We did not have the cricket problem at that time. We had bait plots where at the end of the week we had one-third of the bait left. That's hard to explain except that in 1969 we had a severe storm on July 4th; 5-10 inches of rain fell in a short period of time. That might have had a severe effect on the insect population and allowed the bait to stay on the ground longer.

Question: You mentioned that one formulation (3:100) was more effective than another (1:100).

Stickley: Yes, that the three treated kernels per 100 was more effective, that is we had less damage.

Question: Do you use the 1% kernels in both formulations?

Stickley: We used the 3% kernels in the 3:100.

TABLE 1. Average damage levels (per ear and number of ears per field) in field-corn fields in three north-central Ohio areas, 1975.

County	FC-99 Treatment Level	No. of Fields	% surface area damaged/ear	% of ears damaged/field
Sandusky	0 lb/acre	7	0.7	19.3
	1 lb/acre	7	0.8	21.3
Ottawa	0 lb/acre	12	1.7	40.3
	1 lb/acre	12	1.5	36.0
Lucas	0 lb/acre	9	0.0	33.6
	1 lb/acre	9	2.2	42.2
Totals	0 lb/acre	28	1.2	32.9
	1 lb/acre	20	1.6	34.3

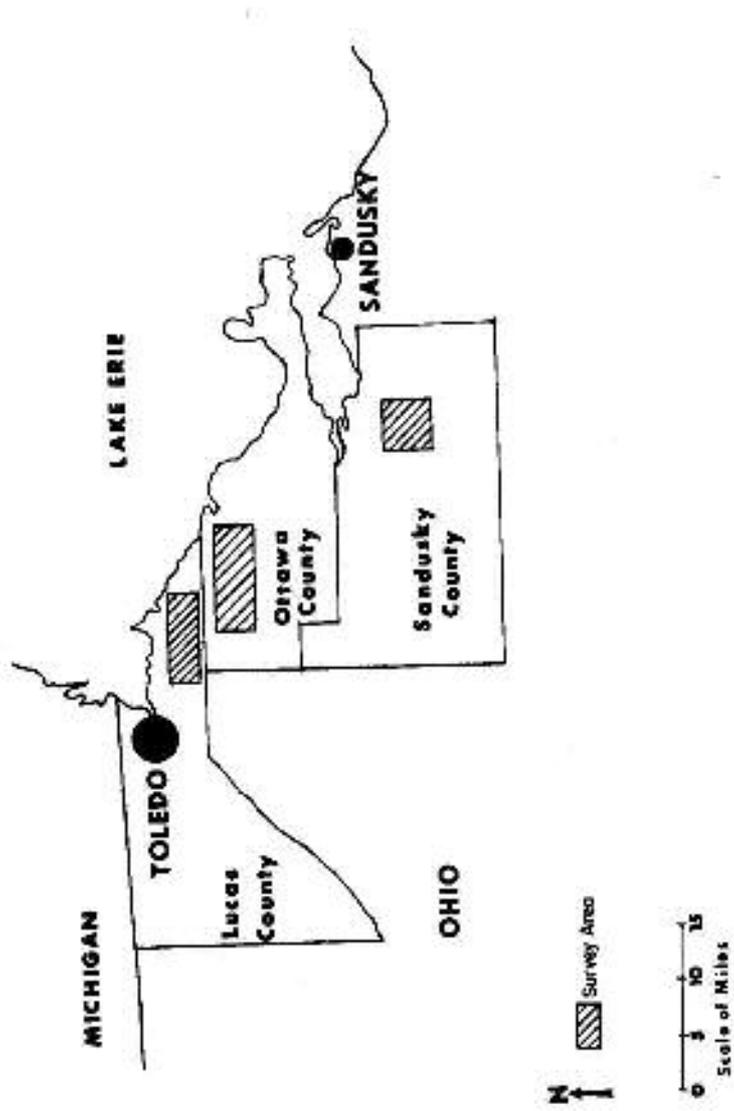


Fig. 1. Location of FC-99 survey areas in north-central Ohio, September 1975

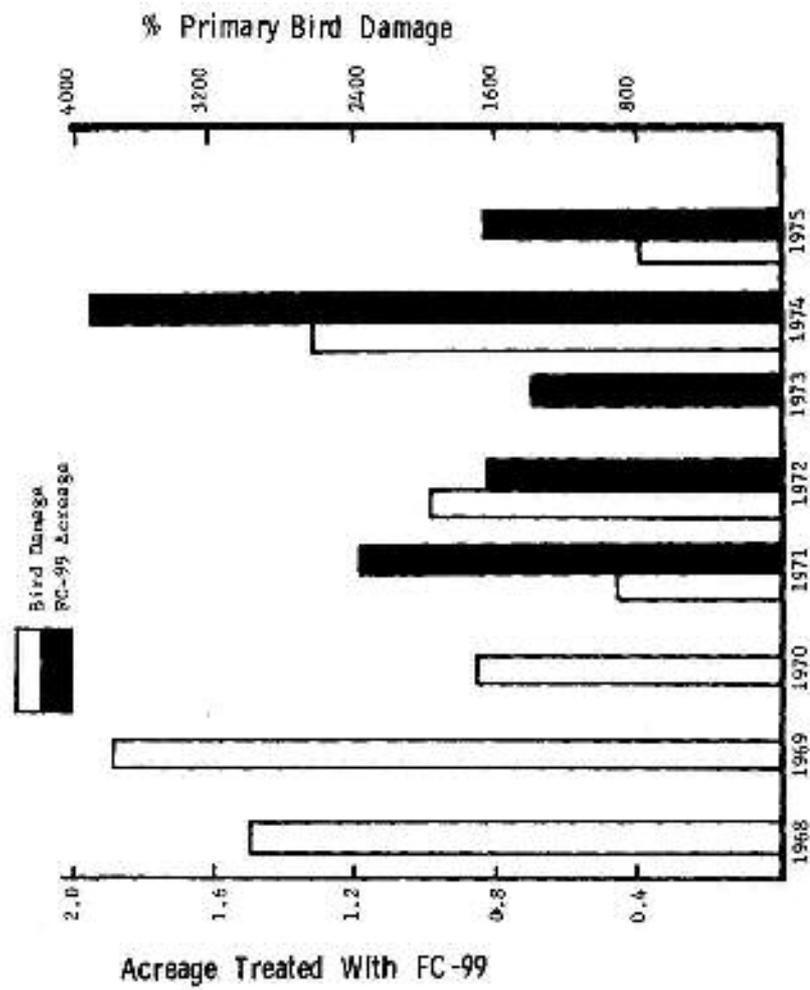


Fig. 2. Estimated percentage of field-corn crop eaten by birds in Lucas, Ottawa, and Sandusky Counties, Ohio, 1968-1975 (Anon. 1975) and acreage of field-corn treated with FC-99 in same counties, 1971-1975.