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AN EVALUATION OF 4-AMINOPYRIDINE FOR DISPERSING WINTER BLACKBIRD ROOSTS IN COLORADO

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INTRODUCTION

Blackbirds and starlings (*Sturnus vulgaris*) often establish large winter roosts in areas where their presence is objectionable because of economic, public health, and nuisance reasons. Several techniques are available for alleviating roost problems, including habitat manipulation, roost dispersal with mechanical and pyrotechnic devices (Mott et al 1978), and, where necessary, direct population reduction (DeGrazio 1964). These techniques, however, have limitations due to weather, roost accessibility, logistics, and adverse public reaction. In the past, 4-aminopyridine (4-AP) has been used effectively as a bird-frightening agent in agricultural crops (Besser 1976), but until now has not been adequately tested for its effectiveness as a roost dispersal agent. Two earlier small-scale tests conducted on two Colorado roosts of 10,000 and 160,000 blackbirds indicated that 4-AP-treated cracked corn baits had a potential as a roost dispersal tool (DeCino et al 1965, Schafer 1966). In January and February 1979, I conducted additional tests to assess the potential of using 4-AP for dispersing roosts, to develop techniques for bait delivery, and to determine hazards to nontarget birds.

METHODS

Study Areas

Two cattail (*Typha spp.*) marsh roost sites were selected in Colorado to test roost dispersal techniques utilizing 4-AP during January and February 1979. The first was 1.4 miles southeast of Longmont in Boulder County, and contained an estimated 49,000 red-winged blackbirds (*Agelaius phoeniceus*) and 1,000 starlings (*Sturnus vulgaris*) that roosted in two acres of a 15-acre marsh (Table 1). The second roost, in which birds were concentrated in eight of 26 acres, was eight miles east of Las Animas in Bent County. Initial roost estimates were 300,000 blackbirds (95% redwings, 4% starlings, and 1% Brewer's blackbirds (*Euphagus cyanocephalus*)).

Dosing

In January at the Longmont roost, 100 male redwings were individually dosed with one 3% 4-aminopyridine corn tablet (Garrison et al. 1979) each of three consecutive evenings and released into the roost as flights of blackbirds entered the roost at sunset. All dosed blackbirds had been captured locally and were held for 14 days in aviary cages before treatment. The actual dosing took about 30 minutes to complete each evening. At the 3% level, treated birds were expected to become affected within 20 minutes (DeGrazio et al. 1971, Garrison et al. 1979). DeGrazio et al. (1972) reported good dispersal results from cornfields when less than 1% of the flocks of birds in the fields were affected by 4-AP treated baits.

Bait Trays

In February at the Longmont and Las Animas roosts, six (3 per acre) and 12 (1.5 per acre), respectively, wooden bait trays (1 in x 2 ft x 3 ft) were placed at intervals throughout the area of each marsh actually used by roosting birds and elevated about two feet above the vegetation. Each tray was prebaited once with 10 pounds of untreated cracked corn until bait from all trays was 90% consumed (3 days), then cracked corn was replaced with 3.0 pounds (Longmont) and 3.5 pounds (Las Animas) of 4-AP-treated cracked corn diluted 1:10 with untreated cracked corn. To minimize hazards to nontarget species, treated bait was placed in trays ½ hour before blackbirds entered the roost; and baits were retrieved the following morning after birds had departed. When retrieved, bait from each tray was weighed to determine the amount consumed.

Bird Observations

Each evening of treatment the number of 4-AP-affected blackbirds, their behavior, and the response reactions of roosting blackbirds were recorded. In addition, 5-minute observations were made on each bait tray to record bird use. Observations started on the first tray upon which birds began to feed and then proceeded in a numbered sequence.

To obtain an estimate of the population, pre- and post-treatment roost counts (by species) were conducted the three evenings preceding roost dispersal and during four evenings of treatment by counting birds on flightlines returning to the roost. At the Las Animas roost, an estimate of the roosting population was made five days after the final treatments. An area within a 10-mile radius of the roost was also surveyed for other possible roost sites of dispersed birds.

RESULTS

Dosing

Upon release, 96% of the individually dosed birds joined the roosting flock; the other 4% flew away. Of 100 birds dosed each of three evenings, only 14, 24, and 21, respectively, were observed or heard distressing. The roosting birds only reacted for a short period of time to affected birds. After three evenings of dosing, the roost population was unchanged, and this phase of the study was terminated.

Bait Trays

The 50,000 and 300,000 blackbirds at Longmont and Las Animas, respectively, were effectively dispersed, at each site within 4 days. At Longmont, there was a 50% reduction in the number of birds returning to the roost the evening following initial treatment (Table 1). After the final treatment 76% of the birds left the area of the original roost, and the remainder formed a new roost about ½ mile distant. At Las Animas, the roost population decreased 43% (Table 1) after the first treatment and 95% of the blackbirds left the original roost area after the fourth (final) treatment and roosted in areas up to six miles away.

Bird usage and amount of bait consumed from bait trays are shown in Table 2 for each roosting area. After the first night of bait exposure, the number of blackbirds using bait trays at the Longmont roost dropped about 55%, whereas bait consumption dropped from 3.5 to 1.9 pounds.

After the first treatment at Las Animas, blackbirds were very reluctant to return to the same roosting area within the marsh. Birds entered the marsh en masse 22 minutes later on the second evening but still spent time on bait trays. Following the second and third treatments, birds began utilizing sections of the marsh ½-1 mile away from the original roosting site. After the third and fourth treatments, flight lines of birds were observed entering the roosting area until birds became affected, then the roosting population would move to other parts of the marsh or join other flight lines of blackbirds en route to other roosting areas up to 6 miles away. Roost estimates at Las Animas 5 days after the final baiting showed that only 1% of the original population of blackbirds remained in the roosting marsh.

At both sites, the numbers of affected birds seen or heard are shown in Table 2. These data represent the minimum number of affected birds observed, since constant bird movement, poor lighting, and dispersion of birds in the roost made it difficult to identify the actual number.

No non-target birds were observed on bait trays. Searches for dead birds were not conducted because of dense marsh vegetation during these roost dispersal studies. Marsh hawks (*Circus cyaneus*) and a prairie falcon (*Falco mexicanus*) were observed occasionally capturing 4-AP-affected birds; however, Schafer et al. (1974) found that hawks that were fed up to 37 4-AP-killed redwings over a period of 21 days showed no intoxication symptoms.

DISCUSSION

Dosing 100 male red-winged blackbirds and releasing them into the Longmont roost proved to be ineffective and time consuming. The reaction of dosed birds to 4-AP was not similar to reactions observed in wild birds, perhaps because captive birds were underweight and stressed. Also, additional birds should have been dosed for optimum dispersal effect.

At Longmont and Las Animas, blackbirds started utilizing untreated baits on trays the first evening they were exposed. The first treatment in both roosts had such a dramatic effect on roosting blackbirds that on the second and third evenings of treatment blackbirds were reluctant to enter the roosting area within the marsh. This indicated that the initial treatments had an effect on the blackbirds' roosting behavior. A similar occurrence was also noted by Mott et al. (1978) during a Tennessee roost dispersal study with sound-frightening devices. Future studies are planned to determine the effectiveness of this technique in other roosting habitat types and various sized roosts. If successful, this technique will provide a safe and economically feasible means for dispersing roosts.

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DISCUSSION

Q: What mortality was there?

A: Birds were affected in the evening when you had very poor lighting, and I was limited on manpower for the tests. We had two biologists working down there, and we tried to count birds each evening that we either saw or heard affected birds out in the marsh. Actual mortality of redwings might be over 1000 birds or so.

Q: How many birds would you have to give avitrol to to be able to affect the flock?

A: The way I figure, if I could affect 1% of the roosting flock in these marshes, I'd feel I could do a good job of dispersing the birds.

Q: Did many birds feed at bait trays?

A: We have bird observations on these bait trays over the 25-minute period before they dropped down into the cattails. We saw quite a bit of interchange between these bait trays. Bait trays actually could hold about 60 birds at one feeding; sometimes there were that many on the tray for up to 5-6 minutes. One treated kernel is enough to kill a redwing--2.7 times the lethal dose, so all the bird needs to get is one kernel. It all depends on what kind of food is in his stomach.

Q: Do you have any feeling at all about the use of these techniques in trees?

A: Yes, I hope this winter to try it in some different types of roosting habitats.

TABLE 1. Estimates of the number of roosting birds before and after treatment.

Site	Pretreatment	Days of Treatment			
		1	2	3	4
Longmont	50,000	25,000	25,000	15,000	12,000
Las Animas	300,000	170,000	90,000	50,000	15,000

TABLE 2. Bird usage of bait trays during 5-minute observation periods, amount of bait consumed, and affected birds observed or heard during dispersal studies in Colorado, 1979.

Site	No. of Trays	Birds Per Minute Per Tray				Pounds of Bait Consumed				No. of birds affected after treatment			
		1	2	3	4	1	2	3	4	1	2	3	4
Longmont	6	18.3	8.38 ^a	6.6	1.8	3.5	1.9	1.7	0.03	39	22	19	5
Las Animas	12	12.2	9.8	4.2	3.5	6.3	4.2	1.9	1.1	54	42	37	37

^a/15 minute observation period.