University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Bird Control Seminars Proceedings | Wildlife Damage Management, Internet Center for

9-16-1970

LABORATORY AND FIELD STUDIES WITH AN AVIAN REPELLENT FOR SPROUTING SEEDS

F. R. Frank
The Upjohn Company, Kalamazoo, Michigan

Edward W. Schafer Jr.
U.S. Bureau of Sport Fisheries and Wildlife, Federal Center, Denver, Colorado

Joseph L. Guarino
U.S. Bureau of Sport Fisheries and Wildlife, Federal Center, Denver, Colorado

Follow this and additional works at: http://digitalcommons.unl.edu/icwdmbirdcontrol

Part of the Environmental Sciences Commons

Frank, F. R.; Schafer, Edward W. Jr.; and Guarino, Joseph L., "LABORATORY AND FIELD STUDIES WITH AN AVIAN REPELLENT FOR SPROUTING SEEDS" (1970). *Bird Control Seminars Proceedings.* Paper 198.
http://digitalcommons.unl.edu/icwdmbirdcontrol/198

This Article is brought to you for free and open access by the Wildlife Damage Management, Internet Center for at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Bird Control Seminars Proceedings by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

LABORATORY AND FIELD STUDIES WITH AN AVIAN REPELLENT FOR SPROUTING SEEDS

F. R. Frank[1], E. W. Schafer, Jr.[2] and J. L. Gaurino[2]

Development of safe bird management techniques has become necessary for the economic survival of many parameters of agriculture. Competition between man and birds for resources has always occurred but has become increasingly complex as the human population increased. As man's demand for additional food and fiber has required more intensive cultivation of arable land, certain birds have caused increasingly costly losses. Bird damage has become so severe in some areas that tillage of certain crops is threatened.

In some situations, troublesome bird populations can be reduced to tolerable levels; however, the primary objective of bird management should be the alleviation of damage to crops and not destruction of birds. All birds possess beneficial qualities and federal or state laws protect most species. To avoid killing birds and still reduce bird damage to agricultural production, the potentially most useful approach to bird management is the development of non-toxic repellents.

DRC-3324, a butyramide, is a chemical example of this approach to bird management. It was initially examined under laboratory conditions by Denver Wildlife Research Center scientists following suggestion of candidacy for this purpose by Upjohn personnel. The chemical met all major criteria established for judging the relative potential of compounds for repellent purposes: the effective concentration was very low; the toxic concentration was substantially greater than the repellent level; it was relatively non-toxic to mammals; and was not phytotoxic to corn seed.

The objective of these trials was to evaluate the effectiveness of the chemical under field conditions as a deterrent to red-winged blackbirds *(Agelaius phoeniceus)* and common grackles *(Quiscalus quiscula)* damaging freshly planted sweet-corn seed.

MATERIALS AND METHODS

Two trials, one each in 1969 and 1970, were conducted at the Asgrow Research Station near Bridgeton, New Jersey. In 1969, treatments consisted of dusting corn seed with 0, 0.5, and 3.0 percent of seed weight with the chemical. Each treatment was applied to a three acre plot and each was separated from another by equivalent acreage. Treatments were replicated on opposing sides of a swamp known to be a bird harbor. Twenty-four randomly selected sub-units, each containing

[1] The Upjohn Company, Kalamazoo, Michigan.
[2]U.S. Bureau of Sport Fisheries and Wildlife, Federal Center, Denver, Colorado.

approximately 200 seeds, were observed for damage in each three-acre plot. Destruction was determined daily starting the day of planting and continuing until plants were approximately four inches tall. Two 6 foot by 50 foot sections in each plot were covered with screen to determine field germination of the seed.

The 1970 experimental procedure was similar except that plot size was reduced to one acre and the trial was run on four widely separated areas in the vicinity of the research station. The treatments on three of the sites consisted of 0 and 0.5 percent of seed weight of the chemical and the seed used in the fourth site was treated with 0 and 0.1 percent of DRC-3324.

RESULTS AND DISCUSSION

In the laboratory, DRC-3324 was observed to be an effective repellent at low concentrations in several avian species and in species in which the comparisons were done, the toxic concentration is considerably greater than the repellent concentration (Table 1). It is relatively non-toxic to mammals (LD_{50}> 326 mg/kg in rats) and was not phytotoxic to corn at 0.5 percent.

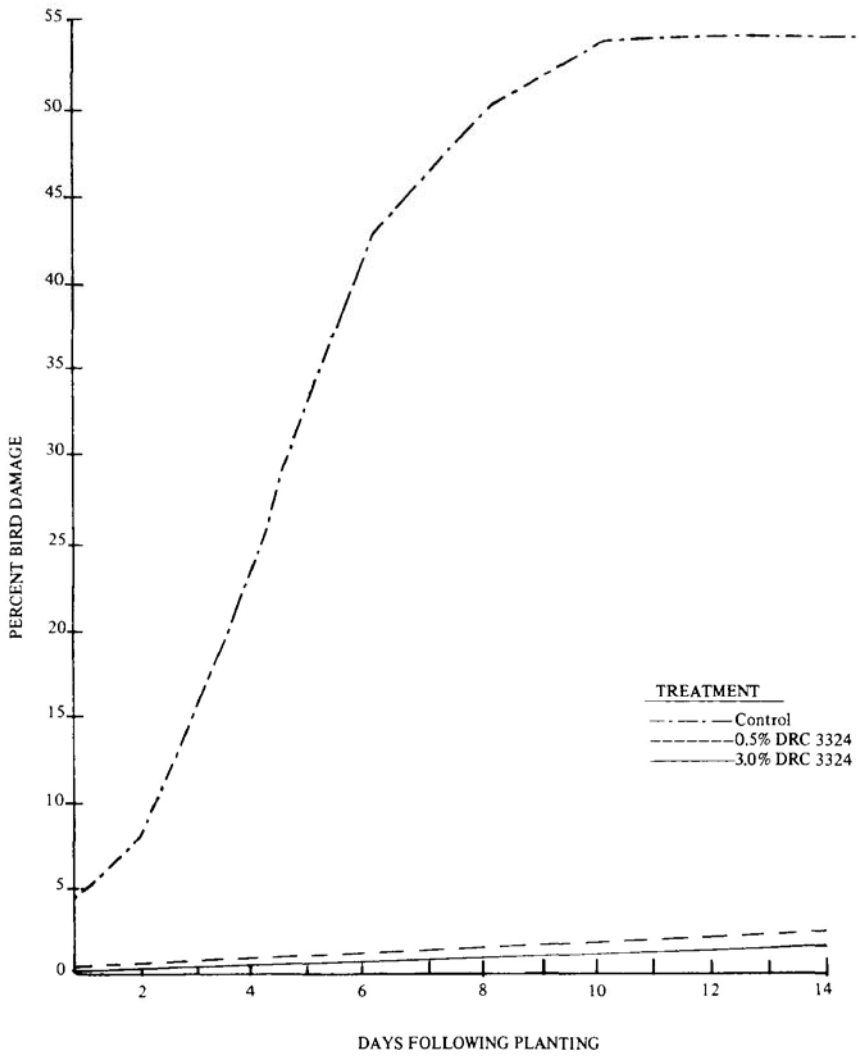
In 1969, the nontreated fields sustained a 53 percent loss of seeds and seedlings while losses were 1.9 and 1.8 percent when seed was treated with 3.0 and 0.5 percent of the chemical, respectively (Figure 1). Seventy percent of the damage to treated plots occurred within five days of planting, while nontreated fields sustained high, continuous destruction until the seedlings were beyond the damage stage (about three to four inches high). This indicates that the crop-destroying behaviour of these birds can be altered and that reduction of animal numbers is not necessary to prevent crop damage.

In 1970, bird damage varied with location, but was always greater in nontreated plots. The most dramatic effect was observed in a field adjacent to a roosting habitat. Sixty-five percent of the seeds and seedlings in the control plot were destroyed compared to less than eight percent of those treated with 0.5 percent of the chemical. The other sites represented areas less frequently visited by birds which was reflected in the relatively reduced seed destruction in these fields. The two plots treated with 0.5 percent of the chemical sustained three percent losses as opposed to ten percent losses in the nontreated sites. When 0.1 percent was used as a seed treatment, destruction was 8.2 and 2.8 percent in nontreated and treated plots, respectively. Germination was identical in treated and nontreated fields.

All observations indicate that DRC-3324 is a very effective bird repellent. Additional information is being acquired to determine if the chemical can safely be used on agricultural and horticultural crops and against other species of birds.

Table 1. R_{50} and LD_{50} of DRC-3324 For Several Bird Species

Species	R_{50} %	LD_{50} mg/kg
Red-winged Blackbird	.091	75
Ring-neck Pheasant	.178	--
House Sparrow	.237	>100
California Quail	.178	--
Common Grackle	.056	>100
Tri-colored Blackbird	.032	--
Starling	- -	100
Common Crow	- -	>100


55
50
45
40
35
30
25
20
15
10
5
0
PERCENT BIRD DAMAGE
2
4
6
8
10
12
14
DAYS FOLLOWING PLANTING
TREATMENT
Control
0.5% DRC 3324
3.0% DRC 3324