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BIRD AND MAMMAL DAMAGE TO FIELD CORN IN OHIO, 1977-79¹

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ABSTRACT. Blackbird and mammal damage to corn is widespread throughout Ohio. Surveys of damage from 1977-79 revealed, however, that blackbirds annually destroyed less than 1% of the corn crops in Ohio, which amounts to a loss of 4-7 million dollars per year statewide. Mammal damage averaged 0.13% over the 3-year period. Over 97% of the cornfields in Ohio receive less than 5% damage from blackbirds, and these losses comprise more than 70% of the total dollar loss in the state.

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INTRODUCTION

Agriculturalists have long been concerned with crop losses due to blackbirds (Icteridae) in the United States. This concern has been particularly true for Ohio, which has the highest breeding season density of red-winged blackbirds (*Agelaius phoeniceus*) of any state (Dolbeer and Stehn 1979). Accurate estimates of losses to birds are fundamental in evaluating the necessity for, and effectiveness of, damage control. In 1966 a survey was initiated in 8 Ohio counties to obtain an estimate of blackbird damage to ripening field corn. This survey was expanded to 19 counties in 1969 and was conducted annually from 1966 through 1976, with the exception of 1973.

These surveys employed a low sampling rate and were restricted primarily to high

damage counties. Thus, they could not be used to estimate statewide losses. In an attempt to secure an unbiased estimate of blackbird damage to corn statewide, the survey was modified in 1977 to include all Ohio counties. In addition, estimates of mammal damage to ripening corn were included in the 1977-79 surveys. Our paper summarizes the results of the statewide assessment of blackbird and mammal depredations on field corn in Ohio during 1977-79.

METHODS

The survey was conducted using a 3-step cluster sampling technique described by Stickley et al. (1979a). The counties chosen for the survey were randomly selected with replacement, and probability of being chosen, proportional to the corn acreage in the county. Within each county, selected sample plots equivalent to 2.6 km² (one square mile) sections were chosen at random, without replacement. Further details and discussion of experimental design and data analysis are presented by Stickley et al. (1979a).

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To quantify damage to field corn, a visual estimate was made of percentage surface area damaged on the corn ear. A differentiation was made between primary and secondary damage, and both types were recorded. Primary damage resulted directly from an animal feeding on the corn kernel. Secondary damage resulted from the husk being opened by an animal, thereby exposing the ripening ear of corn to atmospheric moisture. Under correct climatic conditions, molding and/or sprouting sometimes developed within the damaged ear (Woronecki et al. 1979). Combining primary and secondary damage figures produced an estimate of total damage. We recorded the percent damage in increments of 1 between 0% and 5%, increments of 5 between 5% and 30%, and increments of 10 between 30% and 100%. An ear of corn knocked to the ground was considered as 100% mammal damage except that portion of the ear that was obviously bird-damaged prior to mammal damage.

RESULTS

During the 3-year period from 1977 to 1979, we sampled 1,027 plots. The average time per sample plot was 1.4 (1.1-1.8) man-hours, and the average annual cost was \$3,837 (\$3,657-3,953) for salaries and travel.

BIRD DAMAGE. In Ohio during the period 1977-79, blackbird damage to ripening field corn ranged from 0.67% to 0.80% surface area damaged per ear, which amounted to a loss of 3.9 to 6.8 million dollars (table 1). Stickley et al. (1979b) conducted similar surveys in 1977 and reported blackbird damage to field corn averaged 0.48% and 0.39% surface area damaged per ear in Kentucky and Tennessee,

respectively. These damage figures represented losses of 1.22 million dollars in Kentucky and 0.39 million dollars in Tennessee. In Michigan, blackbird depredations to field corn in 1979 averaged 0.25% surface area destroyed, representing an economic loss of 1.36 million dollars (Kelley 1979). Thus, Ohio appears to receive a greater percent and dollar loss of corn to blackbirds than do these nearby states. Less intense surveys of blackbird damage to corn on a nationwide basis in 1970 and 1971 by Stone et al. (1972) and Stone and Mott (1973) support this finding. They found Ohio had the third highest bushel loss in 1970 and the highest loss in 1971 of the major corn growing states.

MAMMAL DAMAGE. In past surveys, mammal damage has been neglected in estimating corn losses to the producer. Mammal damage, principally raccoon (*Procyon lotor*), was negligible on a statewide scale (table 1). High damage in a few sample plots indicate, however, some individual growers incurred tangible losses. The mammal damage estimate reported here is similar to estimates reported in Kentucky and Tennessee (Stickley et al. 1979b).

DISCUSSION

Although the overall blackbird damage to ripening field corn in Ohio may reach several million dollars annually, the per hectare loss is quite low in most fields. Assuming that the distribution of damage

TABLE 1
Primary, secondary and total mean damage to ripening field corn
attributable to blackbirds and mammals in Ohio, 1977-79.

Year	1° Blackbird Damage (%)	2° Damage (%)	Total Blackbird Damage			Total Mammal Damage		
			%	Bu. * (Mil.)**	Dollars (Mil.)	%	Bu. (Mil.)	Dollars (Mil.)
1977	0.59	0.08	0.67	2.5	3.9	0.16	0.60	0.93
1978	0.60	0.20	0.80	3.0	5.9	0.10	0.38	0.75
1979	0.67	0.04	0.71	2.7	6.8	0.13	0.49	1.24
3 yr. Av.	0.62	0.11	0.73	2.7	5.5	0.13	0.49	0.97

*Bushels

**Millions

in sampled plots is representative of the distribution of damage among fields, then of the 1,027 fields sampled during 1977-79, 90% had less than 1% damage and 99% had less than 5% damage (table 2). Jugenheimer (1976) reported that losses of corn caused by insects, weeds, disease and fungi total over 20% of potential harvest and that harvesting techniques often lose 5% or more of the crop. When compared to losses from these other sources, corn losses due to blackbirds appear insignificant for most farmers. The few farmers receiving high damage, however, were hurt economically. Although only about 1% of the fields received greater than 5% loss to birds, these fields incurred about 25% of the total dollar loss (fig. 1).

Dolbeer (1980) developed a cost-benefit graph to compare the costs versus benefits of bird-damage control in corn. His cost-benefit graphs revealed that, for most corn producers, the damage is too insignificant in the context of a total farm program to justify an economic investment in currently available bird control techniques (e.g., Avitrol, propane exploders). The emphasis in damage control should be placed on that 1% group of fields that are receiving 25% of the loss. Additional research effort should be directed toward the development of a safe, effective and economical avian repellent that can be used by all growers suffering losses to birds.

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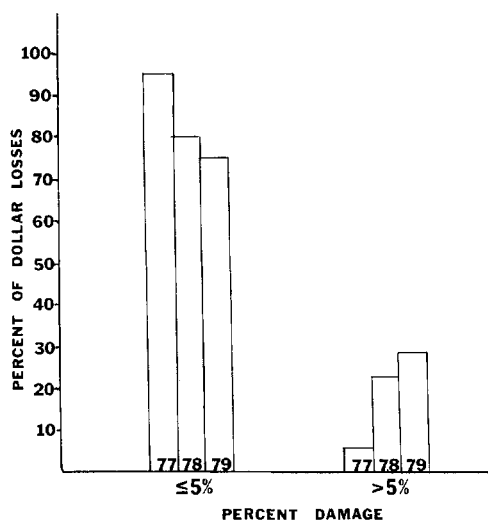


FIGURE 1. Percent of total dollar loss caused by blackbirds in ripening field corn derived from fields with less than and greater than 5% damage.

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TABLE 2

Distribution of plots of field corn into various percent damage categories from survey of blackbird damage to ripening corn in Ohio, 1977-79.

Year	No. Plots Sampled	No. Counties Sampled	Percentage of Plots in Damage Category				
			0%	>0- <1%	≥1- <5%	≥5- <10%	≥10%
1977	412	30	20.4	72.8	6.3	0.2	0.2
1978	279	54	11.4	73.5	13.3	1.4	0.4
1979	336	60	13.1	75.9	9.2	0.9	0.9
3 yr. Av.	342	48	15.0	74.1	9.6	0.8	0.5

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