

## BIRD AND MAMMAL DAMAGE TO MATURE CORN IN KENTUCKY AND TENNESSEE

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*Abstract.* In a survey to determine the extent of blackbird and mammal damage to ripening field corn in Kentucky and Tennessee, 268 0.5 ha plots in 23 Kentucky counties and 170 plots in 13 Tennessee counties were examined in the fall of 1977. Plots were randomly chosen so that counties with more corn had a greater chance of being surveyed. In Kentucky, blackbird damage to ripening corn averaged 0.48%, or approximately 609,000 bushels valued at \$1,218,000 out of a total crop valued at \$253,800,000. In Tennessee, blackbird damage averaged 0.39% or approximately 185,000 bushels valued at \$380,000 out of a total crop valued at \$97,272,000. Mammal damage, mainly raccoon (*Procyon lotor*), was also negligible, with estimates of 0.17% of the corn destroyed by mammals in both states. This amounted to a loss approximating \$430,000 for Kentucky and \$165,000 for Tennessee. Although overall blackbird and mammal damage to ripening corn in Kentucky and Tennessee during 1977 is estimated to be 1,114,000 bushels valued at \$2,193,000, the per ha loss is so low it precludes the use of most damage control techniques. However, damage in a few plots sampled was sufficiently high to warrant the use of control techniques. In comparison with 1970 and 1971 surveys, damage appears to be increasing.

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People in agribusiness often complain about blackbird (Icteridae) damage to ripening field corn in Kentucky and Tennessee. Two national surveys, which included Kentucky in 1970 and 1971 and Tennessee in 1970, were conducted by the USDA Statistical Reporting Service in cooperation with the U.S. Fish and Wildlife Service (Stone et al. 1972, Stone et al. 1973). We decided that a larger, more definitive survey in this 2-state area was needed because of the variance in recent claims by some farmers and agriculturalists and the above-mentioned surveys. We surveyed mammal damage also because it can be locally severe.

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### METHODS

We used a 3-stage cluster sampling technique with first, second, and third stages defined as counties within a state, 0.5-ha plots within a county, and 50 consecutive ears of corn within a plot, respectively. The numbers of randomly located counties and plots were selected with probability proportional to the number of corn acres harvested in 1975. The number of counties selected with replacement and 0.5 ha plots selected without replacement were computed to minimize the damage estimate variances subject to a manpower constraint of approximately 22 man-weeks. These calculations indicated selection of 4.4 plots per 4047 ha of corn in each of 28 Kentucky counties and 8.0 plots per 4047 ha of 15 Tennessee counties (some counties selected twice in both states). In the survey conducted between August 17 and September 7, 1977, 268 plots in 23 Kentucky counties and 170 plots in 13 Tennessee counties were sampled. Details and discussion of the experimental design and data analysis were presented by Stickley et al. (1978).

## RESULTS AND DISCUSSION

*Bird damage:* Most of the counties sampled were in central and western Kentucky (Fig. 1) and Tennessee (Fig. 2). In Kentucky, blackbird damage to ripening field corn averaged 0.48% surface area damaged per ear (Table 1) or approximately 609,000 bushels valued at \$1,218,000 out of a total crop valued at \$97,272,000 (personal communication, Tennessee Crop Reporting Service). Anderson county had the greatest amount of damage in Kentucky—3.3%; Blount county had the greatest amount in Tennessee—1.0%. In Kentucky the greatest damage in any 1 plot was 4.7%; in Tennessee it was 4.5%. No damage occurred in 33% of Kentucky's plots (Fig. 3), and in 28% of Tennessee's plots (Fig. 4). The loss is probably somewhat less than the percentages given because blackbird damage occurs primarily to top kernals, which are smaller than kernals farther down the cob.

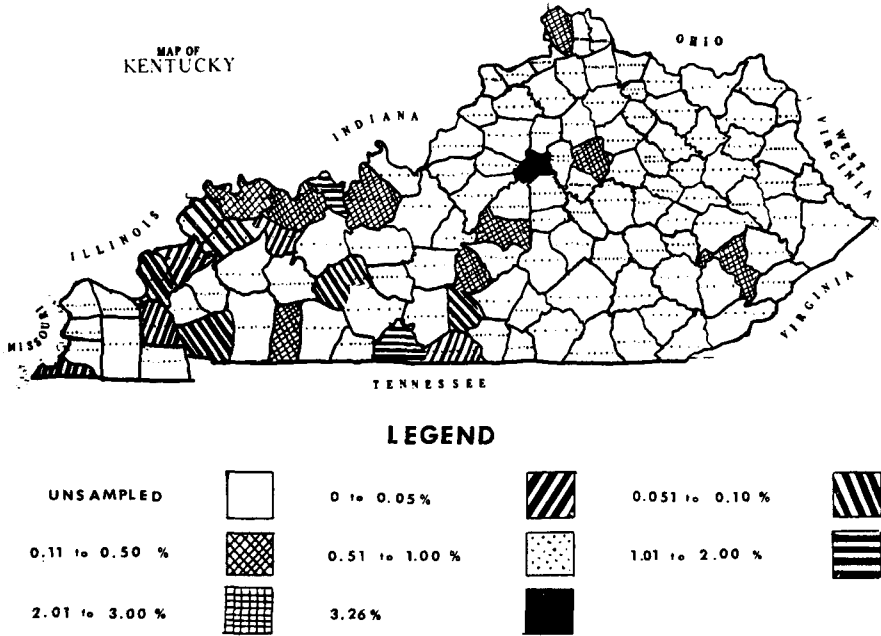
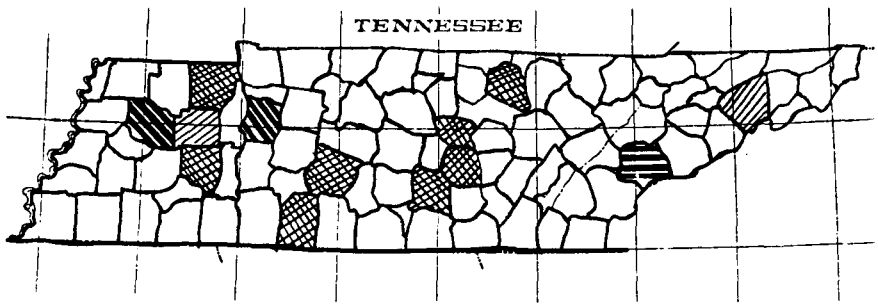


Fig. 1. Locations of sampled counties in Kentucky. Legend represents bird damage to percentage of corn ear surface area.

Although bird damage was relatively minor, it appears to have increased in both states, especially Tennessee, since the 2 earlier damage surveys reported by Stone (1972, 1973). Unfortunately, statistical comparisons cannot be made between the earlier surveys and ours because of differing methods of sampling. In Kentucky, the earlier surveys estimated mean bushel per acre loss to be 0.3 and 0.1 in 1970 and 1971, respectively, compared with our estimate of 0.4 in 1977. In Tennessee, the 1970 mean bushel per acre loss to birds amounted to 0.1 (Stone et al. 1972) compared with 0.2 in 1977.

When percentage of corn ears opened was examined, blackbird activity was apparently considerably greater in 1977 than in 1970 or 1971. Kentucky had 2.5 and 1.9% of its ears opened in 1970 and 1971, respectively (Stone et al. 1972 and 1973), compared with 5.0% in 1977. The contrast was even more pronounced in Tennessee where 1.6% of the ears were opened in 1970 (Stone et al. 1972) compared with our figure of 8.1% in 1977.



### LEGEND

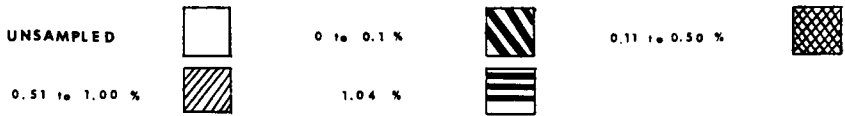


Fig. 2. Locations of sampled counties in Tennessee. Legend represents bird damage to percentage of corn ear surface area.

Table 1. Bird and mammal damage, in terms of percentage surface area of corn ears destroyed, in Kentucky counties in 1977.

| <i>County</i>      | <i>% by bird</i> | <i>% by mammal</i> | <i>No. plots</i> |
|--------------------|------------------|--------------------|------------------|
| Allen              | 1.47             | .00                | 4                |
| Anderson           | 3.26             | .10                | 1                |
| Boone              | 2.56             | .01                | 3                |
| Breckenridge       | .26              | .00                | 10               |
| Butler             | .07              | .00                | 6                |
| Crittenden         | tr               | .00                | 6                |
| Daviess            | .15              | .00                | 63               |
| Fayette            | 34               | .00                | 3                |
| Fulton             | .02              | .00                | 5                |
| Green              | .13              | .23                | 5                |
| Hancock            | 1.11             | .00                | 2                |
| Henderson          | .15              | .12                | 26               |
| Livingston         | .10              | .00                | 4                |
| Marion             | .44              | .52                | 6                |
| Marshall           | tr               | .12                | 9                |
| McLean             | tr               | .00                | 11               |
| Metcalfe           | .10              | .40                | 5                |
| Monroe             | .04              | .00                | 6                |
| Perry              | 2.68             | 2.75               | 1                |
| Todd               | .11              | .05                | 12               |
| Trigg              | .07              | .18                | 5                |
| Union              | .05              | tr                 | 62               |
| Webster            | .01              | .15                | 13               |
| Statewide estimate | .48              | .17                |                  |
| Standard error     | .17              | .10                |                  |

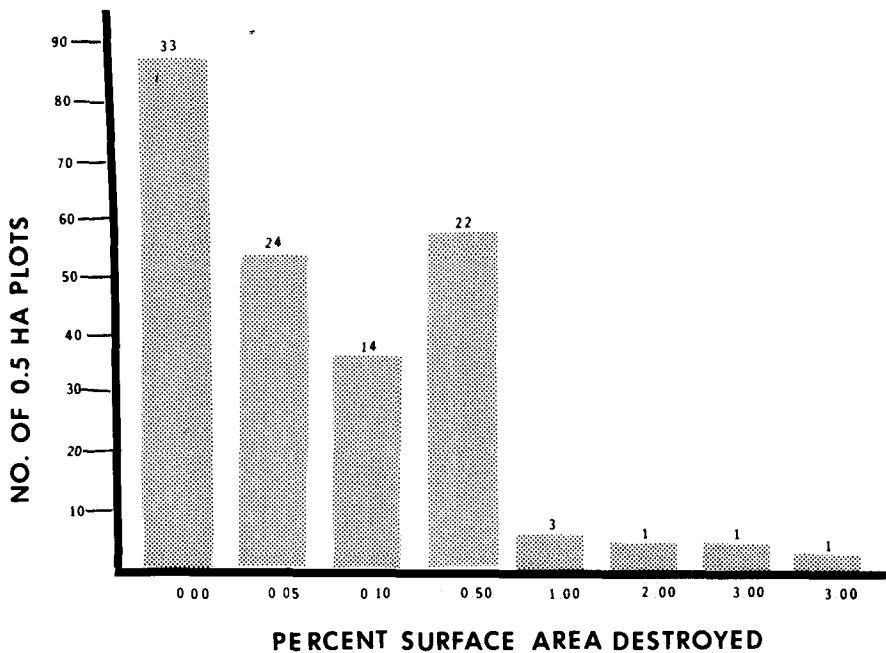


Fig. 3. Bird damage to 0.5-ha plots of ripening corn in Kentucky in 1977 by percentage of surface area of corn ears destroyed. (Numbers at top of columns indicate percentage represented by each category.)

Table 2. Bird and mammal damage, in terms of percentage surface area of corn ears destroyed, in Tennessee counties in 1977.

| <i>County</i>      | <i>% by bird</i> | <i>% by mammal</i> | <i>No. plots</i> |
|--------------------|------------------|--------------------|------------------|
| Blount             | 1.04             | .45                | 4                |
| Carroll            | .56              | .26                | 11               |
| Coffee             | .21              | .00                | 46               |
| DeKalb             | .24              | .72                | 7                |
| Gibson             | .10              | .00                | 21               |
| Green              | .86              | .18                | 11               |
| Henderson          | .40              | .02                | 12               |
| Henry              | .38              | .28                | 16               |
| Humphreys          | .10              | .00                | 6                |
| Lawrence           | .38              | .16                | 9                |
| Maury              | .44              | .00                | 10               |
| Overton            | .12              | .00                | 5                |
| Warren             | .38              | .44                | 12               |
| Statewide estimate | .39              | .17                |                  |
| Standard error     | .08              | .06                |                  |

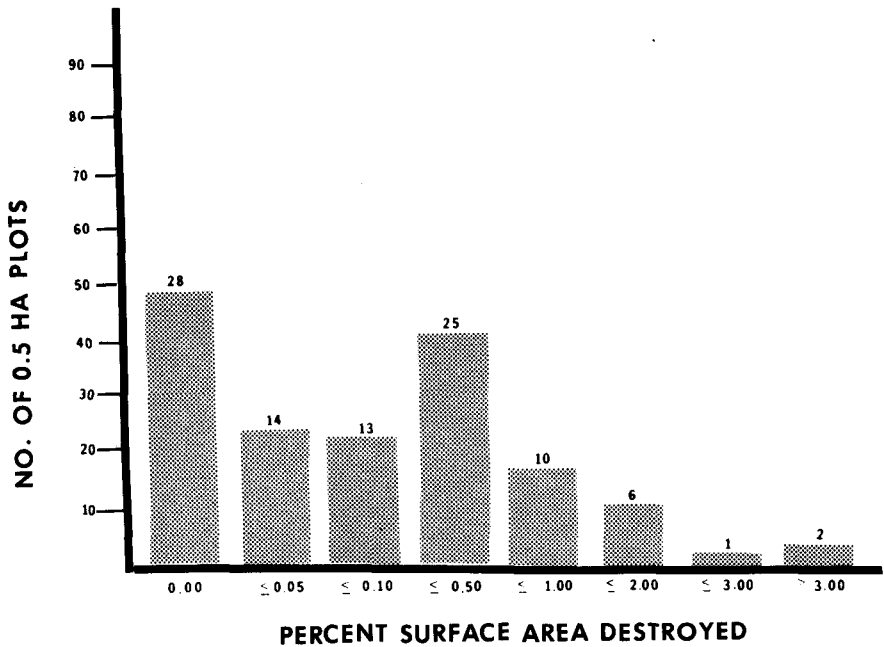


Fig. 4. Bird damage to 0.5-ha plots of ripening corn in Tennessee in 1977 by percentage of surface area of corn ears destroyed. (Numbers at top of columns indicate percentage represented by each category.)

Again, accurate comparisons cannot be made between the earlier surveys and ours; however, the percentage of ears opened suggests an increase in bird activity.

We realized at the completion of the survey that there was slight bias in our estimate if it is assumed that higher levels of bird damage occur in field edges as observed in sunflower fields (Knittle 1976). This factor is quantified by Stickley et al. (1978). Such a bias would result in large fields where 0.5 ha plots were located within the field's interior. However, some bias could have been compensated for in smaller fields where edge rows have a greater chance of being sampled.

*Mammal damage:* Mammal damage, mainly raccoon was also negligible (Tables 1 and 2). Both Kentucky and Tennessee produced estimates of 0.17% of the surface area of corn destroyed by mammals. In Kentucky 230,000 bushels were destroyed at a cost of \$430,000. In Tennessee, 90,000 bushels were destroyed at a cost of \$165,000. Perry county was high in Kentucky with 2.8% and DeKalb county was high in Tennessee with 0.7%.

#### General

We obtained man-hour data for 271 of the 438 plots surveyed. We averaged 1.7 man-hours per field, with a range of 0.8 man-hours per field for an experienced biologist to 3.1 for a new employee.

Although the overall blackbird and mammal damage to ripening corn in Kentucky and Tennessee during 1977 is estimated to be 1,114,000 bushels valued at \$2,193,000, the per ha loss is so low it precludes the use of most damage control techniques. However, damage in a few plots sampled was sufficiently high to warrant the use of control techniques.

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