

## HAS AN INTEGRATED PEST MANAGEMENT APPROACH REDUCED BLACKBIRD DAMAGE TO SUNFLOWER?

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Since the mid-1970s many new and modified damage abatement methods have been used to reduce blackbird damage to ripening sunflower in the northern Great Plains. To assess the overall impact of these techniques, we analyzed the dynamic relationship between breeding blackbird densities and sunflower damage. Breeding density estimates were made at both the regional and county levels, whereas, sunflower damage estimates were made at the county level only. Periodic regional estimates of breeding densities between 1967 and 1998 for red-winged blackbirds (*Agelaius phoeniceus*), common grackles (*Quiscalus quiscula*), and yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) showed no differences among years. To increase our ability to detect changes in breeding density, we started intensive county-level surveys in 1996. These surveys, in four counties in North Dakota and South Dakota, showed that blackbird densities were greater in 1998 and 1999 than during the previous two years. We surveyed sunflower damage in two of these counties from 1994 to 1998 and found no difference in damage ( $\bar{x} = 1.8\%$ ) among years. In 1997 and 1998, with the two other counties added to the survey, we found that damage was similar between years, averaging 2.2%. Dollar loss per hectare was trending lower in three of the study counties that had a historical database for comparison. This supports the idea that 'local' breeding densities are not correlated with damage levels. We will continue to use annual estimates of breeding densities and sunflower damage to assess the effects of an evolving Integrated Pest Management program.