

USA RICE FEDERATION PERSPECTIVES ON THE IMPACTS OF BLACKBIRDS ON THE RICE INDUSTRY

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Abstract: The USA Rice Federation comprises all segments of the United States rice industry. The federation was formed by 3 charter members: the U.S. Rice Producers' Group, the Rice Millers' Association and the USA Rice Council. Today's rice industry faces serious challenges on every front - lack of an adequate economic safety net for producers, increased regulatory controls, trade barriers, and heightened competition. To be successful, rice producers must manage their resources, decrease their production costs, increase crop yields, and manage diseases and pests. Blackbirds are pests that have a serious economic impact on the rice industry in Louisiana, Texas, Arkansas, Missouri and other states. The birds annually cause millions of dollars in damage to both newly planted rice and ripening rice. Additional economic losses from blackbirds are incurred when depreciated fields must be replanted, birds must be hazed and frightened from susceptible rice fields and harvests are delayed. Current blackbird management techniques available to rice growers are limited by effectiveness, cost and logistics. New and improved management strategies are needed to reduce blackbird damage to rice and improve profitability to growers.

Key words: blackbird damage, blackbirds, Louisiana, rice, USA Rice Federation.

POPULATION DYNAMICS OF THE MOST ABUNDANT BIRD IN NORTH AMERICA: THE RED-WINGED BLACKBIRD

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Abstract: The red-winged blackbird (*Agelaius phoeniceus*) is the most abundant bird in North America, based on survey-wide (United States and southern Canada) results from the North American Breeding Bird Survey (BBS), 1966-2000. The numerical success of the red-winged blackbird is related to the species' adaptability to various wetland and upland habitats for nesting and roosting and divergent feeding and migratory patterns for males and females that minimize intersexual competition. Based on numbers derived from nationwide (United States) winter roost surveys conducted in the 1970s and modeling of the annual cycle, I estimate that the North American redwing population ranges from a low of at least 100 million birds in late April (prebreeding) to more than 200 million birds in late July (postbreeding) during a typical year. Thus, more than 100 million redwings must die naturally each year in the course of the annual cycle to maintain the population at a baseline stable number of 100 million. However, BBS data indicate the North American redwing population has shown mean annual declines ($P < 0.01$) of 1% from 1966-2000, and of 0.9% from 1980-2000. Twenty-three of the 59 U. S. states and Canadian provinces surveyed showed declines ($P < 0.05$) and only 3 indicated increases, 1966-2000. For the years, 1980-2000, 22 states and provinces showed declines and 4 indicated increases. The steepest declines have occurred in the Great Lakes region and eastern United States and Canada. These population declines appear related to agricultural land-use changes in which grassland (hay and pasture) habitats have declined and row crop acreage has expanded, changes that have negatively affected many grassland birds. Proposals to reduce red-winged blackbird populations to alleviate crop depredations must be carefully considered in light of the current continental population decline driven by habitat changes. In addition, because of the high level of natural mortality that occurs annually in the population, it will be difficult to quantify the impact of additive mortality from management actions such as poisoning programs.

Key words: *Agelaius phoeniceus*, breeding bird survey, North America, red-winged blackbird.

U.S. FISH AND WILDLIFE SERVICE PERSPECTIVE ON CONTROL OF BLACKBIRDS CAUSING CROP DAMAGES

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Abstract: The U.S. Fish and Wildlife Service (USFWS) supports credible, publicly reviewed, science-based efforts to manage migratory birds, including blackbirds that damage crops. The USFWS will work with producers, government agencies (e.g., Wildlife Services, U.S. Department of Agriculture) and other stakeholders (including those opposed to lethal bird control) to find effective solutions to migratory bird damage. The USFWS is charged with implementing the Migratory Bird Treaty Act which protects migratory birds, including blackbirds. Under the Act, the USFWS may issue permits for actions, normally not permissible, that impact migratory birds (e.g., depredation control and scientific collecting). Requests for depredation control permits, including those for use of chemical agents, are assessed on a case-by-case basis. A depredation order, authorized through the regulatory process, allows restricted actions to address migratory bird depredation on agricultural and aquacultural products. The USFWS supports efforts to increase understanding of blackbird issues through research and peer-reviewed studies and has even recommended specific research needs to Wildlife Services personnel. The USFWS supports finding effective solutions to blackbird depredation on sunflower crops in North Dakota and South Dakota, but is concerned that actions outlined in preliminary proposals to use DRC-1339 may not be effective in reducing crop losses, may adversely impact nontarget migratory birds, and may result in long-term population impacts. Additional data and analyses are needed to allow for a science-based assessment of potential control measures. The USFWS supports further development of a broad range of alternatives to address blackbird impacts on sunflower and other crop production.

Key words: blackbirds, Migratory Bird Treaty Act, permits, sunflower, U.S. Fish and Wildlife Service.

DISTRIBUTION OF A RADIO-LABELED AVICIDE IN TWO SPECIES OF BIRDS FOLLOWING A SINGLE, ORAL DOSE

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Abstract: Every year millions of birds migrate through the central plains of the United States. They pause to feed on agricultural crops such as sunflower, corn, and small grains, causing significant damage. One possible solution to mitigate this problem is to reduce the population of these birds. While the use of an avicide presents dangers to certain nontarget bird species, the benefits could outweigh the risks. One candidate avicide for this purpose is 3-chloro-4-methyl-aniline hydrochloride (CPTH). This chemical appears to pose minimal hazard to mammalian species (LD_{50} s greater than 1000 mg/kg for species tested) but is extremely toxic to blackbirds (LD_{50} for the red-winged blackbird <10 mg/kg). In addition, CPTH is less toxic to nontarget bird species such as hawks and most granivorous songbirds (LD_{50} s between 100 and 500 mg/kg) but extremely toxic to owls and a few granivorous songbirds. Thus, concerns surround use of this chemical in an uncontrolled field environment.

What information is known about CPTH comes from pathological examination of exposed birds. CPTH was found to cause damage to the proximal convoluted tubules in sensitive avian species. This observation, along with an observed elevation in the level of uric acid in the birds, leads us to classify this compound as a nephrotoxin. The hypothetical mode of action involves bioactivation in the liver resulting in damage to the kidney and interruption of normal excretion processes leading to death by uric acid poisoning.

To help elucidate the mechanism of action, a CPTH resistant species (dark-eyed junco, *Junco hyemalis*) and CPTH susceptible species (red-winged blackbird, *Agelaius phoeniceus*) were dosed with a radioactive tracer. The LD_{50} for red-winged blackbirds is 2.4 mg/kg while that for dark-eyed junco is significantly higher at ~170 mg/kg. At specified time intervals after administration of the dose, the birds were euthanized and a blood sample taken. Samples of tissues, blood, drinking water, feed, and feces from each bird were combusted using a biological oxidizer. The resultant carbon dioxide (made up partially of the ^{14}C from the labeled CPTH) was collected in a scintillation cocktail and the radioactivity counted on a liquid scintillation counter.

The total radioactivity present in each tissue was plotted for both species as a function of time after dose. For the majority of the tissues for both species the elimination curve followed the same pattern. The initial concentrations were relatively high and followed a first-order elimination process with greater than 95% of the dose being eliminated from the body by 4 hours. The exceptions to these results were the elimination curves for kidney and liver in the red-winged blackbird. For these samples, the concentrations remained significantly elevated above background for the entire 24-hour test period. The concentrations in blackbird kidney tissue were 15 times greater than those in junco kidney tissue by the end of the 24-hour test period. Also of interest was the observation that the concentrations in blackbird kidney were greater than those in the liver by up to 2 orders of magnitude, indicating significant retention in the kidney.

These results suggest that CPTH is acting as a nephrotoxin for the red-winged blackbird. The strongest evidence for this is the elevated concentrations in the kidney of the red-winged blackbirds up to 24 hours following administration of the dose. The concentration remains at relatively the same level for the entire test period, indicating that there is virtually no elimination of the CPTH from the kidney of this species. The minimal concentration of ^{14}C CPTH in the blood and other organs also indicates that the CPTH is bound to the tissue of the kidneys and is not freely circulating in the bloodstream. Comparing this with the rapid 4 hour elimination in the resistant species and we are left with strong evidence for the mode of action of this potent avicide.

Key words: avicide, red-winged blackbird, 3-chloro-4-methyl-aniline hydrochloride, CPTH, metabolism, sunflower.

WILDLIFE SERVICES NEPA COMPLIANCE AND STATUS OF THE SUNFLOWER PROTECTION EIS

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Abstract: The National Environmental Policy Act (NEPA) (Public Law 91-190, 42 U.S.C. 4321 et seq.) requires that all major federal actions be evaluated for their potential impact on the quality of the human environment. Council on Environmental Quality (CEQ) regulations require “. . . an early and open process for determining the scope of issues to be addressed and for identifying significant issues related to a proposed action.” The Animal and Plant Health Inspection Service (APHIS) follows CEQ regulations implementing NEPA (40 CFR 1500 et seq.), USDA (7 CFR 1b), and APHIS NEPA Implementing Guidelines (7 CFR 372) by conducting scoping, analysis, documentation, and project monitoring. The sunflower protection Environmental Impact Statement (EIS) was initiated to determine if a new direction should be taken by Wildlife Services to protect ripening sunflowers from damage caused by blackbirds and, if so, what environmental effects might result. Issues related to the preliminary alternatives were developed using an Interdisciplinary Team approach with APHIS, the North Dakota Department of Agriculture, North Dakota State University, the North Dakota Game and Fish Department, the South Dakota Department of Agriculture, South Dakota Game, Fish and Parks, and the U.S. Fish and Wildlife Service. Issues were also identified through scoping from interested publics. On March 22, 2001, requests for public involvement were published in the Federal Register (66 FR 16028) and in newspapers with circulation throughout North Dakota and South Dakota. On May 21, 2001, a *Notice of Intent* to proceed with an EIS was published in the Federal Register (66 FR 27933) and in the same newspapers used previously. A *Notice of Availability* for an APHIS sunflower protection scoping document was also published in the Federal Register (66 FR 63356) and the same newspapers, and was sent to individuals and organizations with interest in the APHIS sunflower protection program.

Key words: blackbirds, National Environmental Impact Statement, NEPA, sunflower, U.S. Fish and Wildlife Services, Wildlife Services.

SPRING DISPERSAL PATTERNS OF RED-WINGED BLACKBIRDS (*AGELAIUS PHOENICEUS*) STAGING IN EASTERN SOUTH DAKOTA

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Abstract: Red-winged blackbirds (*Agelaius phoeniceus*) are very abundant summer residents throughout the Prairie Pothole Region of central North America. In late summer they amass in post-breeding flocks that cause significant amounts of agricultural damage, particularly in sunflower fields near natal sites. We sought to determine if these birds causing crop damage had staged during spring migration in eastern South Dakota. In April 2001, we aurally color-marked ~370,000 red-winged blackbirds near Badger, South Dakota (44°48' N, 97°21' W), approximately 350 km southeast of the core region of major sunflower production in North America. We measured patterns of migratory dispersal by collecting birds in 54 randomly selected blocks in the northcentral United States and Prairie Provinces of Canada. The marked specimens (n = 33) were categorized into 3 polygons based on analyses of banding and re-sighting data and proximity to the region of concentrated sunflower production. We estimated that 82% of the migrants that staged in eastern South Dakota during spring resided either within or on the periphery of the sunflower growing region. These birds probably stayed within 200 km of their breeding territories until at least late August and caused early damage, which represents the majority of damage to sunflower. Resident birds in Alberta and most of Saskatchewan (18%) probably arrived too late in the damage season to significantly impact the sunflower crop.

Key words: *Agelaius phoeniceus*, breeding range, color-marking, dispersal patterns, northern Great Plains, red-winged blackbirds, spring migration, sunflower damage.

MANAGEMENT OF BLACKBIRD/HUMAN CONFLICTS: A NATIONAL OVERVIEW OF USDA/WILDLIFE SERVICES PROGRAMS

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Abstract: Conflicts between humans and blackbirds range from agricultural and natural resources impacts and property damage to threats to human health and safety. Nationwide, blackbirds are responsible for more than \$150 million in damages to crops annually. Urban blackbird roosts contribute to human health hazards and cause damage to property. Flocks of blackbirds can pose threats to aircraft and aircraft passengers. Working at the request of agencies, organizations, producer groups, municipalities, property owners, and others, the U. S. Department of Agriculture's Wildlife Services program provides assistance in the management of these various conflicts. Wildlife Services blackbird damage management efforts include direct operational programs and technical assistance programs. This paper provides a national overview of Wildlife Services efforts at mitigating blackbird conflicts.

Key words: blackbirds, crops, human health, management, Wildlife Services.

IMPACT OF BLACKBIRD DAMAGE TO SUNFLOWER: BIOENERGETIC AND ECONOMIC MODELS¹

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Abstract: We constructed bioenergetic and economic models to estimate the potential impact of red-winged blackbirds (*Agelaius phoeniceus*), common grackles (*Quiscalus quiscula*), and yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) on production yields of sunflower in the northern Great Plains of North America. The amount of sunflower consumed annually by males and females, after considering field metabolic rates, energy value and moisture content of achenes, and percentage of sunflower in diets was, respectively: red-winged blackbirds 277 g and 168 g; common grackles 267 g and 230 g; and yellow-headed blackbirds 248 g and 139 g. The per capita annual economic damage was: male red-winged blackbirds U.S. \$0.09, females \$0.05; male common grackles \$0.09, females \$0.07; and male yellow-headed blackbirds \$0.08, females \$0.05. Annual loss was \$5.4(1.3 (SE) million for all three species in aggregate, with red-winged blackbirds accounting for 52% of the loss. Blackbird damage represented 1.7% of the dollar value of the 1999 sunflower harvest in the northern Great Plains. This loss would be inconsequential if damage were distributed evenly, however, bird damage is often localized around wetlands and can be economically debilitating to individual producers. Although our model was based on regional population estimates, it should perform well at local scales, provided that a local population can be defined, accurately estimated, and remains stable in size over the 6-week length of the damage period. Because of the large numbers of blackbirds that congregate in the region during August and September prior to migration, sunflower producers should expect some crop losses. The solution to the conflict appears to be one that focuses not on eliminating all damage but on preventing it from exceeding 5% per field.

Key words: bioenergetics, common grackle, crop damage, economic valuation, modeling, red-winged blackbird, sunflower, yellow-headed blackbird.

¹ Peer, B. D., H. J. Homan, G. M. Linz, and W. J. Bleier. 2003. Impact of blackbird damage to sunflower: bioenergetic and economic models. *Ecological Applications*. In Press.

THE RISK OF AVIAN BOTULISM OUTBREAKS FROM AVICIDE DRC-1339 IN NORTH DAKOTA WETLANDS

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Abstract: Blackbirds (Family Icterinae) are responsible for damage to ripening sunflower in the prairie pothole region of the United States. The avicide 3-chloro-4-methylaniline hydrochloride (DRC-1339) has been studied as a means of lethal control to reduce blackbird depredation on the crop. Affected birds frequently seek water and often die within 1-3 days in or near wetlands where they are roosting. Decomposing vertebrate carcasses can provide an optimal growth medium for production of *Clostridium botulinum* toxin. Toxic maggots can be ingested by waterbirds, especially waterfowl, causing additional mortality and initiating an outbreak of avian botulism through the carcass-maggot cycle. Blackbird carcasses were seeded in selected wetlands in Stutsman County, North Dakota during August and September 2000 and July, August, and September 2001 to evaluate the risk these carcasses might have in initiating or contributing to an avian botulism outbreak. Blackbird carcasses were not rapidly removed by scavengers or other predators in most of the wetlands we studied, indicating that carcasses could last sufficient time to initiate an avian botulism outbreak. Overall, 35% of the carcasses remaining in wetlands at 9 days post-seeding produced 4-5 grams of maggots per carcass. In addition, the percentage of carcasses with maggots declined from summer to fall, probably resulting from lower ambient and wetland temperatures. We tested 125 blackbird carcasses and 15 samples of maggots for the presence of type C *botulinum* toxin in 2000, and 252 carcasses and 93 maggot samples in 2001. None of these tests indicated toxin was produced in the blackbird carcasses placed in our study wetlands. These results indicate the risk of botulism outbreaks was not likely to increase when relatively small numbers (e.g., < 100) of blackbird carcasses occur in wetlands during late summer and early fall.

Key words: avicide, avian botulism, blackbirds, DRC-1339, sunflower, wetlands.

STATUS AND PERSPECTIVE OF SOUTH DAKOTA GAME, FISH AND PARKS REGARDING BLACKBIRD MANAGEMENT

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THE IMPACT OF BLACKBIRD DEPREDATION ON RIPENING SUNFLOWER: THE NORTH DAKOTA PERSPECTIVE ON THE NEED FOR BETTER STAKEHOLDER RELATIONSHIPS AND EFFECTIVE MANAGEMENT METHODS

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