

The availability of multiple sources of foods or drinks has a profound influence on choice behavior of rodents, so that the most abundant types of substance is chosen preferentially. However, it is not known how other taxonomic groups might respond to the same kind of variation in availability. Birds tend to be visual foragers, and are known to adjust their food selection based on relative densities of alternative foods only when the appearance of the foods differs. Here we tested European Starlings (*Sturnus vulgaris*) with various combinations of repellent-treated or unadulterated water (experiment one) or food (experiment two). In experiment one, birds consumed significantly more of the repellent-treated water (R) than plain water (W) there were more R bottles than W bottles available, and vice-versa. Therefore in experiment one, an aversion to the repellent was reversed to an apparent preference. Similarly, birds' avoidance of repellent-treated food disappeared when bowls containing the treated vs. untreated food were relatively abundant. These results suggest that overuse of any single repellent could impact the effectiveness of the repellent. Further testing is needed to determine whether these findings will hold true under field conditions. This finding could have important implications in landscape-scale use of chemical repellents for vertebrate pest control.

(P4) LAND USE CHANGES TO MANAGE WILDLIFE HAZARDS AT A CENTRAL KANSAS AIRPORT

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Historically, row-crop agriculture has been an important source of revenue for Mid-continent airport in Wichita, Kansas (ICT). In May of 2002, wildlife hazards associated with species using the crops were reevaluated and determined to outweigh the yearly revenue generated from crop production. During the following fall and spring a variant of Kentucky-31 tall fescue was seeded on ~1,000 acres of airport property that had been in winter wheat production. High populations of Canada geese (*Branta canadensis*) and other waterfowl are in the immediate vicinity of ICT during the fall and winter months due to the abundant winter wheat fields and numerous large bodies of water. Waterfowl sightings have greatly decreased at ICT following the establishment of our tall fescue grass stand. Wildlife survey data also shows a great decrease in other problem avian species using the area, such as mourning doves (*Zenaidura macroura*) and Rock doves (*Columba livia*). Species that appear to have been positively affected by the planting of fescue grass include: upland sandpiper (*Bartramia longicauda*), Eastern and Western meadowlark (*Sturnella* spp.) and grackles (*Quiscalus* spp.). Overall, the conversion to grass from row-crop agriculture has created a more aesthetically pleasing environment, a more accessible landscape in case of emergency and a reduction in the number avian species using the area and being struck by aircraft.

(P5) HOW DO BIRDS REACT TO APPROACHING AIRCRAFT? OBSERVATIONS FROM THE COCKPIT

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Aircraft collisions with birds are a serious problem worldwide, costing commercial aviation over \$1 billion USD each year. Losses to general and military aviation are not as well defined but believed to be substantial. Although considerable effort has been expended to develop technologies to detect birds in aircraft flight paths and to disperse birds from airports, we have surprisingly little understanding of how birds react to approaching aircraft. An improved understanding of bird reactions to aircraft may provide guidance to pilots on avoidance tactics in some situations and provide insights to make aircraft more visible to birds. We developed a database of bird reactions to aircraft by searching the pilot comments section for each of the 56,000 bird strike records in the Federal Aviation Administration National Wildlife Strike Database for Civil Aviation, 1990-2003. We found 633 records in which the pilot noted a response (or lack of response) of the bird or bird flock to the approaching aircraft (in all cases a strike occurred). We classified these responses into 12 categories. Our data analysis indicated that about 80% of the birds encountered attempted some type of reaction to avoid being struck (82% of 367 “bird on ground” cases, 77% of 266 “bird in air” cases). When the aircraft was greater than 500 feet above ground level (AGL), 87% of birds encountered in the air that showed a defined reaction attempted to dive and only 8% attempted to climb. In contrast, below 500 feet AGL only 25% of the birds encountered in the air that showed a defined reaction attempted to dive but 32% attempted to climb. These data suggest that most birds attempt to avoid approaching aircraft, and avoidance maneuvers are governed by height AGL and other factors. Research into systems of lighting, reflective paint or other concepts that would enhance the visibility of aircraft to birds appears to be warranted in an effort to reduce collisions.

(P6) STATUS OF NORTH AMERICAN CANADA GOOSE POPULATIONS IN RELATION TO STRIKES WITH CIVIL AIRCRAFT

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Waterfowl in North America are managed in four administrative flyways – the Atlantic (AF), Mississippi (MF), Central (CF), and Pacific (PF). Canada goose populations in each flyway are subdivided into “migrant-goose” and “large-goose” populations. The “large-goose” populations (AF resident, MF “giant”, CF Hi-Line, CF Western Prairie/Great Plains, PF Rocky Mountain), consist primarily of flocks that are non-migratory (hereafter referred to as resident geese). Estimated migrant and resident geese numbers in these flyways are based on mid-winter or breeding period counts. The overall Canada goose population increased 5 fold from 1970 (1.08 million) to 2003 (5.54 million). Most of this overall increase was due to a 16-fold increase in the population of resident geese (from 220,000 to 3.61 million). From 1990-2003, the resident population increased by 2.6 million birds (1.0 million to 3.61 million). In contrast, the migrant population has remained relatively stable since 1990 with the population in 2003 estimated at 1.93 million. Resident geese comprised 65% of the total Canada goose population in 2003 compared to only 36% in 1990 and 20% in 1970. Resident Canada geese are of particular concern to aviation because of their 1) large size (typically 7-10 lbs which exceeds the 4-lb bird certification standard for engines and airframes), 2) flocking behavior which increases the likelihood of multiple bird strikes, 3) attraction to airports for grazing, and 4) year-round presence in urban environments near airports. From 1990-2003, 824 Canada goose strikes and 295 “goose” (unidentified to species but likely Canada geese) strikes with civil aircraft were