United States Department of Agriculture

Animal and Plant Health Inspection Service

National Wildlife Research Center

Wildlife Services Seeking Solutions Through Research

Avian Diseases: Carriage of Bacterial Pathogens by Geese and Blackbirds

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National Wildlife Research Center Scientists Examine Goose Impacts on Humans and the Environment

Wildlife Services' (WS) National Wildlife Research Center (NWRC) is the only Federal research organization devoted exclusively to resolving conflicts between people and wildlife through the development of effective, selective, and acceptable methods, tools, and techniques.

Groups Affected by These Problems:

- Airports
- Airlines
- Airline passengers
- Urban citizens using recreational facilities
- Golfers
- Farmers
- Livestock producers
- Natural resource managers

Major Research Accomplishments:

- WS demonstrated that the chemical, nicarbazin, has potential as a reproductive inhibitor for Canada geese.

Applying Science and Expertise to Wildlife Challenges

Public Health and Safety—NWRC scientists have seen considerable requests for information on the impact of waterfowl, specifically geese, on public health and safety and agricultural production. The focus of this research project is to understand and develop management methods and recommendations to reduce the impact of Canada geese as carriers of disease, parasites, and noxious weeds. Canada geese can affect public health and safety in urban landscapes and animal health in agricultural landscapes. This research is critical in order to evaluate risks and develop ecological assessments related to goose management.

Scientists are gathering information on the ability of geese to act as carriers of pathogens that can infect people in urban areas and livestock, such as cattle, sheep, and horses, in agricultural landscapes. The study is also evaluating the potential for geese to act as carriers of plant parasites and noxious weeds that can economically impact agricultural production and horticultural commodities, such as truck

crops and turf. Producers spend considerable sums of money to eliminate weed species and pathogens from agricultural fields, only to have the fields re-inoculated by goose flocks. In addition to the cost, the constant chemical treatment needed to keep fields weed and pest free place a burden on the environment.

Urban Landscapes—Fecal samples from Canada geese were collected throughout the year from a number of sites in Fort Collins, CO. This was the first study to exhaustively characterize the prevalence of *Escherichia coli* serogroups in any wildlife species. The overall prevalence of *E. coli* ranged from 2 percent during the coldest time of the year to 94 percent during the warmest months of the year. During March through July, when nonmigratory geese dominated the local goose population, the prevalence of enterotoxogenic (ETEC) forms of *E. coli* was 13 percent. During the same period, the prevalence of enterohemorrhagic (EHEC) forms was 6 percent, while prevalences for enteroinvasive (EIEC) and enteroagglomerative (EAEC) forms were 4.6 and 1.3 percent, respectively. All samples positive for *E. coli* were examined for genes and three isolates were positive for human virulence factors, representing a 2 percent prevalence for feces containing potential human toxins. These data will prove useful in focusing attention on the risks that increasing populations of urban Canada geese may pose to public health.

Agricultural Pastures—Scientists will also determine the prevalence of specific infectious organisms *(Salmonella spp., Campylobacter spp., and Escheri coli H:0157)* found in Canada goose feces in agricultural pastures. A national-level perspective will be established to determine the prevalence of these 3 pathogens in Canada goose feces and their impact on agricultural productivity and animal health. Results from this work will provide recommendations for managing possible risks to agriculture.

Selected Publications:

- Stahl, R.S., and J.J. Johnston. 2002. High performance liquid chromatography-based determination of nicarbazin in waterfowl. *Journal of Chromatography* 775:103-108.
- Johnston, J.J., M.J. Goodall, and J.C. Hurley. 2001. Determination of diazacon in quail and quail serum by ion pair reversed-phase chromatography. *Journal of AOAC International* 84:634-639.
- VerCauteren, K.C., M.J. Pipas, and K.L. Tope. 2001. Evaluations of nicarbazin-treated pellets for reducing the laying and viability of Canada goose eggs. Pages 337- 346. Proceedings of the Ninth Wildlife Damage Management Conference.
- Primus, T.M., D.J. Kohler, M. Goodall, C. Yoder, D. Griffin, L Miller, and J.J. Johnston. 2001. Determination of 4,4'- dinitrocarbanilide (DNC), the active component of the antifertility agent nicarbazin in chicken, duck, and goose plasma. *Journal of Agricultural and Food Chemistry* 49(8):3589 3593.