

## The Problem

Since the early 1900s, wildlife conservation efforts in the United States have focused on restoring, protecting, and managing many wildlife populations. In some cases, such as with white-tailed deer and Canada geese, these efforts have been so successful that species have become locally overabundant. Overabundant species cause various conflicts with people, ranging from minor nuisance issues to serious habitat and crop destruction, disease spread, and collisions with vehicles and aircraft.

Traditionally, State fish and wildlife agencies have used hunting and trapping to manage wildlife populations. However, in urban and suburban areas where most human-wildlife conflicts occur, these management practices are often legally restricted, impractical, or socially undesirable. Wildlife fertility-control methods, including contraceptives such as chemosterilants, devices, and immunocontraceptives, can help manage conflicts from locally overabundant wildlife populations when used as part of an integrated management approach.

## Science-Based Solutions

Wildlife contraceptives and other fertility control methods are promising new tools for managing wildlife populations and diseases. Scientists at the National Wildlife Research Center (NWRC)—the research arm of the Wildlife Services program in the U.S. Department of Agriculture’s (USDA) Animal and Plant Health Inspection Service (APHIS)—work with State fish and wildlife agencies, universities, zoos, international organizations, and private partners to develop, test, and register fertility-control methods.

Such tools alone, however, cannot quickly reduce overabundant wildlife populations to healthy levels. Instead, they are most effective when used together with other wildlife management methods, such as trapping, relocation, population management, or hunting. Immediate population goals can only be met by removing problem animals. Fertility-control methods can then be used in some situations to slow the rate of population recovery or maintain populations at desired levels.

Fertility-control methods may also help with wildlife disease management. For instance, brucellosis is a bacterial disease that causes abortions, infertility, and lower milk production in bison, elk, and cattle. Brucellosis is transmitted during the birthing process. The injectable GonaCon Immunocontraceptive Vaccine may reduce the spread of brucellosis by preventing reproduction in infected bison. Similarly, scientists are investigating an approach that combines rabies and contraceptive vaccines to reduce stray dog populations and rabies in developing countries.

### ***NWRC scientists strive to develop wildlife contraceptives and other fertility-control methods that are:***

- ***Safe for the target species, nontarget species, and the environment***
- ***Free of undesirable side effects***
- ***Safe for human consumption if ingested while eating animal products***

### **GonaCon Immunocontraceptive Vaccine**

#### **Target Species:**

White-tailed deer (*Odocoileus virginianus*) and wild or feral horses (*Equus caballus*) and burros (*Equus asinus*)

GonaCon has also been tested successfully in elk, bison, feral swine, prairie dogs, ground squirrels, cats, and marsupials (kangaroos, brushtail possums, and wallabies)

#### **Application Method:**

Injection by hand or remote dart

#### **How It Works:**

GonaCon stimulates the production of antibodies against gonadotropin-releasing hormone (GnRH)—a key reproductive hormone needed to produce estrogen and progesterone and to trigger ovulation.



GonaCon is an injectable vaccine for use with mammals, such as white-tailed deer and wild or feral horses.

By binding to GnRH, the antibodies reduce GnRH’s ability to stimulate the release of these sex hormones. As long as a sufficient level of antibody activity is in the bloodstream, sexual activity is decreased, and vaccinated animals remain infertile.

#### **Effectiveness:**

During field studies in New Jersey and Maryland with free-ranging deer in semi-enclosed urban settings, a single, hand-injected dose of GonaCon was 67 to 88 percent effective at preventing pregnancy the first year and 47 to 48 percent effective the second year. Some female deer have remained infertile for up to 5 years in pen studies. A second dose of the vaccine can be given to extend contraceptive effectiveness. Additional research is needed to determine how often deer will need to be re-vaccinated to remain infertile for their reproductive lifetime.

In horses, a single, hand-injected dose of GonaCon has been shown to significantly reduce mare fertility, resulting in 25 to 45 percent fewer foals being born over 2 to 3 years. Current research is determining the best time for re-vaccination to maintain infertility and whether injection by dart impacts the vaccine’s effectiveness.

#### **Registration Status:**

USDA holds two product registrations for GonaCon (GonaCon Immunocontraceptive Vaccine and GonaCon-Equine) through the U.S. Environmental Protection Agency (EPA). These registrations allow vaccine use in adult female white-tailed deer and wild or feral horses and burros. For GonaCon to be used in a specific State, it must be registered with the State and approved for use by the State’s fish and game or natural resource agency. In 2015, GonaCon-Equine was licensed to SpayFIRST! to produce and distribute the vaccine.

#### **Who Can Use It:**

EPA regulates GonaCon, which is a restricted-use pesticide. Only USDA Wildlife Services or State wildlife management agency personnel or individuals working under their direct supervision can use it. They must strictly follow all requirements on the product label.

### **OvoControl P—Oral Bait**

#### **Target Species:**

Feral pigeons (*Columba livia*)

#### **Application Method:**

Oral, bread-like bait pellet often distributed with a broadcast feeder

#### **How It Works:**

OvoControl P contains 0.5 percent nicarbazin. Nicarbazin affects egg hatchability by weakening the yolk membrane, which allows the albumin and yolk to mix. When OvoControl P is fed to pigeons during their breeding season, it reduces the number of offspring produced. The effects are fully reversible, and when OvoControl P is withdrawn, egg production and hatchability return to normal within a few days.

#### **Effectiveness:**

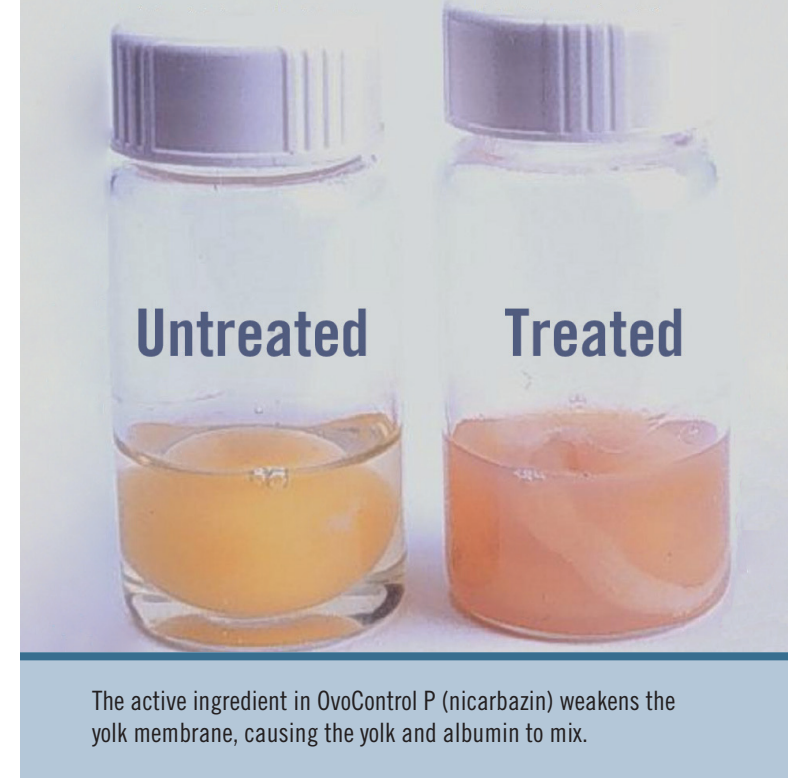
Under ideal conditions, with all target birds eating the proper dose of OvoControl P, no new chicks are hatched. However, during actual field use, not all targeted birds may consume the bait. So, some chicks may still be observed, but the numbers would be greatly reduced. Field observations of treated pigeon populations have shown up to a 50-percent reduction in flock population within 1 year.

#### **Registration Status:**

OvoControl P is registered by the EPA and is produced and distributed by Innolytics, LLC.



Overabundant feral pigeons and other wildlife can cause serious damage to natural habitats, agricultural crops, and urban landscapes.



The active ingredient in OvoControl P (nicarbazin) weakens the yolk membrane, causing the yolk and albumin to mix.

#### **Who Can Use It:**

OvoControl P is classified as an unrestricted or general use pesticide. Users must strictly follow all requirements on the product label.

## Contraceptive Safety

NWRC adheres to all Federal, State, and tribal human health and environmental standards when registering pesticides, drugs, and vaccines. NWRC extensively tests its fertility control methods, which meet or exceed the EPA’s rigorous safety standards. There are no known dangers associated with humans or wildlife consuming animals treated with GonaCon or OvoControl P.

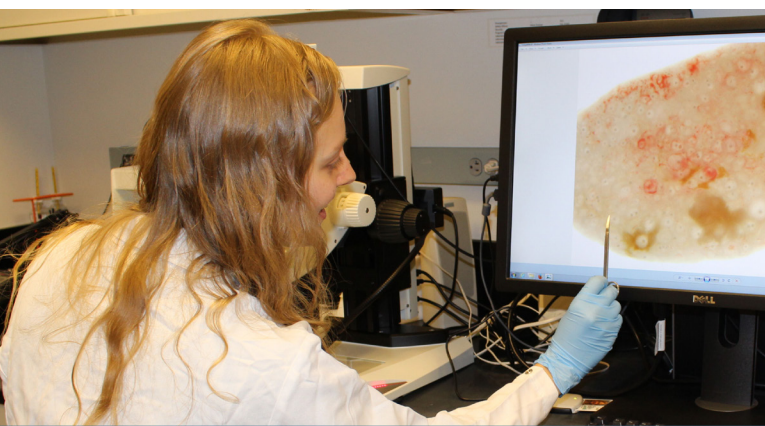
## Future Research

Future NWRC research will focus on products that cause permanent sterility with one application. For instance, scientists are investigating compounds to reduce the number of ovarian eggs in mammals, such as free-roaming dogs and feral swine. Other efforts will help expand existing product registrations, develop improved contraceptives and oral delivery systems, and determine how fertility control can be used to prevent wildlife disease spread.

## About the National Wildlife Research Center

NWRC is the only Federal research facility in the United States devoted entirely to developing effective wildlife damage management methods. The Center applies scientific expertise to address human-wildlife conflicts involving a range of issues: agriculture, human health and safety, property damage, invasive species, and threatened and endangered species. NWRC scientists strive to find solutions that are biologically sound, environmentally safe, and socially responsible for use in resolving wildlife damage management problems. Often, the Wildlife Services' operational personnel help NWRC scientists develop and evaluate new management tools and methods.

NWRC employs more than 160 scientists and support staff at its headquarters in Fort Collins, CO, and at field stations throughout the United States. NWRC's scientists have expertise in animal behavior, chemistry, economics, epidemiology, genetics, immunology, population modeling, reproductive physiology, statistics, toxicology, wildlife biology, wildlife sensory biology, and veterinary medicine.



NWRC researchers are investigating compounds that cause permanent sterility in mammals, such as free-roaming dogs and feral swine.

## More Information

For more information on the development of wildlife contraceptives and other fertility-control products, contact NWRC at (970) 266-6000 or visit our Web site at [www.aphis.usda.gov/wildlifedamage/nwrc](http://www.aphis.usda.gov/wildlifedamage/nwrc).

### Wildlife Services Office Phone Numbers

For help with wildlife damage management issues in your State, please call Wildlife Services' toll-free number at 1-866-4USDAWS (1-866-487-3297) or one of the numbers listed below.

- NWRC Headquarters (Fort Collins, CO): (970) 266-6000
- Eastern Regional Office (Raleigh, NC): (919) 855-7000
- Western Regional Office (Fort Collins, CO): (970) 494-7443
- Operational Support Staff (Riverdale, MD): (301) 851-4009

***“Solutions to problems depend upon knowledge, which only research can provide.”***

*—Edwin R. Kalmbach, first Director for the predecessor of the NWRC (1940–1954)*

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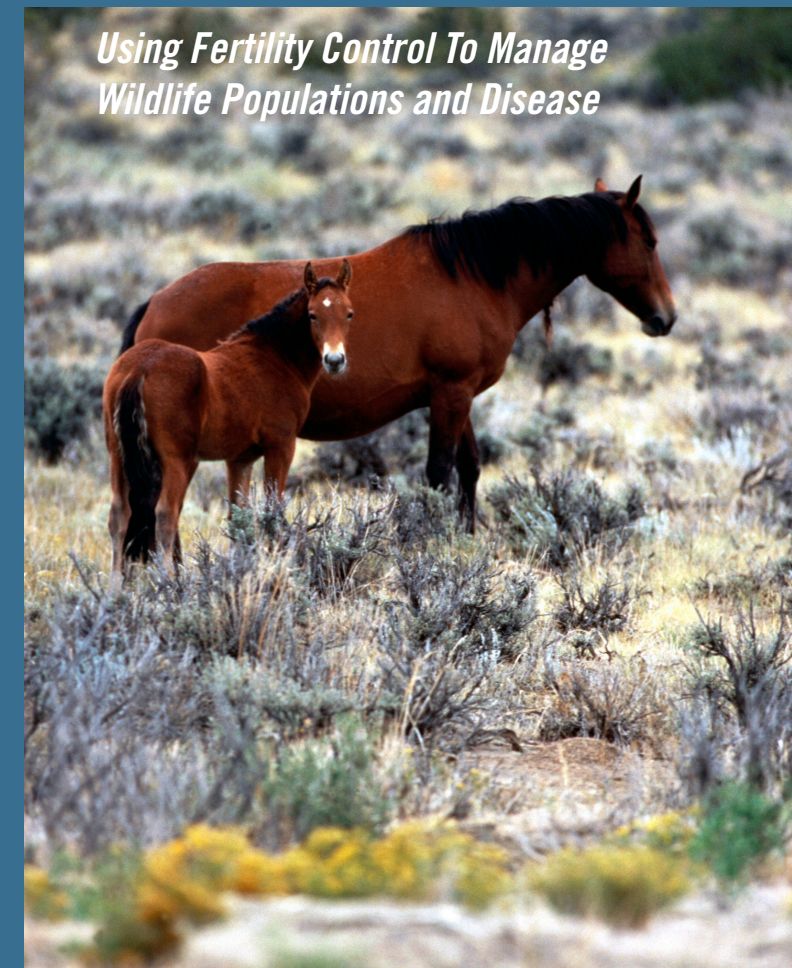
[www.aphis.usda.gov/wildlifedamage/nwrc](http://www.aphis.usda.gov/wildlifedamage/nwrc)



United States Department of Agriculture

## Solutions Through Science

*Using Fertility Control To Manage Wildlife Populations and Disease*



Wildlife Services  
**NWRC**  
National Wildlife Research Center

Animal and Plant Health Inspection Service