Instead, they may be most useful in specific and overabundant wildlife populations to healthy levels. Contraceptives alone, however, cannot rapidly reduce or as oral baits. Regardless of origin, contraceptives production. Some have been dispensed as vaccines the products investigated have been employed for use in wildlife damage management. Some of State fish and wildlife agencies, universities, zoos, Services program—works collaboratively with NWRC—the research arm of APHIS' Wildlife Hunting and trapping have been the traditional methods fish and wildlife agencies use 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 contraception is one method—when used as part of an integrated approach with other methods—that can potentially help manage locally overabundant wildlife populations in these particular settings.

**GonaCon™-Immunocontraceptive Vaccine**

**Method of Application:** Single-shot, hand-injected vaccine

**Target Species:** Adult female white-tailed deer (Odocoileus virginianus)

GonaCon has been tested successfully in other mammal species, including elk, feral deer, horses, bison, feral swine, prairie dogs, ground squirrels, and feral dogs and cats. Future registration of GonaCon for use in other species is expected.

**How It Works:** GonaCon stimulates the production of antibodies that bind to GnRH—a gonadotropin-releasing hormone necessary for production of estradiol, progesterone, and testosterone. 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 present in the bloodstream, sexual activity is decreased, and vaccinated animals remain infertile.

**Effectiveness:** A single, hand-injected dose of GonaCon has successfully kept some female deer infertile for up to 5 years in pen studies. During field studies in New Jersey and Maryland with free-ranging deer in semi-enclosed urban settings, the vaccine was 68 to 88 percent effective at preventing pregnancy the first year and 47 to 48 percent effective the second year. A second dose can be administered during year 2 to extend contraceptive effectiveness. Additional research is needed to determine how often deer will need to be re-vaccinated to maintain infertility in subsequent years.

**Status of Registration:** Registered by the U.S. Environmental Protection Agency (EPA). Who Can Use: GonaCon is regulated by EPA and is a restricted-use chemical. Only USDA Wildlife Services or State wildlife management agency personnel or individuals working under their authority can use it. GonaCon users must also follow State authorization processes. All requirements on the product label must be strictly followed.

**OvoControl® G and P—Oral Bait**

**Method of Application:** Oral, bread-like bait fed to target animals prior to and during their breeding season; it can be distributed with broadcast bait feeders by hand.

**Target Species:** Resident Canada geese (Branta canadensis), Muscovy ducks (Cairina moschata), and feral pigeons (Columba livia)

**How It Works:** OvoControl contains 0.5 percent nicarbazin—the active ingredient in OvoControl—that is given to brooder chickens to prevent the disease coccidiosis. A side effect of nicarbazin is decreased egg hatchability and egg production. IniGonaCon is an injectable vaccine for use with mammals, such as white-tailed deer, prairie dogs, and feral dogs and cats.

OvoControl has no effect on the current number of adult or juvenile resident geese. Under ideal conditions, with all target birds consuming the administration of OvoControl, 92 to 97 percent of chicks are hatched. Under actual field use, not all targeted birds may consume the bait. Consequently, some chicks may still be observed. The number of target birds is needed to determine how often the numbers would be significantly reduced. Field studies in pigeons have shown a 60-70 percent reduction in flock population within 1 year.

**Status of Registration:** Registered by EPA. Who Can Use: OvoControl is a registered trademark of Innolytics, LLS, Rancho Santa Fe, California. NWRC scientists collaborated with Innolytics, LLC, for 8 years to develop the OvoControl products. In 2005, the EPA granted regulatory approval for the use of OvoControl to reduce overabundant resident Canada geese populations. A registration for feral pigeons and Muscovy ducks soon followed.

**DiazaCon®—Oral Bait**

**Method of Application:** Oral bait fed to target animals prior to their breeding season.

**Target Species:** Variety of birds and mammals with limited breeding seasons; current research involves monk parakeets, prairie dogs, and grey squirrels.

**How It Works:** DiazaCon will likely be registered as a “Restricted Use” agent and only be administered by licensed pest control operators, USDA Wildlife Services, or State wildlife management agency personnel or individuals working under their authority.

**Status of Registration:** Not registered. Field studies in support of EPA registration are ongoing.

**Who Can Use:** DiazaCon is a registered trademark of Innolytics, LLS, Rancho Santa Fe, California. NWRC scientists collaborated with Innolytics, LLC, for 8 years to develop the OvoControl products. In 2005, the EPA granted regulatory approval for the use of OvoControl to reduce overabundant resident Canada geese populations. A registration for feral pigeons and Muscovy ducks soon followed.

**Who Can Use:** DiazaCon is a registered trademark of Innolytics, LLS, Rancho Santa Fe, California. NWRC scientists collaborated with Innolytics, LLC, for 8 years to develop the OvoControl products. In 2005, the EPA granted regulatory approval for the use of OvoControl to reduce overabundant resident Canada geese populations. A registration for feral pigeons and Muscovy ducks soon followed.

**Who Can Use:** DiazaCon is a registered trademark of Innolytics, LLS, Rancho Santa Fe, California. NWRC scientists collaborated with Innolytics, LLC, for 8 years to develop the OvoControl products. In 2005, the EPA granted regulatory approval for the use of OvoControl to reduce overabundant resident Canada geese populations. A registration for feral pigeons and Muscovy ducks soon followed.
Safety of Contraceptives

The NWRC must adhere to Federal human health and environmental standards by registering chemicals, drugs, and vaccines with Federal and State regulatory agencies. The wildlife contraceptives NWRC develops are tested extensively and must meet or exceed the EPA's rigorous safety standards. There are no known dangers associated with human or wildlife consumption of animals that have been treated with GonaCon or OvoControl. Secondary hazard studies are ongoing for DiazaCon.

Future Research

Future NWRC research on wildlife contraception will likely involve studies to support expanded registration of existing products, develop oral delivery systems, and prevent transmission of wildlife diseases. Potential research areas include the following:

- Development of new formulations and delivery methods, including automated vaccine delivery systems for administering the injectable form of the GonaCon vaccine, as well as oral and nasal delivery systems.
- Prevention of the spread of brucellosis in bison.
- Solutions to problems depend upon knowledge, which only research can provide.” —Edwin R. Kalmbach, first Director for the predecessor of the NWRC (1930–54)

More Information

For more information on the development of wildlife contraceptives, contact the NWRC at (970) 266-6000 or visit our Web site at www.aphis.usda.gov/wildlife_damage/hcrc.

For assistance on wildlife damage management issues in your State, please call Wildlife Services’ toll-free number at 1-866-4USDA-WM (1-866-487-3297) or one of the numbers listed below.

At headquarters (Riverdale, MD):
- Operational Support Staff (301) 734-7921

In the field:
- NWRC Headquarters (Fort Collins, CO) (970) 266-6000
- Eastern Regional Office (Raleigh, NC) (919) 855-7200
- Western Regional Office (Fort Collins, CO) (970) 494-7443

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