

# WILDLIFE HEALTH FACT SHEET

## FERTILITY CONTROL OF DEER

This fact sheet gives an overview of a relatively new method of controlling overabundant deer - immunocontraception.

Background – Over the past three decades, the number of urban/suburban areas in North America where deer are overabundant has grown enormously. The consequences of high deer density range from vehicle collisions and damage to agriculture crops and gardens, to the loss of the natural biodiversity of other animals and plants. Deer may also serve as disease reservoirs for certain infectious diseases and have injured people and pets. Particularly in urban areas, the options for controlling deer populations are limited.

Options for Controlling Deer Populations – The number of deer in any given area is controlled by four factors: 1) birth, 2) death, 3) emigration (moving out), and 4) immigration (moving in). Emigration and immigration are difficult to influence. Increasing emigration by capturing and moving animals is difficult, expensive, stressful, and results in very high animal mortality from capture and transport and the difficulties adjusting to new habitats. Immigration can be controlled to some extent through hunting and reducing deer density on the urban fringe. Humane killing by gunshot can be effective and humane, even in urban areas, especially when deer are shot by highly trained marksmen under controlled conditions. Fertility control or contraception is the remaining option.

Contraception – Several approaches to contraception of large mammals have been explored, including surgical sterilization, hormone implants, and vaccination. Surgical sterilization requires the capture of deer, a general anesthetic that provides adequate pain control, and sterile surgical techniques employed by a veterinarian. It is highly invasive, expensive and impractical on an operational basis for a wild population. Hormone implants have to be replaced frequently and there are concerns about food-chain effects when treated animals are consumed by people or other animals. The use of vaccines to control fertility (immunocontraception) is considered a promising approach, but those available currently are still experimental, expensive and difficult to implement.

Immunocontraception – Immunocontraception is the use of vaccines to produce antibodies that target the reproductive system or its function. The most tested approach uses PZP (pig zona pellucida) proteins to produce antibodies that attach to the surface of the eggs of treated females and prevent sperm from fertilizing the egg; PZP vaccines are ineffective on males. PZP vaccines do not change normal behaviour, but may extend the breeding season with females coming into heat for more cycles since they do not become pregnant. Another type of vaccine, GonaCon<sup>®</sup>, produces antibodies that interfere with normal sexual development at the hormonal level; however, the duration of efficacy of GonaCon<sup>®</sup> is too short (only about 1 year) to be very useful.

The most promising contraceptive vaccine is SpayVac<sup>®</sup>, a PZP vaccine developed in Canada. SpayVac<sup>®</sup> is highly effective in deer, lasting several years (up to 6 years) with a single dose. Other PZP vaccines require boosters, increasing the technical challenges, risks to the deer, and the costs. PZP vaccines are advocated by a number of animal welfare groups, including the Humane Society of the US. None of these vaccines are licenced in Canada and are accessed only through an experimental permitting process from Health Canada.

Implementing a Contraception Program on a Deer Population – Using contraception to control deer populations depends on three factors:

- 1) An effective, long-lasting contraceptive vaccine,
- 2) A situation where the deer are tame and confined to some degree, to allow capture, treatment and marking, and
- 3) Adequate funding.

No matter how effective the contraceptive agent, if deer easily enter the population or are too difficult to catch and treat, the population cannot be brought under control with reasonable cost. The ideal situation for applying contraception is a small, isolated island, with small numbers of easily approachable, tame deer. It may also be possible to use contraception in other deer populations but such trials have not been done.

Requirements for a Program – Approximately 90% + of does in a population should be treated. Treatment includes capture, vaccination and a permanent form of marking for identification. Vaccines can be delivered with darts using a marker dye but deer are marked only until the dye wears off. Ear tags and a collar are permanent and allow treated deer to be easily recognized, avoiding accidental recaptures of previously treated animals.

The best time of year to capture deer is during the winter (cooler and animals tend to congregate), however does are usually pregnant at this time. The vaccine does not harm pregnant does or fawns so new fawns will be born the first year of the program. This means a delay in deer number reductions and the new female fawns will need to be treated.

Contraception and Lethal Removal – The process of reducing the population by contraception alone is slow – if there are too many animals before the program begins there is likely to be too many afterwards. Therefore, while with enough time and money, a deer population should be able to be brought under control by contraception alone, the process is complicated, is likely to take up to 10 years and be very expensive. To increase success, shorten the time required, and reduce costs, contraception and lethal removal are recommended to be used together. With this approach, a certain number of deer are treated *before* a number-reducing cull, while the deer are easier to capture.

Controlling a deer population by contraception alone requires that approximately 90% of the does be treated – a very tall order. Combining contraception with lethal removal accomplishes two goals:

- 1) the population size is reduced quickly, and
- 2) a high proportion of the remaining does can be treated.

It is important to understand that treating only 50-60% of the does in a population will be largely a waste of time and money – the main result will be improved survivorship of the remaining deer, with little effect on population size since treated does tend to live longer without the costs of pregnancy and lactation.

Personnel Required to Implement Contraception – Non-government persons require permits to handle and treat wildlife. The administration of drugs to immobilize deer and handling procedures requires specialized training and experience. Volunteers can be very helpful, but must work under appropriate supervision.

Costs – The information given here is very general. The cost of capturing a deer, where the deer are easily approached, is generally \$400-600/deer, even with volunteer help with baiting and monitoring traps – likely the most cost effective capture technique. The vaccine cost is at least \$200/dose = total of \$600-800/treated deer. There are additional costs for personnel time for consultation, preparing implementation plans, and coordinating outreach and community meetings. The cost of culling, whether used alone or in conjunction with contraception, is additional.

Annual monitoring and follow-up treatment is necessary to vaccinate untreated does that enter the population as immigrants, as fawns conceived before their dams were inoculated, or born from untreated does. Implementing immunocontraception is a long-term commitment. In its first year, a program to vaccinate 20-25 does is estimated to cost \$20-25 000. At this time this approach is not considered feasible for widespread use as a deer management tool in British Columbia.

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