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Ministry of
Natural Resources

Ministère des
richesses naturelles

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CONTROLLING FOX RABIES IN ONTARIO

Ontario Ministry of Natural Resources (MNR) researchers believe they have found a way to stop rabies in its tracks. MNR researchers expect to eliminate fox rabies in Ontario by air-dropping approximately 500,000 vaccine baits a year over the province.

Why should Ontario worry about rabies?

The Arctic fox strain of rabies, spread by Red foxes and Striped skunks, has been a serious and persistent problem in Ontario since 1954. Although the rabies in southern Ontario persisted in Red fox and infiltrated skunks, the rabies strain is called 'Arctic fox' strain because it originated from that species in the Canadian Arctic. Until 1992, southern Ontario had more reported cases of animal rabies than any other province or state in North America. This has cost governments more than \$7 million a year in diagnosis; investigation of reports of animal bites to see if rabies was involved; treatment of humans in contact with rabid animals; compensation to farmers for loss of livestock; cost of quarantine and research. Pet owners spend an additional \$50 million a year having their pets vaccinated. The last human death in Ontario due to rabies was in 1967. It was believed to be a result of Arctic fox strain rabies but strain typing was not available at that time.

How have we approached the problem?

The Ministry of Natural Resources Rabies Unit, in conjunction with scientists from Connaught Laboratories and Queen's and McMaster universities, the universities of Toronto and Guelph, and the federal Canadian Food Inspection Agency attacked rabies at its source: the red fox. Research has centered on immunizing wild foxes. Scientists now believe that if they are able to immunize a large enough percentage of the 'carrier species' population that spreads rabies, the disease will die out completely. A recent addition to the fight against rabies is Artemis Technologies Inc.

Moving towards a solution

Vaccinating wildlife on a large scale poses many challenges. Several existing rabies vaccines work well when injected, but injecting enough wild foxes was out of the question. An alternative was to deliver the vaccine orally, in a bait. The ERA rabies vaccine is a modified-live virus and, therefore, quite delicate. It must be absorbed in the mouth, for if it were released in the stomach

it would be destroyed. Current baits have a blister pack containing 1.8 ml of rabies vaccine embedded in them.

Finding a vaccine bait that wouldn't be ignored by foxes was another challenge. Not only must a bait be attractive to eat, it must be easy to mass-produce, and easy to store, handle and distribute over large areas. Most of all, researchers needed to ensure the blister pack of vaccines would be chewed along with the bait. The successful bait is a mixture of fats, wax and flavouring.

Testing some answers

In 1989, after many years of small-scale studies, MNR researchers began a five-year trial in rabies control. They started in a 30,000-square kilometer area in rural southeastern Ontario. They chose an area large enough to prove that it was the bait program, and not simply a natural cycle, that would change the level of rabies.

Every September and/or October, specially equipped ministry aircraft have dropped baits for the wild foxes at a density of 20 baits per square kilometer along flight lines spaced at two kilometers apart. Three Twin Otters are outfitted with special bait-dispensing machines. Navigation is done using the latest satellite and computer technology so that millions of baits are spread uniformly and at a predetermined density. The number of baits delivered is computer controlled and carefully recorded. This helps ensure a minimal number of baits are wasted. In urban and other areas, helicopters and hand-baiting are occasionally used to spread the vaccine baits.

How are we doing?

A rabid fox has not been found in southeastern Ontario since September 1993. From 1970 to 1989, the treated region had been averaging 385 cases of animal rabies in a year. By 1993, that dropped to 16 cases. Of those 16, there were 4 foxes, 3 skunks, 1 coyote, 1 wolf, 1 cow and 6 bats (one of the foxes was infected with a bat strain of rabies). Bats carry their own forms of rabies, and since bats in Ontario are small and insect-eating, the rabies vaccination program does not affect them. From 1994 to 1999, the southeastern Ontario area has had about nine to ten rabies cases annually, all of bat origin. On 13 July 1999, the first case of 'mid-Atlantic raccoon' rabies strain entered southeastern Ontario from the United States (see Raccoon Rabies – The Facts), but the 'Arctic fox' strain has never been re-established in this area.

In 1993, the experimental program to eliminate fox rabies was expanded to the rest of the rabies zone in southern Ontario. In 1998, rabies dropped to its lowest level in Ontario since 1961. Whereas Ontario had averaged 2,000 cases of rabies per year during the 1980s, at the end of 1998, there were only 78 of which four cases were fox. During 1999 to 2001, rabies increased in Ontario from 99 to 210 cases annually. This increase came, not as a result of fox rabies in southern Ontario, but as a consequence of the reappearance of fox rabies in northern Ontario, the invasion of 'mid-Atlantic raccoon' rabies into Ontario from the USA, and the unusually high number of rabid bats (54) in 2001. In 2006, there were 82 cases in Ontario: 42 bat strain, 0 raccoon strain, and 40 Arctic fox strain.

Although the number of rabid foxes has diminished acutely in southern Ontario, there are two concerns that still require our attention and the continuation of the vaccine-baiting programs to eliminate fox rabies. First, the 'Arctic fox' rabies strain has persisted in skunk populations, mainly in southwestern Ontario. These areas with residual rabid skunks have to be baited to prevent rabies re-infiltrating fox populations. Secondly, fox rabies has reappeared in some areas of northern Ontario (Sudbury, Cochrane, and Kirkland Lake). These northern areas must be monitored and baited, as required, to prevent a permanent establishment of the disease.

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