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NORWAY RAT EXCLUSION IN ALBERTA

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ABSTRACT: Since 1950, Alberta Agriculture has supervised and coordinated a rural-based Norway rat (*Rattus norvegicus*) control program that has essentially kept the province rat-free. Success is achieved by eliminating invading rats within a control zone 600 km long and 30 km wide along the eastern border of the province. A systematic detection and eradication system is used throughout the zone to keep rat infestations to a minimum. Strong public support and citizen participation was developed through public education and a sound awareness effort. Although rat infestations within the interior are minor, a rat response plan is in place to deal with a large or difficult case. Government preparedness, legislation, climate, geography, effective rat baits and close cooperation between provincial and municipal governments have contributed to program success.

KEY WORDS: Agricultural Pests Act, Norway rat, eradication, sylvatic plague, toxicants, anti-coagulant, arsenic, scilloricide, Warfarin, antu, thallium sulphate, barium carbonate, strychnine, zinc phosphide, compound 1080, carbon monoxide, boreal forest, detection, eradication, firearms, ground squirrel, pocket gopher

Proc. 18th Vertebr. Pest Conf. (R.O. Baker & A.C. Crabb, Eds.) Published at Univ. of Calif., Davis. 1998.

INTRODUCTION

Norway rats (*Rattus norvegicus*) first arrived in North America along the eastern seaboard about 1775 on board steage and merchant sailing vessels. Rats spread westward over the continent accompanying human settlement (Hall and Kelson 1959), entering upper Canada in the early 19th century (Ontario Provincial Archives). About 100 years later, rats entered the Canadian prairies through Saskatchewan from the mid-west United States. Within 10 years following World War I, rats had reached central Saskatchewan, and World War II spanned the province to the eastern border of Alberta.

Rat migration into Alberta was stopped along the eastern border by a well organized and managed program of eradication. Alberta's rat control program continues today in halting the westward advance of rats into the province.

This paper describes the history, current status and strategies of rat control, the future of rat control in Alberta, and the factors which contributed to the success of the program.

Reference data were cited from departmental, as well as divisional, annual reports from Alberta Agriculture, Food and Rural Development and from original documents and files of the Departments of Alberta Agriculture and Saskatchewan Agriculture, 1950 to 1983.

HISTORY

Wild Norway rats were first discovered in Alberta during a Department of Health epidemiology field survey along Alberta's eastern border. Field crews conducting sylvatic plague (*Yersinia pestis*) studies on Richardson's ground squirrel (*Spermophilus richardsonii*) uncovered, by chance, a rat colony on a family farm near the community of Alsask in central Alberta.

Department of Agriculture

Report of the findings brought immediate action by the provincial government, which was concerned about rats as possible vectors of sylvatic plague. A decision

was made to halt the westward migration of rats into the province. As a result, in 1950, responsibility for rat control was transferred to the Department of Agriculture.

The Department's Agricultural Pests Act of 1942 authorized the Minister of Agriculture to name any pest that was likely to contaminate or destroy any crop, stored grain, feed, and foodstuffs. The regulations of the Act required that all persons and municipalities, rural and urban alike, were to take active measures to destroy, control, and prevent pests, such as rats, on their property. Fortunately, provincial legislation to eradicate pests was in place before rats entered Alberta and became effective when rats were declared a pest in 1950.

Rat Control Zone

Departmental officials had the foresight and determination to eradicate rats and quickly established a rat control zone (RCZ) that included all the farm land infested with rats (Figure 1). The north-south dimension of the control zone extended from the Alberta-Montana border in the south to the relatively uninhabited boreal forest region of the north, a distance of 610 km (380 miles). The width of the zone was three survey ranges west from the Alberta-Saskatchewan border, a distance of 29 km (18 miles).

Training and Education

Most Albertans had no experience with, or knowledge of, Norway rats or how to prevent or control them. The Department responded by developing a public relations campaign aimed at educating the public, detailing rat control objectives, and mustering support from all levels of government, industry, and the rural community.

Control Methods

Rat control methods in 1951 included the destruction of rat colonies, elimination of rat harborages and potential food sources, and rat-proofing farm buildings and rural structures. The recommended toxicants were arsenic, red squill (scilloricide), antu, thallium sulfate, barium

carbonate, zinc phosphide, strychnine alkaloid, and compound 1080. Rat snap traps, carbon monoxide gas, and shooting were also used. At that time, anti-coagulant baits had not been commercially developed for rat control; although Warfarin had been discovered, it was still new and relatively untested.

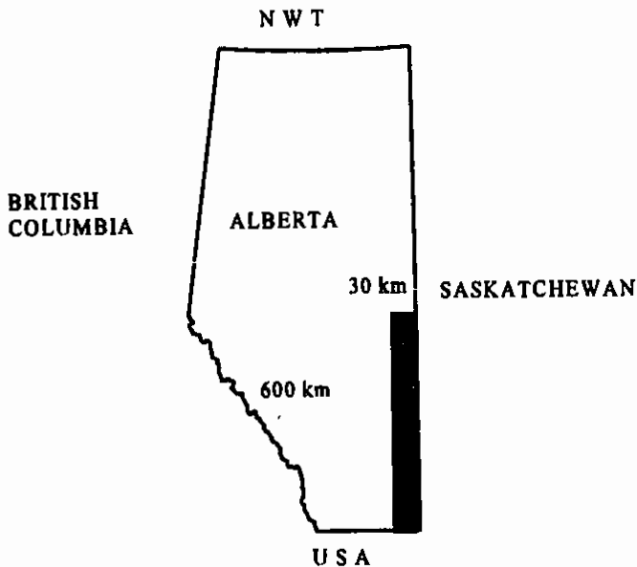


Figure 1. Rat Control Zone in eastern Alberta.

The Department did not have the necessary skills and expertise to control rats, so in 1952 the Department hired a private pest control firm to arrest the westward movement of rats.

From 1952 to 1953, over 60,000 kg of arsenic trioxide (73%) tracking powder was placed under 8,000 buildings on nearly 3,000 farms. This undertaking proved to be too expensive, and due to rising concerns about risk to non-target animals such as livestock and poultry, was discontinued. However, the quick knock-down of rat populations and termination of rat migration gave the Department time to organize a sound rat control program.

Provincial-Municipal Cooperation

The Department, in cooperation with the several municipalities along the eastern border, developed a universal strategy of detection for and control of rats on agricultural land. All farmsteads, nuisance grounds, and other potential rat habitat were identified as inspection sites and were to be inspected regularly and consistently throughout the year. Some locations were to be inspected more than once, depending on proximity to nearby infestations and distance from the eastern border. This organized and systematic strategy of rat presence was the mainstay of rat control and is still practiced today.

During the 1950s, upwards of 25 municipal Pest Control Officers (PCO) were hired to conduct rat control within the RCZ. In addition, 250 PCO's were appointed as municipal pest control officers throughout provinces' rural and urban municipalities as required by law.

Until 1975, the Department of Agriculture and the partnering municipalities shared equally in the cost of rat control. Since then, the Department has paid 100% of the total cost of the rat control program.

As an incentive for others to participate in the rat control program, the Department offered rat bait and other related control materials and manpower assistance to landholders and municipalities free of charge.

The Department produced several campaign posters, visual displays, preserved rat specimens, pamphlets and publications, as well as warning posters, report forms and other incidental documents to report and record rat control activities.

PRESENT DAY RAT CONTROL PROGRAM

Today, the rat control program operates essentially the same way it did over 40 years ago. The major differences today are the workforce is smaller, fewer farmsteads, improved road systems, and better communications and control agents.

Within the RCZ, rat control is carried out with six man-years of labor in half the original number of municipal jurisdictions involved in the rat control program.

While rat control field operations are still the responsibility of the municipalities within the RCZ, the provincial government continues to provide resource support, complete funding, and overall administration and superintendence of the program.

Although rats continue to invade Alberta, reported rat infestations continue to decline (Figure 2).

Today, over 90% of all reported rat infestations occur on actively occupied land (Figure 3). Furthermore, nearly all rat infestations are located within less than one km of abandoned farm structures where equally available resources exist, but where rats are absent.

To improve the accountability of provincially funded programs, the two levels of government entered into written contracts clarified the roles and responsibilities of both parties.

FACTORS AFFECTING RAT CONTROL

Natural Barriers

The occurrence of Norway rats is directly dependent upon the presence of people. In Alberta, the distribution of people is largely determined by vegetation type and geography, which also acts as a barrier from invading rats. The province is protected from rat invasion in the south by open, relatively unsettled short-grass prairie, in the north by boreal mixed-wood forest, and in the west by the Rocky Mountains. The only route of invasion is overland from the east along a sparsely populated rural area; itself a limiting factor to rat migration.

Weather

Probably the most influential natural factor affecting rat invasion in Alberta is the temperate and inhospitable climate of the western prairies. For about half the year the province is snow covered with daytime temperatures well below-freezing. The harsh climate limits rat activity to occupied, man-made structures and discourages rat colonization in isolated areas.

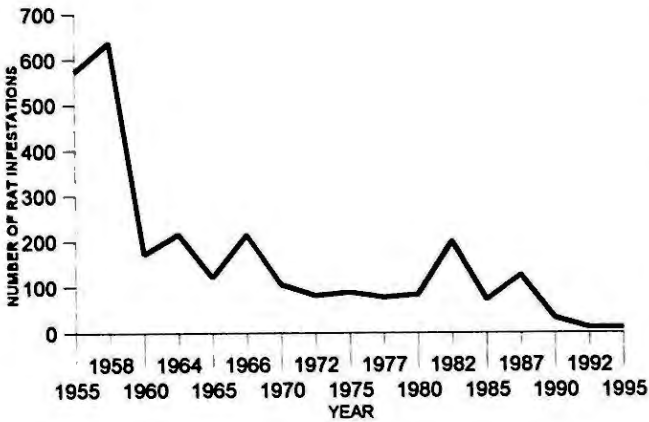


Figure 2. Number of rat infestations in Alberta, 1955 to 1995.

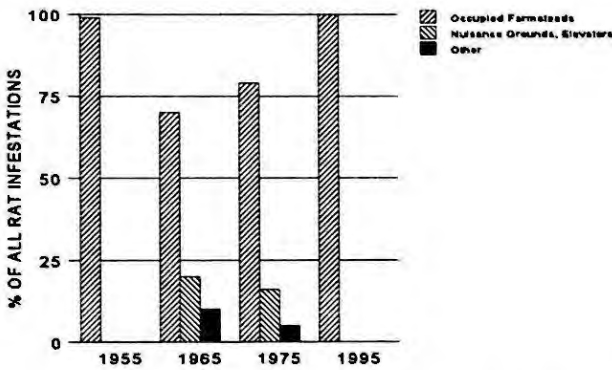


Figure 3. Distribution of rat infestations in Alberta, 1955 to 1995.

Rat Control Zone

The size of the rat control area (6840 sq. mi.) is relatively small compared to the rest of the province (246,422 sq. mi.). If rats had spread to the rest of the agricultural sector, as has occurred in other western provinces, control would probably not have been attainable.

Desire to Eradicate Rats

From the beginning, authorities and residents were determined to keep the province free of rats and have done it for over 45 years, in spite of the fact that several outbreaks occurred as far west as 150 miles from the RCZ.

Legislation

Provincial authorities had appropriate legislation in place before rats invaded the province; although never needed, it had the necessary affect of maintaining zero tolerance of rats.

Demographics

Changes in land tenure patterns over the past five decades along the eastern border of Alberta has had a favorable impact on rat control. Continuous farmland consolidation and declining farmstead numbers (Figure 4) have resulted in decreased rat colonization due mainly to loss of rat habitat, even though rat control east of the province remained unchanged.

Agricultural Changes

Many technological and structural changes to prairie agronomy over the last 50 years, such as the "green revolution," specialization, diversified, and intensive livestock production have had a positive affect on rat control. The "mixed farm" of the 1950s became either a grain or livestock operation in the 1970s. In the process, many buildings, whether functional or obsolete were altered or removed, resulting in reduced rat habitat.

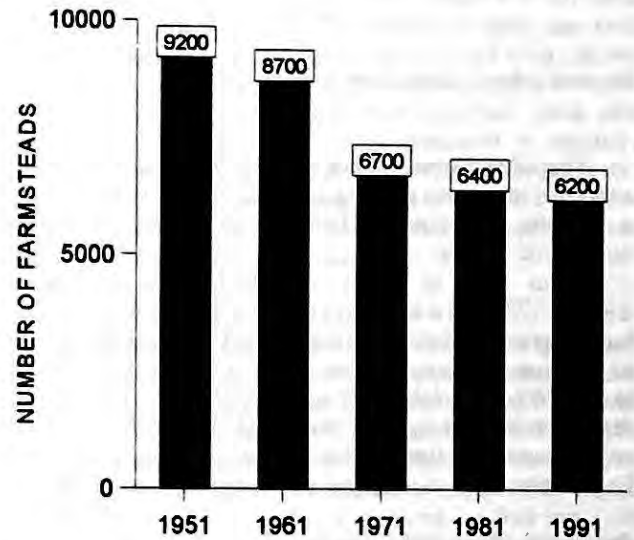


Figure 4. Number of farmsteads in eastern Alberta, 1951 to 1991.

Sanitation

Within the past three decades, traditional rural garbage disposal dumps or nuisance grounds have been replaced with more efficient and better supervised waste transfer sites (WTS). Provincial statute regulations for the management of refuse at WTS discourage or forbid practices deemed detrimental to the principles of today's concepts of "clean air" and "safe health."

Rat Proofing

The development of new and affordable building materials and designs has aided in controlling rats. For example, corrugate steel grain bins, hopper bottom bins, as well as metal silage towers, feed bunks, and reinforced concrete floorings have replaced wooden structures on many farms.

Careful management of feed and grain storage, such as proper spacing and placement of forage round bales, can deter rat inhabitation in storage yards.

Communications

Improvements to telephone and other communications systems between residents, municipalities, and PCOs have greatly enhanced rat control.

Adherence to basic on-farm strategies, such as keeping rat bait out at all times and consulting with PCOs when suspicious rodent activity is observed, have occurred as a result of the close relationship between landholders and PCOs.

Release of regular news media articles, including national television coverage, production of rat control publications, taxidermied displays, and hands-on training, have improved rat control awareness. In Alberta, citizens are encouraged and, indeed do, report suspect rat sightings, which is an enigma since most Albertans can not identify rats or rat sign. As a result, between 100 and 200 reported sightings are received and investigated annually, most turning out to be pocket gophers (*Thomomys talpoides*), muskrats (*Ondatra zibethicus*), Richardson's ground squirrels (*Spermophilus richardsonii*), or meadow voles (*Microtus* sp.).

Alberta has a world-wide reputation for being rat-free which brings writers, reporters, and media from around the world to witness the rat control program in action.

New Baits and Control Strategies

The development of new and more efficacious rat baits has dramatically improved rat control in Alberta. Inexpensive and versatile bait formulations, such as those designed with extended field life, high moisture resistance, and requiring only a single feed to cause death, are commonly used in Alberta. These baits have added features of safety, reliance, and diversity.

The rural nature of rat control in Alberta provides the unique opportunity to physically destroy rat colonies with fire, heavy equipment, fumigants, pyrotechnics, and firearms that may not be feasible or legal elsewhere. These control tools have been very useful, particularly where baiting has been problematic or where the window of control with conventional techniques is too short and immediate control action is required.

Attitude

The positive attitude of local residents, authorities and local politicians towards rat control has met with very little opposition. Rat control was, and still is, considered everyone's problem, therefore, everyone is expected to contribute accordingly. Generally, citizens are neither reluctant nor complacent participants. Also, despite occasional non-target poisoning accidents, neither controversy nor dispute has encumbered the good and

successful conduct of the program. The program is managed by local citizens, free of government interference and, therefore, giving landowners and municipal leaders considerable independence to meet individual situations and conditions.

FUTURE OF RAT CONTROL IN ALBERTA

Eastern Border

So long as rats continue to invade from the east, Alberta will undoubtedly need to maintain the rat control zone strategy along the eastern border. Rat control vigilance should not be mitigated by the absence of rat infestations within the control zone nor by rat control conducted east of the Alberta-Saskatchewan border even by Alberta's PCOs.

Grain and livestock production have been the agricultural mainstay in eastern Alberta, and because there is very little likelihood of major change in these agricultural practices, rat control will likely continue to be important.

Until 1985, the only measurement of control was the total count of rat infestations. In actuality, this method only provided a relative index of control; a comparison of one year's success against another. However, due to the homogeneous nature of the municipal rat control strategy, a more accurate evaluation would be the combination of infestation size, lineal distance from the eastern border, and turn-around time (time from detection to clean-up); i.e., a "rat infestation index." Within the last five years, very few rat infestations were larger than 100 rats in size nor further than 11 miles from the border, with a turn around of time of less than 100 days.

Over the past 10 years, changes in infestation patterns indicate that rat control is approaching "ground zero" in many municipalities. Several municipalities have not reported a rat infestation in over a decade while the rest report a continual decline in infestations. At this rate, presumably no rat infestations will be found across the RCZ. How long a period of zero rat infestations will be necessary before the program will be changed, down-sized or discontinued, will no doubt be a political decision.

Interior

The Agricultural Pests Act forbids the importation, sale, or captive breeding of Norway rats or any subspecies or derivation of the genus *Rattus*. Pet shop owners, herpetologists, and other persons interested in keeping rats as pets are not allowed to do so in Alberta. Only hospitals, universities, and other related institutes of education, authorized by the government, are allowed to possess live *Rattus* species of any kind.

The occurrence of rats in the interior of the province, although not increasing significantly, is a growing concern for provincial authorities. Norway rats have been reported throughout the province and, not surprisingly, have been directly associated with the revitalized and emerging industrial boom that has taken place within the past three decades.

Added to this problem are the sophisticated and efficient transportation systems capable of delivering live rats across the continent in a matter of days. Further,

overseas commerce via container shipping and rapid air freight around the world provides opportunities to import rats to Alberta.

The worst case scenario for rat control in the interior of the province would be undetected rat infestations on agricultural land. Due to the high number and density of farmsteads and the grain-livestock based agriculture within the province, rat control could be very difficult to achieve. To prevent such a disaster, the government relies heavily on the training and cooperation of government and municipal authorities in rat identification and control, open communications with the public, and an active rat control awareness campaign.

Fortunately, Alberta has a long reputation of being rat-free, so almost any person is able to contact the proper authorities to report a rat.

The Department of Agriculture has developed a rat response plan should rats be reported in the interior of the province. Incorporated in the plan are appropriate and necessary procedures and listings of resources including local, civic, and provincial authorities, as well as news media and other associated personnel whose involvement could be necessary to cope with a large infestation.

In retrospect, probably the single most critical point in the history of rat control in Alberta was the advanced

thinking of provincial authorities some 45 years ago to take the bold initiative to halt the invasion of rats into the province. This is made more poignant when other provincial authorities at that time considered rats nothing more than a necessary risk to agriculture, much like weeds or grasshoppers, and were resigned to live with them. The future of rat control in Alberta looks very good, given the performance and support provided over the last 45 years, and more particularly the last decade.

ACKNOWLEDGMENTS

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LITERATURE CITED

- BOURNE, J. B. 1993. Rat control in Alberta. Print Media Branch, Alberta Agriculture, Edmonton, Alberta, Canada T6H 5T6. 4 pp.
- DORRANCE, M. J. 1984. A history of rat control in Alberta. Print Media Branch, Alberta Agriculture, Edmonton, Alberta, Canada T6H 5T6. 9 pp.
- HALL, E. R., and K. R. KELSON. 1959. The mammals of North America. The Ronald Press Co., New York.