

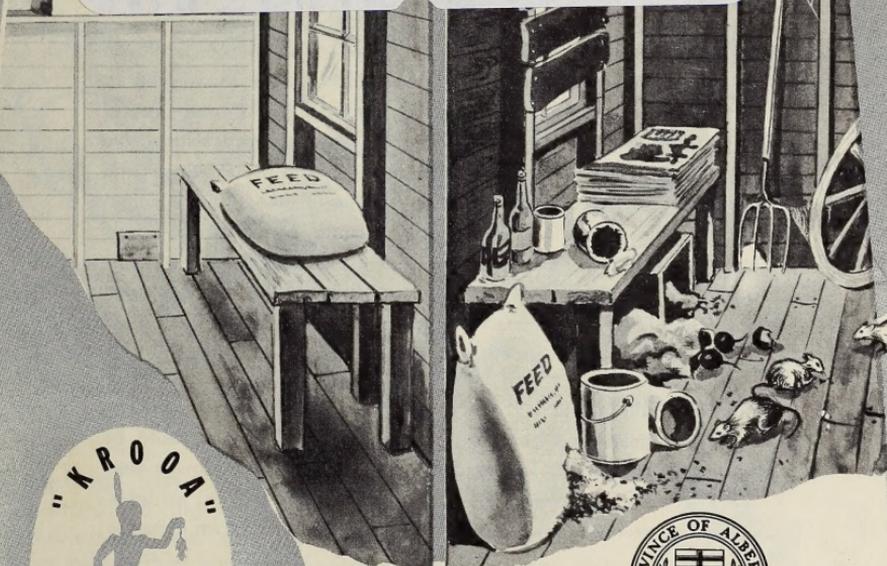
RAT CONTROL IN ALBERTA

6. REVISED BY 1961 13P/

J. B. GURBA, Supervisor,
CROP PROTECTION AND
PEST CONTROL

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~~NO RATS IN HOUSE~~



Published by Direction of
HON. L. C. HALMRAST
Minister of Agriculture

Foreword

There is no other rodent in the world, which is so widespread and which has so outwitted man in his efforts to exterminate it, as the rat. While a small group of persons are controlling rats, many people are at the same time, by their thoughtlessness and carelessness, providing the rat with comfortable shelter and plenty of food. If such conditions are allowed to continue, then the most ingenious methods and the best poisons will never exterminate rats. Rat control is everybody's job. All persons, rural and urban, must become rat conscious and assume their share of responsibility. The important thing that must be done is to deprive the rat of its food and shelter and thus threaten its very existence. This means the rat-proofing of buildings, careful and proper disposal of garbage and the utilization of modern and approved agents for destruction.

To the best of our knowledge, Alberta was the only Province or State on the North American continent, prior to 1950, that was considered rat free, when a few rat colonies were discovered in a narrow strip along the eastern border. The Department of Agriculture was charged with the responsibility of resisting this invasion. A program to deal with this threat to the Province was organized in an attempt to get our citizens to take positive action against this pest. Ten years later, despite persistent invasions by this pest, rats have been consistently eradicated in all east border areas. The line of infiltration now (1961) extends from Township 12 in the Irvine-Walsh area to Township 62 near Cold Lake. The rest of the province has been kept free of rats.

This bulletin deals briefly with the organization of the rat control program and various rat control methods which could be used in Alberta. It is intended that this bulletin will provide useful information for farmers and others on how to prevent rat infestations as well as how to cope with any established rat colonies.

R. M. PUTNAM,
Deputy Minister.

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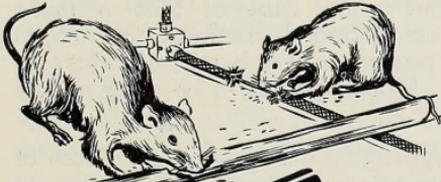
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GENERAL



The brown or Norway rat is one of the worst pests in the world. It destroys property and consumes the food of man. It is a serious menace to:

- (1) Agriculture — destroys grain, poultry, eggs, undermines farm buildings.
- (2) Home — lives in cellars and basements, raids the pantry.
- (3) Industry — destroys stored merchandise, equipment and buildings.
- (4) Health — spreads bubonic plague, intestinal diseases, trichinosis, other diseases.

Many authorities estimate that the damage done by one rat amounts to \$20.00 per annum. At a rapid rate of reproduction (one pair of rats may equal up to 50 or more in a year) the damage and

financial loss can soon amount to millions of dollars. In the U.S. alone rats damage 200 million bushels of grain yearly — the annual rat bill in that country is over 2 billion dollars. It is estimated that if rats become established in Alberta the annual loss would be around 25 million dollars. Without a doubt, the rat is a most expensive boarder wherever it is present.



RATS IN ALBERTA — A Brief History



A colony of rats was located on a farm near Alsask in the summer of 1950 by fieldmen of the Department of Health, Division of Entomology. This colony was quickly eradicated. This was the first recorded evidence of rats actually established in Alberta. In the fall of 1950, the responsibility of rat control was transferred to the Department of Agriculture,

Field Crops Branch. Rat surveys by the Department revealed that by the spring of 1952 there were 39 colonies of rats established in the area between Empress and Consort in Ranges 1 and 2. Even early in 1951 it was recognized that the rat threat to our province was a reality.

PART I — ADMINISTRATION AND POLICY

Under the authority of The Agricultural Pests Act the rat was officially named a "pest" by Ministerial Order. It became the legal responsibility of every person in the province to destroy Norway rats on his premises. Every municipality, city, town and village was asked to appoint a local pest control officer to be responsible for rat control in his area. There are over 250 pest control officers appointed throughout Alberta. Most of these are actively engaged checking rat reports



in their districts and encouraging residents and local authorities to clean up potential rat harborage. Much remains to be done in this regard.

To aid local authorities, the Department employed the services of a rat exterminating firm to eradicate existing colonies and to prevent further infestation along the 4th Meridian. This work commenced in June of 1952 and was completed in July, 1953. During that time over 140,000 lb. of special rat contact powder was placed under all buildings where rats were present or could become readily established in the area between Medicine Hat and Provost, covering Ranges 1, 2, 3, 4 and in some instances, Ranges 5 and 6. This contact powder was placed on some 2,700 farmsteads involving over 8,000 buildings. The exterminators also dismantled many old buildings and rat proofed others to prevent infestation. Department fieldmen generally supervised the campaign and after July, 1953, carried on the control program with the co-operation of Municipal officers and residents.

At about this time anti-coagulant poisons such as Warfarin were proven effective. These became the main control weapons, with the objective of having effective bait stations out at every potential rat harborage along the invading front. Poisons are supplied free of charge. Provincial and municipal pest officers make farm-to-farm checks, demonstrating and assisting with control measures.



To assist Alberta citizens with identification, the Department has prepared over 70 mounted rat specimens. These have been placed in the offices of District Agriculturists, Schools of Agriculture and other public places.

Four rat films, colored slides, posters and other displays have been used at numerous meetings, fairs, schools, etc., to acquaint the public with the rat problem and means of control.

1. Rat Control Policy

The following is the provincial policy under which rat control is undertaken and approved poisons supplied. It is understood, that this policy may be changed as necessary for a more effective campaign.

(a) Every person shall take active measures to prevent the establishment of rats upon any lands or premises, owned, occupied or controlled by him.

(b) Every person shall take active measures to destroy any rats which may be found upon any land or other premises owned, occupied or controlled by him.

(c) Any municipality, upon application to the Field Crops Branch of the Department of Agriculture will be supplied with Warfarin and/or other approved poisons for rat control.

(d) Warfarin will be supplied free of charge to any municipality on condition that the municipality appoints one or more Pest Control Officers and complies with other requirements of the Agricultural Pests Act and regulations made thereunder.

(e) The Municipality shall issue to the owner or occupier of land or premises, such quantity of this rodenticide as the Pest Control Officer may consider necessary for the prevention and/or extermination of rats.

(f) Any person to whom the approved rodenticide is issued shall use it in a manner as directed by the officer.

(g) The Department of Agriculture will supervise and assist local Pest Control Officers in co-ordinating and administering the control program in their area.

2. Organization

Because rat invasion is a constant threat, we need to be properly organized and know what to do. To fight the battle successfully, every Albertan in every walk of life must play an active part. Here are a few "musts" if timely action is to be taken and establishment of rat colonies prevented :

(a) Every Municipal District, County, Special Area, City, Town and Village, must appoint a local Pest Control Officer to check and handle local problems. The name and address of this officer should be mailed to the Field Crops Commissioner, Alberta Department of Agriculture, Edmonton.

(b) This local Pest Control Officer should become acquainted with his District Agriculturist and work closely with him.

(c) No person should spare any effort to kill every Norway rat he sees. Any person who kills a rat or suspects the presence of rats must report this information to his local pest officer or the District Agriculturist.

(d) There are various methods of controlling rats. Some methods are more effective than others depending on the particular case and situation. The local Pest Control Officer, together with the District Agriculturist where possible, will provide instruction on the proper use of approved methods, and supervise and/or apply such methods, as in their opinion, are warranted.

(e) The Department of Agriculture employs provincial Pest Control Officers to aid in the co-ordination and supervision of the rat control program, and assists in local programs undertaken. It also issues timely posters, pamphlets and other vital information to aid in the campaign. There is close co-ordination between the government and municipalities along the eastern border.

PART II—RAT CONTROL METHODS

Permanent control and final eradication must be the objective of any effective rat control program. Once started there can be no slackening off. Sporadic campaigns will only reduce temporarily the number of rats which will soon increase to their original numbers.

An effective program must incorporate four major phases of control:

- (1) Destruction of rats.
- (2) Elimination of rat harborages.
- (3) Elimination of food supply of rats.
- (4) Rat-proofing of buildings.

Such a program should receive attention at all times of the year and must have the whole-hearted co-operation of all concerned.

1. Destruction of Rats

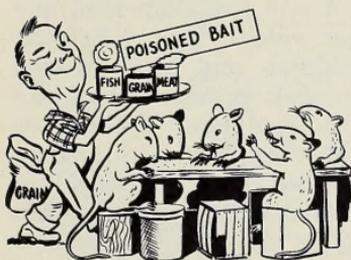
The most efficient means of large scale destruction of rats is by the use of poisons or rodenticides. Various poisons have been found to be effective — Warfarin, Pival, Red Squill, Antu, Barium Carbonate, Zinc phosphide, 1080, Thallium sulphate, Arsenic, Strychnine alkaloid and others. Only Red Squill, Antu, Warfarin, and Pival can be recommended for the general public since the remaining ones are extremely poisonous and dangerous to humans, pets and livestock. Where Red Squill or Antu are used, directions on the container should be followed closely. Warfarin and Pival are safer, more effective and the main poisons used.

(a) POISONS.

Warfarin and Pival.

These poisons are anti-coagulant compounds, which are tasteless and odorless. Rats eat them quite readily and when taken internally over a period of time, painless death results from internal bleeding.

Warfarin and Pival come in 3 forms — (1) Concentrate, (2) Ready-to-Use Bait Mixture, and (3) Water Soluble Salt.



If using 0.5% concentrate, mix 1 part by weight of Warfarin or Pival with 19 parts by weight of bait. Coarse rolled oats makes a good cereal type bait. A small quantity of mineral oil or other edible oil should be added to make dusty bait more attractive.

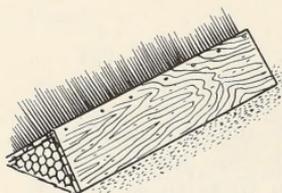
Ready-to-Use-Bait Mixture requires no addition of bait and can be set out as packaged.

Water Soluble Warfarin is the sodium salt of Warfarin; Water Soluble Pival is the sodium salt of Pivalyn. Both come in small package form and readily dissolve in water to form a tasteless, odorless solution. Water baits are especially useful where water is not readily available and plentiful food makes dry bait less successful. These are best set out in chick founts or shallow dishes, under non-freezing conditions. During freezing weather the water soluble salt, or the concentrate, can be mixed with margarine, butter, lard or drippings—all of which are readily eaten. Keep containers clean at all times.

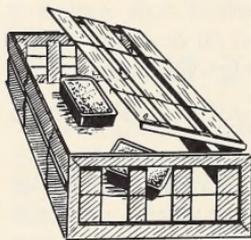
Determine where rats are located. Look for burrows, tracks, trails, droppings, etc., around barns, coops, feed bins and bale stacks, garbage dumps, etc. Baiting must be done for a 2 to 3-week period as rats require 4 or 5 feedings or water-bait drinks within a 10-day period, for a killing dose.



Place mixed Warfarin or Pival bait (2 oz. to 1 lb., depending on rat population) where rats feed or travel — in rat runways, along walls or close to watering places. Water can be placed near bait to attract rats and encourage them to eat more bait. Set out bait in clean, shallow containers, preferably metal or plastic such as coffee tins or pie plates, to keep bait dry and fresh. Water bait can be used successfully with dry bait, in separate containers, placed close together.



Protect bait from children, pets and domestic animals with boards or bait boxes. Make bait stations 4 to 6 feet long, from any boards, 6 to 8 inches wide, to keep the poison out of reach of children and pets. Fasten securely. Sample models of home-made bait stations are shown on last page. Other types can be improvised to fit particular baiting places. Chicken wire will keep pets and fowl out, yet permit rats to enter freely. Keep both ends of station open as rats prefer to feed in a sheltered place that offers escape in several directions.



Keep bait stations supplied with fresh bait at all times. Use gloves when handling poison bait and stations to avoid contamination with human scent. Examine bait stations daily during first week, regularly thereafter. Rats should not be short of bait for more than 48 hours. Attention means success.

After rats have been exterminated, keep a few permanent stations supplied to catch stragglers and rats moving in.

After third day of baiting, watch closely for dead or weak rats. Kill sick rats and burn or bury carcasses. Pets and hogs may become sick from eating rat carcasses. Feed domestic animals well during rat baiting to further prevent eating of poison and poisoned rats.

The above are a few basic suggestions. The Norway rats are extremely clever; the local operator may have to use various other means to outwit them.

ANTIDOTE FOR POISON



In case of poisoning by Red Squill or Antu induce vomiting. Follow with a liberal dose of Epsom salts. Call a doctor immediately.

Normally Warfarin or Pival are not harmful to humans or livestock unless taken in considerable quantities over a period of time. In case of poisoning, induce vomiting followed by liberal dose of Epsom salts. Call a doctor immediately. Treatment should include transfusions of whole blood and intravenous and oral administrations of Vitamin K preparations as in overdose of dicumarol.

Transfusions of whole blood and intravenous and oral administrations of Vitamin K preparations as in overdose of dicumarol.



(b) FUMIGATION.

Baiting may be supplemented by fumigation with calcium cyanide or carbon monoxide (car exhaust gas). Fumigation is most successful in burrows or under floors where gas concentrations can be built up rapidly.

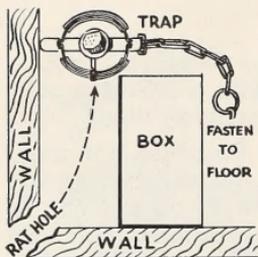
Calcium Cyanide* dust or crystals upon contact with moisture in the air or soil, forms a very poisonous gas (hydrocyanic or prussic acid) which kills rats in a few minutes. The dust is forced into burrows with a regular hand or pump type dust gun. It should be used out of doors and

away from buildings that house people or livestock. *Calcium cyanide is a deadly poison and should only be applied by trained persons.

Calcium cyanide when exposed to the air leaves a non-poisonous residue. The gas created is soon dissipated in the surrounding air, so hay and other crops are not rendered poisonous by its use if they are well exposed to the air for two days.

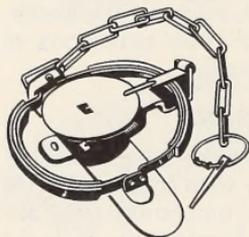
Carbon monoxide gas (car exhaust) is effective at high and low temperatures. An adapter can be easily and cheaply made from some cylindrical connections such as radiator hose to connect a car or tractor exhaust to a 1-inch gassing hose. Decreasing diameters of short hose connect the adapter to the 1-inch hose. With good connections, up to 100 feet of hose may be used without much loss of gas. The gas motor should be run at moderate speed for about 10 minutes for each burrow. All exit holes should be blocked to prevent dissipation of gas. This method of gassing is less dangerous to the inexperienced operator than the use of calcium cyanide.

***WARNING:** — Regulations made under the Public Health Act prohibit the use of calcium cyanide in or under any buildings except where fumigation is carried out by a licensed fumigator in possession of a permit issued by the Provincial Board of Health.



(c) TRAPPING.

In trapping rats, placing the traps properly is far more important than the selecting of a bait for the trap. Rats shun open spaces. Their instinct for stealth and protection causes them to run behind any object that is placed or leaning against the wall. It is in such places that traps should be set. Baits on traps — bacon strips, fresh fish, peanut butter, etc., should be tied firmly to the trigger to prevent them being easily taken away without springing the trap. Traps that had dead rats in them for some time or rat blood adhering to them may be scalded with boiling water before using again.



Trapping is difficult where there is an abundance of food within easy reach of the rat. All food, except baits, should be removed. Change the baits on traps frequently and keep

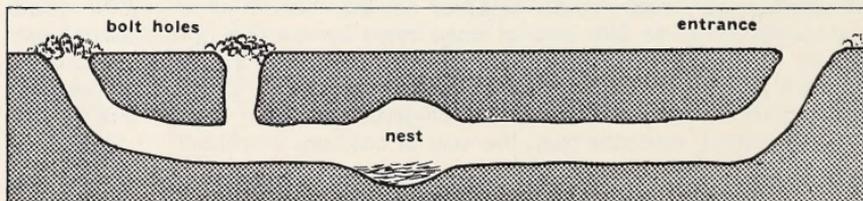
traps clean. The mature rat is wise to much that is going on around him. Watch his movements and use your ingenuity to outwit him.

2. Elimination of Rat Harborages



The brown rat lives underground, beneath stored materials, within double walls and in similar enclosed places. Unless these shelters are destroyed or eliminated, any extensive baiting or trapping program will be only partly effective. Along with any poisoning program, all such harborages should be eliminated. All burrows should be broken up. Stored materials should be placed on racks 12 to 18 inches off the ground. If materials are worth keeping, they are worth storing properly.

Piles of trash with weeds around them offer excellent harborages. Remove these at once! Buildings should be blocked off the ground or on concrete foundations (see "Rat Proofing"). Fence posts, lumber, etc., should be piled on stands off the ground — at least 12 inches — so that there will be light present underneath. Rats don't like light. Rip up dead spaces where rats can hide, or seal them permanently.



SIDE VIEW OF RAT BURROW

3. Elimination of Food Supply for Rats



Rats can't live without food and shelter. Eliminate these two and the premises lose their appeal for rats. Open garbage and trash heaps should not be permitted, on the farm or in urban centres. No food or garbage should be spilled on the ground. Don't give the rat a free meal — put waste into garbage cans and cover with a well fitting lid. If complete burning is not possible, the debris should be buried about 3 feet deep. In cities

and towns unsightly dumps should be eliminated. Local Health Officers will help plan a program to :

- (a) put away waste food where rats can't get at it.
- (b) provide good garbage cans with lids that will fit properly and can be kept in place.
- (c) provide for sanitary land fill or other proper disposal for waste at nuisance grounds in cities, towns, villages and hamlets.

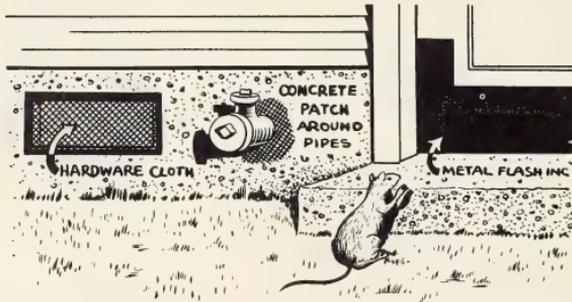
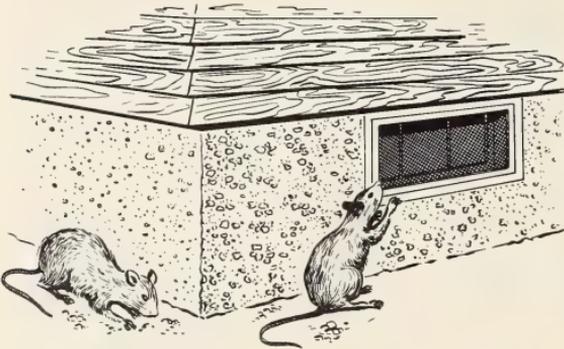


4. Baiting Feed Stacks

Some livestock feed supplies such as stacks of bundles or bales provide excellent winter food and harborage for rats. Drifting snow usually covers outward signs of the infestation. Often the sheltered rats are not discovered until lower layers of the stack are being fed in late winter. By this time numbers may have increased and the rodents, when disturbed, will disperse to seek shelter elsewhere. This situation can be easily prevented by careful placement of warfarin dry-mix bait at or near ground level of the stack when it is being built. Bait should be placed, in 1 pound unopened plastic bags, every 20 feet just inside the margins of the feedstack. Leave a space between bales or bundles, in order that regular inspections can be made during the winter. Migrant rats, entering the stack bottom, will quickly detect, and begin feeding on, the poison bait. Stacks which are not baited at the time of building can be effectively treated by removal of an outside bale or bundle, near the ground, every 20 feet or so around the edge. When the bag of bait has been placed within, the hole should then be closed to keep out light, and drifting snow. Later, unused bags of bait can be salvaged for future needs.

NOTE : — There is no practical danger to livestock in the event that warfarin bait spills-onto the feed. Not sufficient bait would be consumed over a period of time to be harmful to farm animals. One possible exception is the danger to cats and chickens which sometimes frequent bale stacks. For this reason all holes in the vicinity of the bait station should be plugged.

5. Rat-Proofing Buildings



Rat - proofing buildings is one of the major factors in rat control. Once the bulk of the rat population is destroyed and harborage eliminated, buildings should be made rat-proof to prevent reinfestation.

If possible all foundations in new buildings should be concrete and extend at least 2 feet below ground as well as at least 18 inches above ground. All openings must be tightly sealed where utility lines enter the building, around drains and where conduits penetrate the foundation wall. Ventilation grids and louvres should have no opening greater

than one-half inch. Rats will squeeze through anything larger than that. Heavy screening of one-half inch mesh or less can be used.

Outside walls at the junction with the foundation will afford access to rats if there is space between the beam and studding. Spaces here should be sealed with concrete or brick. Tops of foundations should be at least 18 inches above ground to protect the wood structure resting on it from rats chewing through.

Hardware cloth of $\frac{1}{4}$ -inch or $\frac{1}{2}$ -inch mesh (at most) is useful in excluding rats from openings that cannot be closed with brick, or cement. Edges of doors or other openings where rats gnaw should be protected with metal sheathing. Sheet metal of 26 gauge is good rat-proofing material.

Farm buildings such as a granary on piers or skids, should be at least 12 inches above ground to allow good lighting, ventilation, and easy access by dogs and cats. Rats do not like light.

Old floors a few inches above ground should be replaced and laid directly upon well drained, well packed soil, or upon a base of compacted cinders, gravel or stone. Treating the base and wood floors with creosote may aid in preventing rat damage. Concrete floors are best.

Often poultry and hog houses offer quite a problem. Avoid the following when planning such buildings: Wooden floors, floors close to the ground, double walls, and the placing of fixtures in such a way as to shelter rats. Hollow walls or spaces between studs are dangerous as these afford harborages. Insulation should be treated with lime or other vermin proofing. Ventilators should be covered with wire screening and the doors sheathed with metal. Walls in barns or poultry houses should be protected from rats by filling the wall above the sill to a height of at least 10 inches with concrete or bricks. A strip of 1/2-inch hardware cloth or galvanized sheet metal 18 inches wide can be placed under the inside wall lining.

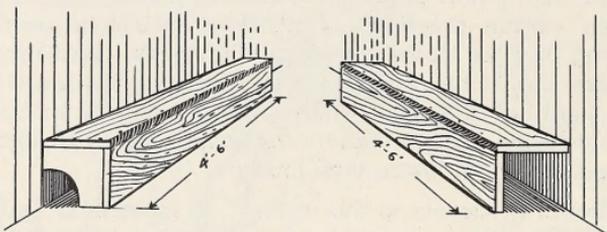
Doors should fit closely to the frame. If more than 3/8 inch from the frame they should be rat-proofed by proper use of metal channels.

Basement windows should have no broken panes and should fit tightly.

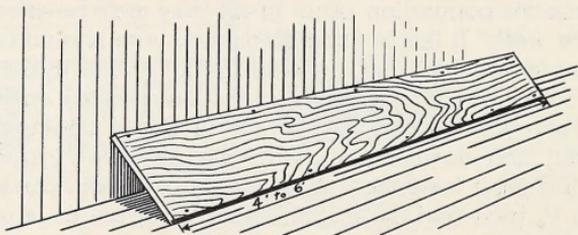
Where the rat population is not great they may be effectively held out by a wire wall. If this is attempted, such wire should be sunk into the ground at least 2 feet and installed in the ground in the form of an "L" so that 1 foot of the wire is extended outside the enclosure. The top of such wire should also extend about 1 foot above ground and then bend out and down again. Rats are extremely agile, therefore a thorough job must be done. Any wire used must have a mesh not greater than 1/2 inch and the quality must be equal at least to that of hardware cloth.



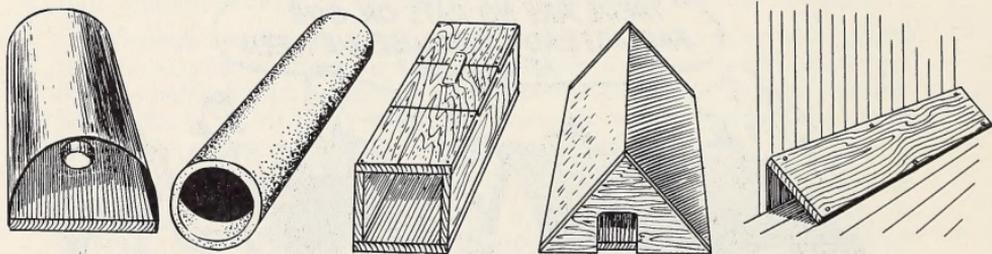
EXAMPLES OF PROTECTED FEEDING STATIONS



Simple bait stations for temporary bait placement. Use 1" x 8" lumber, preferably 4 to 6 feet long. Fasten securely.

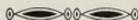


Baits can be placed behind boards leaned against walls. Use 1" x 8" or 1" x 10" boards, preferably 4 to 6 feet long. Fasten securely.

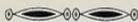


Sample forms of other bait boxes.

OTHER AVAILABLE PUBLICATIONS ON PEST CONTROL



Louse Control in Cattle.....	Publication No. 73
Warble Fly Control.....	5M-3-58
Control of Garden Pests.....	Publication No. 130
Grasshopper Forecast Map for Alberta.....	Current Year
Grasshopper Control in Alberta.....	Publication No. 145
Chemical Control of Insect Pests.....	Publication No. 139
Sweet Clover Weevil Control.....	Mimeograph
Insects Infesting Stored Grain.....	Mimeographs
Ergot in Seed and Feed.....	Mimeograph
Directions and Precautions for Using Coyote Getters.....	Leaflet
Poisons for Coyote Control.....	Bulletin No. 3
Kill Rats with Warfarin or Pival.....	Publication No. 69
Pocket Gophers.....	Publication No. 124
Magpie Control in Alberta.....	Publication No. 120
Houseflies and Their Control.....	Publication No. 15
Insects Attacking Conifers.....	Publication No. 41



**See your District Agriculturist or
Local Pest Control Officer**
or Write
FIELD CROPS BRANCH
Alberta Department of Agriculture
EDMONTON, ALBERTA



"KROOA"



**KEEP RATS
OUT OF
ALBERTA**

ALBERTA DEPARTMENT OF AGRICULTURE