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THE NEW APPROACH TO RABBIT POISONING

"1080" AND IMPROVED METHODS

By A. R. TOMLINSON, Chief Vermin Control Officer; C. E. MARSHALL, Senior Vermin Control Officer, and C. D. GOODING, Vermin Control Research Officer

The rabbit in Australia has only a relatively short history*, but during that period, of 168 years, has probably done more harm to this country than any other pest. In Western Australia, as in some of the other States, investigations directed towards the improvement of control methods—particularly poisoning—have been intensified over recent years. Although it is recognised that no single method could accomplish eradication or give completely satisfactory control, it is also evident that the improvement of poisoning methods could help greatly. Some of our investigations have been aimed at improving techniques in poisoning procedure and also in finding better poisons. One of the new poisons, "1080" (sodium fluoroacetate) has proved very effective.

Following the initial trials with "1080" which were carried out in the Eastern States by officers of the C.S.I.R.O.†, in which they showed "1080" to be far better than all other standard poisons, for quantity of poison used, cost and palatability of the poisoned bait—a trial shipment of 28 lb. of "1080" was obtained in 1952 and tests were started in Western Australia on a field scale. Considerable

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*It is estimated that this period started about 1835.
†C.S.I.R.O. = Commonwealth Scientific and Industrial Research Organization.
Fig. 2.—During the experiments furrows were ploughed with light tractors or land rovers, in both cases using a standard type rabbit poisoning attachment.

data was available from America, mainly dealing with the coyote, against which much success had been obtained. This combined with results from C.S.I.R.O., the Tasmanian State Department of Agriculture and our own tests showed that for practical control of rabbits “1080,” when correctly applied, was superior to other poisons in use.

WEST AUSTRALIAN RESEARCH FINDINGS

As mentioned in a previous article, dealing with this subject, tests were conducted to examine the placement of the furrow in relation to the percentage rabbit kill. Furrows of various size were used; the placement of bait in the furrow; the size of the bait; the type of bait; number of free feeds (pre-feeds) necessary; consumption of poison over a period; seasonal variations, bait preferences, and finally, method of distribution. All these were studied and tested.

Our findings after over 12 months of experimental work are listed below:

1. Placement of Furrow.—In the previous article it was mentioned that variations in furrow size have no bearing on the kill obtained. However, for ease of laying bait, a wide shallow furrow is recommended. It is impossible under most conditions to “draw” rabbits into a furrow, either by the smell of freshly turned earth or by free feeding. Unless the furrow is placed so as to intercept the rabbit on his run to feed or water, or in normal movement, he will not be drawn to the trail. A perfect example of this was obtained at Manjimup where approximately half of the rabbits in the warren were cleaned out, and the others left intact. The furrow ran along only one side of the burrows, and all those rabbits remaining were habitually feeding in the opposite direction, even though the trail was only five yards away. So when ploughing a poison trail it is necessary to make sure that every rabbit in that paddock must cross a trail during the course of his nightly wanderings. Thus it becomes virtually impossible to have too much trail.

2. Type of Bait.—Various types of bait media were tested including apple, carrot, turnip, swede, potato and of the grains, oats. Of the fleshy type of bait, apples proved far superior to any of the others, in the area tested. In one furrow 50 apple, 50 carrot and 50 swede cubes were laid alternately. The rabbits took every apple cube and left all the others. Two tests are summarised here:

<table>
<thead>
<tr>
<th>Bait</th>
<th>Test I</th>
<th>Test II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>50</td>
<td>84</td>
</tr>
<tr>
<td>Carrot</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>Turnip</td>
<td>....</td>
<td>14</td>
</tr>
<tr>
<td>Potato</td>
<td>....</td>
<td>14</td>
</tr>
<tr>
<td>Swede</td>
<td>1.5</td>
<td>....</td>
</tr>
</tbody>
</table>

Oats were universally taken by rabbits at all seasons of the year. In nearly all cases, dry oats without the addition of any sweetening material, prove more attractive than oats treated in any way.

Seasonal Fluctuations. Difficulty was experienced in getting rabbits to take apples during the spring months, although good kills were obtained using oats at the same time. It is therefore recommended that plain dry oats be used for poisoning.
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rabbits at all seasons of the year. Oats have the following advantages over apples:—

(a) There is less danger of accidental poisoning.
(b) They are clean to handle.
(c) No preparation is necessary.
(d) They may be mixed and laid quickly, thus reducing the cost to the farmer.
(e) They are readily available in all areas of the State.
(f) They can be stored and are always on hand at any time, when required.

Comparative tests conducted during winter and spring months showed that the kills obtained with oats were generally superior to those using apple.

3. Free Feeding.—The question of the amount of free feeding necessary with a tasteless poison like “1080,” was very exhaustively investigated. It was thought that possibly the amount of free feeding could be cut down and so shorten the poisoning process (and reduce costs). However, after testing the results from poisonings using from one to six free feeds, also one large free feed left out for several days until it was all consumed, it was found that for best results consistent with economy, either three or four free feeds was optimum. Occasionally a good kill was “fluked” with only one or two unpoisoned feeds, but these were exceptional cases, due to shortage of pasture feed.

It is therefore recommended that a minimum of three free feeds be given on each property.

The free feeding of unpoisoned material for several days, is designed to break down the rabbits’ suspicions of the trail and to allow all to become accustomed to eating oats. All creatures are wary of new things and the rabbit especially so; it is this suspicion which has helped him in his survival. Just doing the work in a haphazard manner might lead to failure and it must be remembered that the poisoner should use all his knowledge and skill to trick the rabbit.

Intelligent free feeding is what is required. Where, for one reason or another, the rabbits have not taken very much of the oats on the first night, it is inadvisable to add more, except in sections where the furrows have been cleaned out. Wherever the rabbits have taken the free feed, more should be added.

Where a good clean-up of free feed has occurred, a larger quantity should be laid the next time until all rabbits are being satisfied. It is a good idea, after three nights’ free feeding to leave another night for any remaining free feed to be cleaned up before laying poison. If poison is laid over surplus free feed, the rabbit might only take sufficient poison to make him sick. He will then recover and possibly become “educated” to the furrow. The important points are:—

(i) Make sure all rabbits are feeding from the furrow.
(ii) Have a clean furrow before laying poison.

It has been shown in Tasmania that a break of one or more nights in the continuity, after feeding has reached its peak (i.e. after three to four days)—had little effect on the kills obtained.

4. Bait Preparation and Placement: In the past it was always considered that bait material required tedious preparation and special care in laying. Oats, for instance, were often placed neatly in heaps on the ground. Fig. 3.—This furrow ploughed by a farmer was more like an irrigation channel.
inside edge of the furrow, as it was claimed that the rabbits, attracted to the furrow, would find the bait and sit there and eat it, while others, running up and down the trial, would not soil it for those that followed. Everyone knows what a back-breaking job it is to lay miles of trail by this method, so we set about simplifying the procedure.

The first step was to test dry oats, without the addition of molasses and the tedious boiling that had always been considered essential, if good results were to be expected. The first test was done on dry oats with the "1080" incorporated into a thin flour and water paste. This was designed to make the poison adhere to the grain. However, field tests showed this to be unnecessary and "1080" mixed in a small quantity of water was sprinkled on the oats and mixed thoroughly. By trial and error, a suitable quantity of fluid was arrived at so that no surplus was present to run to the bottom of the bucket. There is no danger of accidental poisoning with this method, if the oats are laid in the still damp condition, soon after mixing. But, if the oats are allowed to dry out, and the operator is working in a confined space, dust containing "1080" from the oats will rise and if inhaled consistently for any length of time, could constitute a danger.

The next stage was to do away with the spoon, which was commonly recommended, and to drop heaps of grain in the furrow by hand, while walking along its length. Some were splashed outside the furrow and it was noticed that these were eaten also. Following this, a series of experiments was conducted to find out if bait really did have to be placed in the furrow to be successful. It was shown that alternating the placement of baits in and out of the furrow made no difference to the consumption. Everywhere the rabbits were feeding they ate the bait whether it was in the furrow or up to six or eight inches away.

There is no need for the oats to be laid in heaps as we have proved that equally high kills are obtained if the bait is laid in a continuous stream.

5. Laying of Bait.—These findings opened up the prospect of successful laying by hand from a moving vehicle. Various positions in a Land Rover were tried; from the tailboard, from the bonnet and finally from one side, with the poisoner sitting in the back, on the driver's side (see photo). With this positioning, bait could be placed accurately in the furrow. However, two men were still needed to operate this practice. A move is now afoot to do away with the second man and to lay all bait by a simple machine built into the back of the Land Rover. This will enable quicker work without any decrease in efficiency.

6. Consumption of Poison.—It was found that the poisoned bait eaten by the rabbits was about three-quarters of the quantity of free feed consumed in one night and that consumption of the poisoned bait extended over at least three nights. In one test in which an over-sufficiency of apple bait was laid, rabbits consumed 20 per cent. of baits on the first night and a further 12 per cent. and 4 per cent. respectively on successive nights. At this stage, the experiment was discontinued. It is, therefore, recommended that baits be left exposed for four nights or more before being picked up or covered by ploughing to reduce the risk of poisoning farm stock.

7. Results of Poisoning Work.—Tests carried out during the recognised poisoning months of January to April have consistently given results approximating 95 per cent. Kills of this magnitude have been obtained in all areas of the State and are not necessarily confined to any one locality. During the spring months when
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the flush feed comes forward, results have fallen in some cases to around the 70 per cent. mark. But at this time of the year a 70 per cent. kill would reduce the rabbit damage to pasture during the lean dry summer period by an equivalent percentage. It is during the late summer and early autumn periods that the greatest shortage of feed occurs on most farms, and it is then that any rabbit grazing at all (especially on perennial grasses) does the greatest damage.

LAST SEASON'S CONTRACT POISONING

Landholders in general have been very satisfied with the work carried out on their properties to date.

Three units, each comprising two men, a Land Rover and caravan started in February in the Manjimup area and continued into the Bridgetown, Greenbushes, Balingup and Nannup areas. During the winter months one of these units stayed in the Lower South-West area whilst the other two were put to work in the Central Wheatbelt, where they continued work until July 29.

One unit operated continuously in the Great Southern areas, centred on Cranbrook, from summer until the end of July. A lot of free feeding was undertaken for farmers in the Great Southern region and so the average charge per farm for that area was much higher than in the other two regions. The summarised charges are listed here:

<table>
<thead>
<tr>
<th>Area</th>
<th>No. of Farms Treated</th>
<th>Total Charges £ s. d.</th>
<th>Average Charge per Farm £ s. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>South-West</td>
<td>575</td>
<td>2,501 19 0</td>
<td>4 10 4</td>
</tr>
<tr>
<td>Great Southern</td>
<td>82</td>
<td>591 6 0</td>
<td>7 4 2</td>
</tr>
<tr>
<td>Wheatbelt</td>
<td>84</td>
<td>399 16 0</td>
<td>4 15 2</td>
</tr>
<tr>
<td>State</td>
<td>741</td>
<td>3,583 1 0</td>
<td>4 16 10</td>
</tr>
</tbody>
</table>

This constitutes approximately 1,400 hours work and at an average working speed of say 3 m.p.h., this gives a conservative estimate of 4,200 miles of furrow. Working on a basis of 16 lb. of bait per mile the respective costs for "1080" and strychnine to do 4,200 miles would be approximately £187 and £1,890.
SECONDARY POISONING

As yet we have had no reported cases of native fauna being poisoned by "1080," and since concentrating on oats, stock losses have also been reduced. The rabbit dose is worked out at approximately ¼ ounce of prepared bait whereas an 80 lb. sheep would need 1½ ounces, a 600 lb. cow 1 lb., and a ten stone man approximately 1 lb. or more of the same material to cause death.

Fig. 6.—These rabbits died of strychnine (above) and "1080" (below). Note the more relaxed position assumed by the lower animal.

In the early stages of our campaign, especially when using apple bait, several primary stock losses, caused by eating bait occurred, but in every instance this happened as a direct result of negligence on the part of the property owner. The greatest danger to other animals is to dogs, cats and foxes which eat rabbits that have died from 1080 poisoning. The surest solution is to educate all dogs at an early age to eat only cooked or skinned meat. The only other solution for an older dog, is to make sure that he is kept tied up or muzzled until all the carcasses not picked up, have had time to disintegrate. There would not be sufficient poison in the remaining bones to do the dog harm.

With foxes, the position is entirely different. Several farmers have deliberately attempted to poison foxes on their rabbit furrows, with some limited success. One man in particular arranged for the team laying the poison to mix up one bucket of apple and lay this out with the general oat bait. He picked up a total of 12 dead foxes. Kills of foxes have been greater on areas where apples have been used; one farmer reported finding 28 carcasses on approximately 500 acres poisoned with "1080" on apples. In the case of apple bait most of these deaths would be primary poisonings due to eating apple. On properties poisoned with oats, secondary poisonings (from foxes eating dead rabbits) have occurred, but have generally been less than on apple-poisoned properties.

SUMMARY

1. The Agriculture Protection Board started experiments with "1080" (sodium fluoroacetate) in 1953 following the importation of 28 lb. of the material late in 1952.

2. Extensive investigational work has been carried out with this poison under varying seasonal conditions to find out the best methods of preparing, and laying the bait and the most effective methods of free feeding.

3. It has been shown that, for several reasons, oats proved a far more effective bait material than any other readily obtainable material.

4. The importance of the trail, and its placement was amply demonstrated in several tests. It was shown conclusively that the trail must be placed so as to intercept the rabbit during his normal movement from the burrow. Rabbits cannot be "drawn" to a furrow.

5. Tests have shown "1080" to be far superior to any other poison for rabbit control.

6. Last season, 741 properties were poisoned, by Government teams in Western Australia for a total charge of £3,583 or £4 16s. 10d. per farm. This includes properties in the Wheatbelt, Great Southern and South-West.

7. Secondary poisonings have been few. The only other animal seriously affected being the fox, predominantly in the areas where apple has been used as bait material.
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†Lazarus, M., Unpublished Report, 1953—Rabbit Poisons, a Preliminary Laboratory Study.
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