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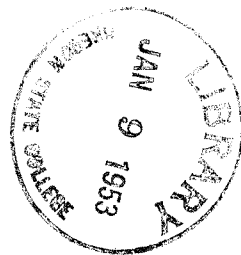
(RESEARCH NOTES)

OREGON STATE BOARD OF FORESTRY

WHEAT TREATED WITH THALLIUM  
SULPHATE FOR USE AS RODENT BAIT

By

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Rodent Bait Report

1948 - 1949

Early in 1948 the last 100 pounds of old Douglas-fir seed in possession of the Oregon State Forestry Department was used as a carrier for Thallium Sulphate in the baiting of rodents on experimental plots. This seed was treated as per instructions from Mr. Moore of the U. S. Fish & Wildlife Service (copy of this treatment attached to report).

In the fall of 1948 a choice of a new carrier had to be made as the high cost of Douglas-fir seed made its use prohibitive. The carrier chosen was wheat. This decision was reached after a series of tests were made for the department by the Charlton Laboratories of Portland, Oregon with grey oats, oat groats and wheat. It was found that wheat was easier to color, did not become soggy during soaking, as did the oats, and absorbed the thallium sulphate in acceptable quantities.

Fir seeds, oat groats, grey oats and wheat were all treated with a 4% solution of  $Tl_2SO_4$  and then tested to determine the relative amounts of thallium absorbed. The results of this test were as follows:

	Mg. Thallium Sulphate per seed
Fir seeds	0.24
Oat groats	1.35
Grey oats	1.65
Wheat	1.08

Further tests using a 2% solution of  $Tl_2SO_4$  on wheat showed that each wheat grain took up 0.25 mg. of Thallium Sulphate. As this amount of poison was

comparable to that contained in the Douglas-fir seed previously used with success, it was the solution used. Using the 2 percent solution it was found that one pound of  $Tl_2SO_4$  would treat approximately 150 pounds of wheat.

An order was given to Charlton Laboratories for the treatment of 1400 pounds of wheat using the 2 percent solution at a quoted price of forty cents per pound with the department furnishing both the wheat and the thallium sulphate.

After the treatment of the first 1100 pounds of wheat, cage tests on whitefooted mice were made with the following results:

CAGE TEST RESULTS

Whitefooted Mouse

(Peromyscus)

2%  $Tl_2SO_4$  Wheat

Bait used in 1948-1949 direct seeding plots

7 grain test

Days to kill

Mouse # 1	7 grains	18 Jan. 49	died 21 Jan. 49	3 days
Mouse # 2	7 grains	31 Jan. 49	died 3 Feb. 49	4 days
Mouse # 3	7 grains	7 Feb. 49	died 15 Feb. 49	7 days

Cumulative effect test

Mouse # 1  
(mighty mouse)

3 grains	17 Jan. 49
1 grain	24 Jan. 49
1 grain	25 Jan. 49
1 grain	26 Jan. 49
1 grain	27 Jan. 49
1 grain	28 Jan. 49
1 grain	31 Jan. 49
1 grain	1 Feb. 49
1 grain	2 Feb. 49
1 grain	3 Feb. 49

	1 grain	4 Feb. 49	
	1 grain	7 Feb. 49	
	1 grain	8 Feb. 49	
	1 grain	9 Feb. 49	
	7 grains	10 Feb. 49	
	6 grains	23 Feb. 49	
	7 (3%)	2 March 49	died 4 March 49
Mouse # 2	1 grain	18 Jan. 49	died 19 Jan. 49
Mouse # 3	1 grain	19 Jan. 49	
	1 grain	20 Jan. 49	
	1 grain	21 Jan. 49	
	1 grain	24 Jan. 49	
	1 grain	25 Jan. 49	
	1 grain	26 Jan. 49	
	1 grain	27 Jan. 49	
	1 grain	28 Jan. 49	
	1 grain	31 Jan. 49	
	1 grain	1 Feb. 49	
	1 grain	2 Feb. 49	
	1 grain	3 Feb. 49	
	1 grain	4 Feb. 49	
	1 grain	7 Feb. 49	
	1 grain	8 Feb. 49	
	1 grain	9 Feb. 49	
	1 grain	10 Feb. 49	
	1 grain	11 Feb. 49	
	1 grain	14 Feb. 49	died 15 Feb. 49

Mr. Moore also made cage tests of this bait and his results showed that the minimum absolute kill was 7 grains. This dosage killed in  $2\frac{1}{2}$  to  $4\frac{1}{2}$  days. This checked very closely with the results shown above where the 7 grains were administered in a single night. Where the wheat bait was given one per night, however, the lethal effect was greatly diminished. Mice being fed one grain of this bait each night not only did not refuse bait at any time but some were observed to seek out and eat the colored, poisoned grain in preference to untreated grain placed in the same receptacles. It was felt that this bait used in hand baiting where approximately 100 seeds were placed in a spot would be quite effective but that a stronger solution would be desirable where the bait

was disseminated from aircraft. The remaining 300 pounds of wheat were therefore treated with a three percent solution of  $Tl_2SO_4$  and cage tests were made. The results of these tests are shown below.

CAGE TEST RESULTS

Whitefooted Mouse

(Peromyscus)

3 %  $Tl_2SO_4$  Wheat

Bait used in 1948-1949 direct seeding plots

5 grain test

Days to kill

Mouse # 1	5 grains	1 April 49	died 18 May 49	48 days
Mouse # 2	5 grains	1 April 49	died 16 May 49	46 days
Mouse # 3	5 grains	1 April 49	died 18 May 49	48 days

These mice are believed to have not been killed by poison. They were left without food for four days. (15 May to 18 May) and it is believed that they starved. Three mice (unpoisoned control) died at the same time. This applies to mouse # 14 in 7 grain test below also.

6 grain test

Days to kill

Mouse # 7	6 grains	12 April 49	died 15 April 49	3
Mouse # 8	6 grains	12 April 49	died 13 April 49	1
Mouse # 9	6 grains	12 April 49	died 14 April 49	2
Mouse # 10	6 grains	15 April 49	died 9 June 49	55 (not killed)
Mouse # 11	6 grains	15 April 49	died 2 May 49	17
Mouse # 12	6 grains	15 April 49	died 18 April 49	3

7 grain test

Days to kill

Mouse # 13	7 grains	25 April 49	died 28 April 49	3
Mouse # 14	7 grains	25 April 49	died 19 May 49	24
Mouse # 15	7 grains	25 April 49	died 26 April 49	1

Cumulative effect test

Mouse # 4	4 April 49	1 grain
	5 April 49	1 grain
	6 April 49	1 grain
	7 April 49	1 grain
	8 April 49	1 grain

	11 April 49	1 grain	
	12 April 49	1 grain	
	13 April 49	1 grain	
	14 April 49	1 grain	
	15 April 49	1 grain	
	18 April 49	1 grain (died)	
	14 days	11 grains	to kill
Mouse # 5	4 April 49	1 grain	
	5 April 49	1 grain	
	6 April 49	1 grain	
	7 April 49	1 grain	
	8 April 49	1 grain	
	11 April 49	1 grain	
	7 days	6 grains	to kill
Mouse # 6	4 April 49	1 grain	
	6 April 49	1 grain	
	7 April 49	dead	
	3 days	2 grains	to kill
Mouse # 4B	25 April 49	1 grain	
	26 April 49	1 grain	
	27 April 49	1 grain	
	28 April 49	1 grain	
	4 May 49	1 grain	
	6 May 49	1 grain	
	9 May 49	1 grain	
	11 May 49	1 grain	
	12 May 49	1 grain	
	13 May 49	1 grain	
	16 May 49	dead	
	21 days	10 grains	to kill
Mouse # 5B	25 April 49	1 grain	
	26 April 49	1 grain	
	27 April 49	1 grain	
	28 April 49	1 grain	
	2 May 49	dead	
	7 days	4 grains	to kill
Mouse # 6B	25 April 49	1 grain	
	26 April 49	1 grain	
	27 April 49	1 grain	
	28 April 49	1 grain	
	2 May 49	dead	
	7 days	4 grains	to kill

Cost of Poison Grain

1948 - 1949

2% solution

Cost of wheat	1100 lbs. @ \$4.00 per 100 lbs.	=	\$ 44.00
Cost of Thallium Sulphate	8 lbs. @ \$29.00 per lb.	=	232.00
Cost of treating	1100 lbs. @ \$ .40 per lb.	=	<u>440.00</u>
	Total		\$716.00

1100 lbs. cost \$716.00  
1 lb. cost .65

3% solution

Cost of wheat	300 lbs. @ \$4.00 per 100 lbs.	=	\$ 12.00
Cost of Thallium Sulphate	3 lbs. @ \$29.00 per lb.	=	87.00
Cost of treating	300 lbs. @ \$ .40 per lb.	=	<u>120.00</u>
	Total		\$219.00

300 lbs. cost \$219.00  
1 lb. cost .73

Cost of poisoning 1 acre

Airplots

Cost of poison grain used (2% solution) 1/4 lb. per acre @ .65 per lb.	\$ .1625
Cost of distributing bait (plane contract at \$ .75 per acre)	<u>.75</u>
	\$ .9125

Disposition of bait 1948-1949 season

Plot # 27	(Roaring river - 660 acres) (2%)	165 lbs.
Plot # 28	(Owl plot D.F. - P.O.C. - 660 acres) (2%)	165 lbs.
Plot # 29	(Owl plot D.F.-N.F.-A.C. 2 X 660 acres) (1st poisoning 2% 2nd poisoning 3% Tl <sub>2</sub> So <sub>4</sub> )	330 lbs.
Plot # 34	(Owl plot D.F.-N.F.-A.C. - 660 acres) (3%)	165 lbs.
Plot # 36	(Melvin Butt Burn P.P. - 250 acres) (2%)	<u>20 lbs.</u>
		795 lbs.

Rodent Bait on hand — (all 2%) 605 lbs.

## Douglas-fir Impregnation With Thallium Sulphate

### For Rodent Poisoning

#### Solution:

Ratio of  $4\frac{1}{2}$  oz. of Thallium Sulphate to 100 oz. water. Solution not to contact metal. Earthenware or glass receptacles to be used. Mixing instruments should be wood or glass. Solution must be kept at temperature of 65 to 70 degrees F. Thallium will crystalize and precipitate at lower temperatures.

To mix: Fill container with  $\frac{1}{2}$  amount of water to be used. This water to be hot, just under boiling temperature. Add Thallium and stir for 5 to 10 minutes. Thallium will then be in solution and remainder of water can be added 70° or warmer and mixture allowed to cool to 65° - 70°.

Food coloring (green) can be added at the ratio of 2 oz. to 3 gal. of solution to color poisoned seed.

#### Seed Treatments:

Seeds are placed in cloth sack and immersed in solution for 20 - 24 hours, removed - drained of excess solution above container and spread on screens (not over  $\frac{1}{2}$  inch thick) to dry - preferably in moving air current. Temperature not important during drying of seed. Low humidity, warm air gives optimum results in quick drying. Turn seed occasionally during drying. Place poisoned seed in non metal container for transportation. Amount of seed that can be treated at one time is approximately  $\frac{1}{3}$  by volume of amount of solution.

Do not allow poison, poison solution, or poison seed to come in contact with the skin. Thallium Sulphate in or out of solution is extremely toxic. There are believed to be no harmful effects from fumes of solution but caution should be exercised at all times.

NOTE: These instructions received from Mr. Al Moore of the U. S. Fish and Wildlife Service