THE GRASSHOPPER CAMPAIGN IN MANITOBA IN 1932*

DURING the summer of 1932 Manitoba experienced an extensive and severe outbreak of grasshoppers. This outbreak was not unexpected, since in 1931 grasshoppers had done considerable damage and had deposited many eggs throughout a wide territory. The last previous outbreak in this province occurred during the years 1919, 1920 and 1921 with smaller, minor, scattered infested areas appearing until 1924. The experience gained in this former period proved to be of great value during the outbreak of the summer of 1932.

Three species of grasshoppers occurred in outbreak form. In the eastern part of the infested area the clear-winged grasshopper (*Camnula pellucida* Scudd) was most abundant. Associated with this species was the two-striped grasshopper (*Melanoplus bivittatus* Say) which, although not so abundant, occurred in great numbers in places. In the western part of the infested area the lesser migratory grasshopper (*Melanoplus mexicanus* Saussure) was most destructive. All three species might be found in many fields throughout the territory involved.

Early in the year arrangements were made for the campaign. The provincial government was to supply the ingredients used in the bait. These were bran, sawdust, salt and some form of arsenic. The distribution of the supplies was placed in the hands of the Extension Service, Department of Agriculture, Winnipeg. Each municipality was a unit with the reeve and councillors in charge of local arrangements. Later, mixing stations were established at strategic points in the municipality or at the most central point in that area if one station was deemed sufficient. The local expenses such as the cost of the mixing machine, rentals, cost of hauling, labor etc., were borne by the municipality. Farmers obtained their poisoned bait ready mixed at a mixing station and scattered this bait where required on their farms.

The poisoned bait used commonly during the campaign consisted of the following:

Bran	50 lb.
Sawdust, bulk equal to bran	(approx. 2½ bushels)
Liquid sodium arsenite	2 qts.*
Salt	2 lb.
Water	10 to 12 gallons

*. The two quarts of liquid sodium arsenite contained a total of 2 lb. of As_2O_3.

* By Prof. A. V. Mitchener, Department of Entomology, University of Manitoba, Winnipeg, in Sixty-Third Annual Report of the Entomological Society of Ontario, Ontario Department of Agriculture, 1932.

This bait gave excellent results. In future the liquid sodium arsenite will likely contain 8 lb. As_2O_3 per gallon as the handling charges will be less per unit of poison. Some dry sodium arsenite and some Paris green were used effectively during the campaign but only under emergency conditions or where it was impracticable to forward the liquid sodium arsenite. Several car loads of malt sprouts were used to replace bran. They were cheaper and quite as good if not better than bran.

During the summer of 1931 and 1932 experimental work with various killing agents, with and without salt as an attractant, mixed with different carriers was undertaken with grasshoppers in the Department of Entomology. Without going into the detail of these poisoning experiments some of the results may be of interest. In all of these experiments treated Red River water from the taps at the Manitoba Agricultural College was used. The use of salt in the various baits appeared to be of relatively little value. No attractant appeared to be essential to obtain a good kill if the proper insecticide was used. Sodium fluosilicate gave an average kill of 78 per cent. and gave better results without salt than with it. In limited work with calcium arsenate and with sodium fluoride excellent results were obtained with a kill of over 90 per cent. in each case. Calcium fluosilicate appeared to have very little toxic effect upon grasshoppers. The carrier for the poison may be bran, bran and sawdust, malt sprouts and sawdust, brewer's grains or brewer's grains and sawdust to obtain good killing results. Liquid sodium arsenite as given in the bait above seemed in our experiments to be the most effective and economical poison used.

The mixing machines were all made locally and were similar to those largely used in the former outbreak. Each machine had a capacity of two hundred pounds of wet bait at a time. When in operation the drum remained stationary. Four sets of stirring rods extending the length of the drum thoroughly mixed the bait. The outside rod of each set was near the inside surface of the drum. Each mixing machine was run by a gasoline engine. Full details concerning the construction of the mixing machine are contained in Extension Bulletin No. 98, Manitoba Department of Agriculture, Winnipeg. Farmers came to the mixing station and took the required sacks of bait home where it was scattered by hand. No mechanical device has yet been demonstrated which will spread the bait as well as the human hand and arm. Broadcasting the bait thinly as one would scatter seeds gave best results. It is difficult to get the farmers to scatter the bait thinly enough. Heavy applications are wasteful, dangerous to stock and productive of poor results.

The grasshopper outbreak of 1932 was the most extensive ever experienced in Manitoba.

The first bait used was on May 13, but poisoning did not become general before the last week of May. The majority of the mixing stations closed down between July 4 and July 10, although an occasional station mixed bait until the first week of August. Applications of bait made early in the season were much preferred. Much more stress was placed upon timely application of the poisoned bait than ever before. We strongly urged that prepared baits be held on the farms until the proper weather conditions prevailed.

Materials used in the campaign included approximately 4,651 tons of bran, 310 cars of sawdust (70 cu. yds. per car), 204 tons of salt, 76,235 gallons (each gallon containing 4 lb. As_2O_3) liquid sodium arsenite and 14 tons dry sodium arsenite and Paris green. Approximately 16,660 tons of prepared bait were made during the season at a cost of approximately thirty-five cents per one hundred pounds of prepared bait for materials. An additional cost of approximately seventeen and one-half cents per one hundred pounds of prepared bait was incurred in the preparation of the bait. The total cost of the ingredients for the campaign approximated $115,770·25.

Many farmers, particularly, those in the very heavily infested areas, stated that had they not used the poisoned bait they believed that their crops would have been destroyed completely, by grasshoppers. Using the estimate of crop yields for the various crop reporting districts of Manitoba, published by the Manitoba Department of Agriculture for the year 1932 it is estimated that the control campaign undertaken by the provincial government saved the farmers of Manitoba approximately 11,000,000 bushels of wheat, 8,000,000 bushels of oats and 5,000,000 bushels of barley. By virtue of the use of poisoned bait greater yields of forage crops, wild hay, rye, flax, roots, etc. were obtained in the infested areas. Many gardens, including market gardens, were protected either in whole or in part by the use of the bait. In addition the campaign reduced the egg deposits available for hatching in 1933.

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