

A DEVICE FOR SOWING GRASSHOPPER POISON

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The seeder shown in the accompanying photograph was improvised, during a grasshopper campaign last summer in western Kansas, to off-set the labor necessary in applying poison bran mash over many acres of land. This seeder was used extensively in Sherman and Thomas counties, and proved to be a success, one man covering as much ground with it as three men sowing the mixture by hand. It was constructed after the manner of an alfalfa seeder occasionally used in that section of Kansas, the dimensions being enlarged to meet the needs of the bran mash.

The seeder consists of a canvas bag which is strapped over the shoulder of the operator and fitted with a feeding device consisting of a canvas sleeve and swinging tube made of tin or galvanized iron, as shown in the photograph. The first one was made on the Kuhrt farm in Sherman County, Kansas, and constructed from an old grain sack, and two empty molasses cans cut and soldered to make the tube.

Some disappointment was encountered before a seeder of the right dimensions was constructed and, after experimenting, it was found that the machine shown in the photograph not only scattered the mixture properly and evenly but covered the ground very rapidly. The dimensions of the metal tube are as follows: Length, 28 inches; diameter at upper end, $2\frac{1}{2}$ inches; diameter at lower end, $1\frac{5}{8}$ inches. Over the opening at the lower end is soldered two short wires bent around in the shape of a U, and crossing each other at right angles at exactly the center and about one inch below the opening of the tube. These wires are soldered to the edge of the tube and soldered together where they cross. Their purpose is to scatter the mixture evenly and thinly as it leaves the tube, being swung by the operator. The canvas sleeve is 12 inches long, 13 inches in circumference at the upper end and 8 inches at the lower end, which fits tightly over the upper end of the metal tube. These were found to be the proper dimensions to allow the mixture to work down into the tube, and to allow the tube to be swung over an 180 degree angle by the operator walking through the field. On a still day the poison bran mash was scattered in this way, evenly and thinly, over a strip of ground sixty feet wide. This enabled one to cover the infested fields in a short time and do the work very thoroughly.

It was found that a seeder made after the above dimensions scattered the poison bran mash at the rate of twenty pounds to four acres, which is recognized as the proper amount to apply under Kansas con-



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1 Scene of the grasshopper poisoning in western Kansas; 2 Poison bran mash seeder in operation; 3 Close view of seeder.

ditions. The mixture can be sown thick or thin depending upon how rapidly the operator travels through the field. Where grasshoppers were found to be very numerous, by walking slowly and whirling the tube regularly the mixture was scattered much thicker than where they were found to be less numerous and the operator walked at a natural gait.

It is necessary to have the oranges or lemons ground through a food grinder in order to prevent the tube from becoming stopped up by the peelings. Many farmers in these counties used old grain sacks cut in two at the middle and strapped over their shoulders in the manner shown in the photograph. One objection to using a grain sack for the bag is that the sweetened mixture penetrates through the cloth and soils the clothes of the man operating the seeder. The writer prepared a bag made of water-proof canvas which overcame this difficulty. Hardware dealers generously supplied the galvanized or tin tubes at the cost of the material plus labor, and sold them at forty cents each. The rest of the outfit was made in a few minutes at the farms. Where it was scattered with these seeders, the grasshoppers ate all of the poisoned bait in a few hours and every particle of the poisoned bran was utilized. Owing to their cannibalistic habits, many grasshoppers apparently died from eating the dead bodies of their less fortunate brothers. It was estimated that 75 to 90 per cent of the grasshoppers were killed by one application of the poison bran mash, scattered by means of these seeders. Public demonstrations were given in each township in Thomas County, and the general opinion as expressed by the farmers was that this cheap and simple device made it possible for them to scatter the poison bran mixture over a much greater acreage than they had heretofore attempted. This type of seeder is recommended by the writer to any who may be supervising grasshopper campaigns in the future.

NEW PARASITE CAGES

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During recent studies of introduced *Braconid* parasites of the Mediterranean fruit-fly (*Ceratitis capitata*) in Hawaii, the adoption of certain improved cages for confining the parasites has given such satisfactory results that it is considered important to place on record a description of these cages.

A glass tube, jar or chimney, in one form or another, with one or more openings tightly plugged or covered, has been usually used by