



# SPRAY CONTROL FOR CORN EARWORM

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# A SPRAY CONTROL FOR THE CORN EARWORM

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The corn earworm is the most destructive pest of sweet corn in Missouri at this time. Some years are more favorable for the insect than others but the earworm is always numerous enough to make effective control measures profitable, at least on early and late maturing plantings. For this reason the Missouri Agricultural Experiment Station has been studying possible earworm control measures for many years and has recommended various treatments. Of these, the most satisfactory has been individual ear injection with a solution of pyrethrum in mineral oil. But this method has never gained much favor with the larger growers because of the slow hand labor involved and, as it is necessary to cover the field twice in order to treat early and late silking ears separately, it is difficult to mark the ears so as to prevent double treatment.

In the past, sprays of the commonly used insecticides have consistently failed to give effective control. Tests were made at the Missouri Agricultural Experiment Station during the season of 1948 with sprays containing wettable powders of DDT, toxaphene, methoxychlor and chlordane. But all failed disappointingly to control the earworm. Beginning in 1945, R. A. Blanchard of the United States Department of Agriculture, in cooperation with certain southern experiment stations, formulated and tested a new spray composed of an emulsion of DDT and mineral oil in water. The results in 1948 looked so promising that the method was tested by the Missouri Agricultural Experiment Station in 1949. Because of the excellent results obtained, the spray is now being recommended on the basis of only one year's experience with the control in this state. Further work may make advisable certain changes in the spray formulation but the method as recommended here is by far the most practical and most efficient developed so far for the control of this insect on corn.

Equipment. -- Almost any type of spray equipment, if correctly used, will give satisfactory results. But best control probably will be obtained with equipment which allows most concentrated application in the ear region along with fairly high pressures. A wheelbarrow type sprayer meets these requirements well and is superior to the knapsack pressure sprayer. A wheelbarrow sprayer will give pressures of at least 100 lbs. and this or even higher pressures are desirable. The small 3-gallon compressed air sprayers operate at 20 to 40 lbs. pressure, and if they are used the pressures must be kept in the upper range if control is to be satisfactory.

Power sprayers employing booms and treating several rows at a time may be used and will be very desirable if large acreages must be treated. This equipment will give high pressures but it should not be expected to give quite as good control as the wheelbarrow sprayer because it is more difficult to provide perfect coverage. When this type of fixed nozzle sprayer is used, care should be taken to properly adjust the nozzles so as to direct the spray at the ear region. At least two and preferably four nozzles should be used to each row. The nozzles used should be of the hollow cone type and should form a spray angle of not over 50° at the pressure used because a wider angle disperses the spray material too much and does not concentrate enough on the silks.

Materials. -- The spray consists of DDT emulsion concentrate and mineral oil in water mixed according to the following table to produce various amounts of finished spray:

| Amount of Finished Spray Desired (Gal.) | 25% DDT Emulsion Concentrate | Mineral Oil 60-90 Saybolt | Add Water to Make |
|---|------------------------------|---------------------------|-------------------|
| 100                                     | 4 gal.                       | 10 gal.                   | 100 gal.          |
| 25                                      | 1 gal.                       | 2 1/2 gal.                | 25 gal.           |
| 10                                      | 3 pints                      | 1 gal.                    | 10 gal.           |
| 3                                       | 1 pint                       | 2 1/2 pints               | 3 gal.            |

The DDT emulsion concentrate should be of a type prepared for agricultural use, formulated so as to be safe for use on plants. The amount of emulsifying agent ordinarily found in such preparations will be sufficient to give a good emulsion of the mineral oil in water without the necessity of adding additional emulsifiers.

The mineral oil should be of a light grade with a viscosity of from 60 to 90 Saybolt. Heavier oils should not be used. A highly refined white oil is preferable but the cheaper less highly refined oils may be used although they may cause some burning of the corn foliage. This burning or browning of the leaves might be objectionable from the standpoint of appearance but it seems to have no ill effect on the size or quality of the sweet corn ear.

In mixing the spray the proper amount of DDT concentrate should be poured into the spray tank and the measured amount of mineral oil added. These should be thoroughly mixed and the water added with complete agitation so as to produce a good emulsion. It will be necessary to provide some agitation to keep the emulsion

from separating. In a wheelbarrow sprayer an occasional vigorous stirring with a paddle will be sufficient; with a power sprayer any good mechanical agitation should be satisfactory. Do not mix more spray than is to be used at once, and do not try to carry over mixed spray from one day to the next.

Apply the spray at a rate of 30 to 50 gallons per acre. On a small scale this would require about one gallon to every 200-300 feet of corn row.

Timing of Applications. -- Two sprays are required for the best results where the materials are applied with a pack sprayer or wheelbarrow sprayer. Put on the first application when from 10% to 25% of the silks have emerged from the ear and the second spray four days after the first. Be sure to direct the spray so as to thoroughly wet the silk masses and shucks.

When using a power sprayer and boom outfit three sprays are advisable. Time them as above except put on the first application somewhat earlier or when 10% of the silks have emerged. Put the second and third applications on at three-day intervals.

Residues of Insecticide. -- Chemical tests have repeatedly shown that when the rates of application recommended here are followed, the sweet corn ear will be free of DDT residue and safe for human consumption. However, the corn leaves, shucks, and stalks which are wet with the spray will carry a high residue of DDT and should not be used as feed for animals.