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INSECT *Pests* AND THEIR CONTROL

By J. A. BUTTON, B.Sc. (Agric.), Entomologist

ROOT MAGGOT FLIES

THE family of insects to which the root maggot flies belong contains a number of species of economic importance. Some attack cabbages, some beans and peas, and some onions. A number of species have become practically world wide in their distribution, and two, the bean root maggot fly and the onion fly, are troublesome in this State.

The adult flies bear a general resemblance to house-flies, but are somewhat more elongated and covered with fine hairs. As the various species are very similar in size and shape, differing only in detail, it is easier to identify the different flies by the plants attacked than by the appearance of the insects.

THE BEAN ROOT MAGGOT FLY

As the name implies, the bean root maggot fly is a pest of beans, but it also attacks legumes such as peas and lupins, and in fact it has been recorded attacking no less than 20 different plants including grass.

Fortunately in this State the fly cannot be classed with the red-legged earth mite or the cutworm for importance, but there is no doubt that this insignificant insect has puzzled many bean growers by causing their plants to wilt and die for no obvious reason.

Life History.

The eggs of the fly are laid in cracks in the soil close to the host plant. Damp soil is invariably chosen and plots carrying liberal dressings of fresh organic manure are especially attractive. The eggs

may hatch in three or four days under favourable conditions, and the maggots soon enter the soft germinating seeds. A rapid break-down quickly follows, often hastened by certain bacteria disseminated by the maggots. The maggot stage lasts from two to several weeks, according to weather conditions, and then the pupal

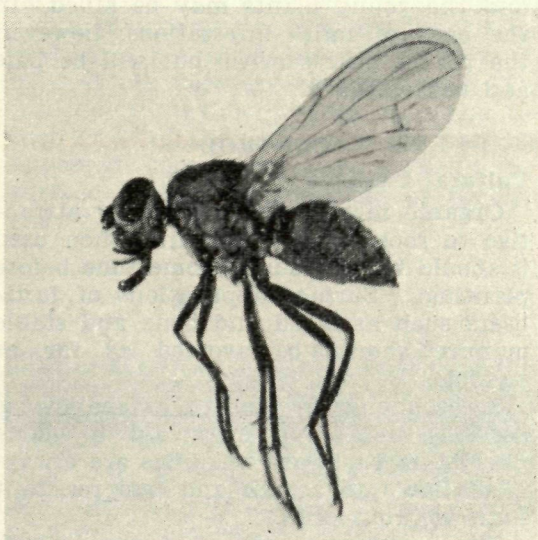


Fig. 1.—Root maggot fly.



Fig. 2.—“Bald-headed” bean seedlings resulting from root maggot infestation.

stage is entered. The pupal cases are barrel-shaped and very similar to those of the house fly.

The adults may emerge about a fortnight after pupating, but, if conditions are dry or otherwise unsuitable, this stage may be lengthened to several months.

As the term root maggot implies, the main damage caused by this fly is due to the maggots feeding upon the roots and germinating seeds. Seeds such as beans and peas may be reduced to a pulpy mass and the young plants may be killed. In the case of mild infestations, however, the plants may survive, but will be pale and backward.

CONTROL

Cultural Methods.

Organic manure is particularly attractive to root maggot flies and when used it should be well dug in some time before planting. Surface applications of fertilisers such as blood and bone and stable manure should be avoided as far as possible.

Seeds should be planted as shallow as possible and given every aid to quick growth, as backward seedlings are always more liable to attack and less resistant than vigorous ones.

The constant working of the soil to prevent cracking and the banking up of

the soil around the plants are all measures which may be adopted to minimise trouble.

Some growers have adopted the practice of planting bean and other seeds in pots for germination and later transplanting.

Chemical Control

Seed Treatment.—Overseas experience indicates that the most satisfactory control with chemicals may be achieved by seed treatments. A process of wet pelleting with insecticides, a fungicide and a sticking agent has been most successful and has been used to protect both bean and onion crops. To treat one bushel of seed the following combinations are suggested:—

1. A mixture of equal parts of “Cover-san” (spergon) and 10 per cent. BHC powder used at the rate of 3 oz. of the mixture to a bushel of seed. Thiram (“Ferrasan” and “Diro 50”) or copper carbonate may be substituted for “Cover-san.”

2. One ounce of 25 per cent. wettable Lindane powder or $1\frac{1}{2}$ oz. of 20 per cent. wettable Aldrin powder mixed with $1\frac{3}{4}$ oz. of fungicide (Cover-san or Thiram) and half a pint of water.

Add the Thiram to the insecticide and mix them into a smooth paste, using a small amount of water. Add the remainder of the water and stir thoroughly. The seed and insecticide should be well mixed and allowed to dry before seeding.

To treat one pound of seed use a quarter of a teaspoon of 25 per cent. wettable Lindane and $\frac{1}{2}$ a teaspoon of fungicide. Place the seed in a two quart container, add the insecticidal paste and shake well until the seeds are uniformly coated.

Surface Treatments.—Because of the inconvenience of the pelleting methods and the spasmodic nature of the trouble locally several spray treatments have been tried. The insecticides were applied in liquid and dust forms directly to the trenches immediately after the seed was planted.

Two methods of applying the sprays were tried, a knapsack sprayer being used in both instances. In the first method, the insecticide was applied to the seed exposed in the open trench; in the second the trench was filled and raked over before a six inch wide strip of insecticide was laid down.

The results of this trial show that the insecticide should be applied to the open trench. Surface treatments were not satisfactory.

Dieldrin, Chlordane and Diazinon sprays and dieldrin and aldrin dusts applied to the open trench gave good results at the following rates:—

Sprays.

Dieldrin—12 oz. of 25 per cent. emulsion per acre.

Chlordane—10 oz. of 100 per cent. Emulsion per acre.

Diazinon—15 oz. of 20 per cent. emulsion per acre.

The above quantities were mixed with water and applied at the rate of approximately 16 gallons per acre.

Dusts.

Aldrin—5 per cent. dust 25 lb./acre.

Dieldrin—2 per cent. dust 15 lb/acre.

THE ONION FLY

The appearance and general life history of the onion fly are so similar to those of the bean root maggot fly that it is unnecessary to give full details. The eggs may be laid on the neck of the young onion plant or in the adjacent soil. The maggots attack the growing bulbs and may entirely destroy them or prevent the production of good plants.

CONTROL

The cultural methods suggested for the bean root maggot fly apply equally to the onion fly. At the time of preparing this article, no recent work on the onion by control has been done locally. However, the treatments listed below have given excellent results overseas, and should prove useful under our conditions.

Seed Treatment.

Seeds should be moistened by immersing in water for a few seconds and then mixed with insecticide to enable it to adhere. Seeding should then be done promptly to ensure that the insecticide does not drop off. Fifty per cent, wettable DDT powder at $\frac{1}{2}$ lb. per pound of seed or 50 per cent. wettable dieldrin powder at 1 oz. per pound of seed.

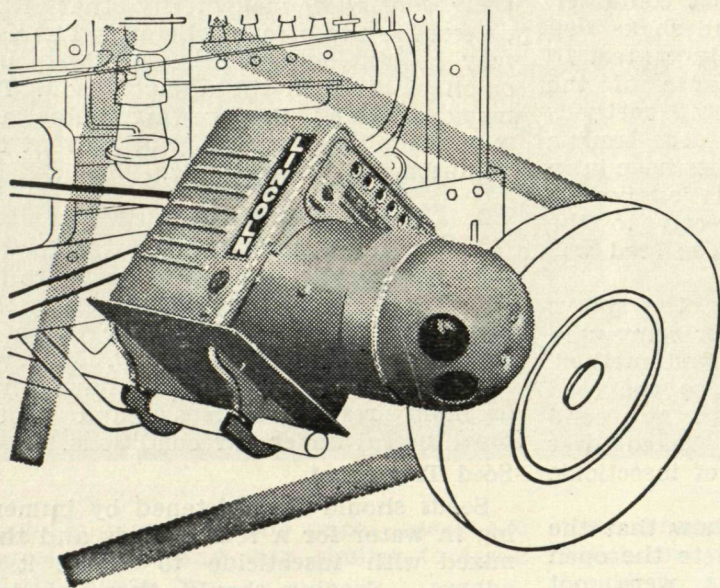
Surface Treatment.

Onion seedlings grown from untreated seed transplants, sets and multipliers may be treated with chemicals at the soil surface. Aldrin dust has been found effective and application rates of $\frac{1}{8}$ to $\frac{1}{4}$ lb. of 5 per cent. dust per 160 ft. of row or 15-25 lb. of dust per acre are recommended. The insecticide may be washed into the top inch or so of the soil. Once the pest has appeared control is more difficult but surface sprays of chlordane or dieldrin should be useful.



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