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PULLMAN, WASHINGTON

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Root Maggots

by

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One of the most injurious insect pests of root crops in all parts of the country, but especially in the truck growing districts of the western part of our state, is the root maggot. These white maggots that work in the roots of radishes, turnips, cauliflower, onions, etc., develop from eggs laid by a fly somewhat smaller than the common house fly.

Experiments have been conducted by this Experiment Station for a period of years, and nothing particularly valuable has been found to keep the maggots out of the roots. However, in the case of the transplanted plants, such as cabbage and cauliflower, a two-and-one-half-inch disc of tar paper, slit to the middle and placed around the re-set plant in the fashion of a collar, served very well in keeping away the fly or the maggot. Plants which are sown in the field cannot be protected by this means.

Our experiments indicate that sprinkling the ground with a sweet poison, made by diluting syrup with a considerable amount of water and adding sodium arsenate as the poison, is beneficial. Of the dozens of treatments usually recommended, none have given satisfactory returns. Various materials, such as cement, glue, kerosene, sand, wood ashes, saw-dust, fertilizers, and so on, have been tested, but without any reliable results.

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Potato Beetles

by

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The most destructive insect pest of potatoes in this country is the Colorado Potato Beetle. These insects are now generally distributed throughout the greater part of eastern Washington, and in the Yakima valley. In some places they are very abundant and destructive, causing from a partial to a total loss of the crop by destroying the plants before the tubers have even started.

The adult beetle is about the size and shape of half a pea, with the round side uppermost. It is yellow in color with the wing covers ornamented with ten longitudinal black stripes. The larva or immature stage is a pale red slug; soft, plump and slimy, and very disgusting in appearance. The orange colored eggs are about the size of the head of a pin. They are deposited by the female on the under side of the leaf in clusters of from three or four to as many as one hundred. It is not uncommon to find as many as fifty or sixty eggs in a cluster. The beetles live over winter in the adult stage, hibernating in the ground. When the potatoes come up in the spring, the beetles emerge from the soil and feed upon the young leaves and vines. They are also seen, however, before the potatoes are even planted. At this time they fly about and mate. After a few days they lay their eggs and in about a week the eggs hatch out into tiny, young, plump slugs, which grow and develop for about three weeks, when they reach their full size as larvae. They then go into the ground, change to pupae, and in about three weeks emerge as adult striped beetles. They soon mate and after a few days the female lays a second crop of eggs which hatch out into a second generation of larvae. A single female may lay several hundred eggs. All stages of the insect may be found at almost any time during the summer. It is not uncommon to find eggs, several different sizes of larvae, and adult beetles all on the same potato vine at the same time. Most of the injury is done by the larvae altho the adult beetles also feed on the foliage, more or less. The first brood of larvae does the most damage in the eastern part of Washington, altho the second brood is much more numerous. This is due to the fact that by the time the second brood of larvae appears in August, the potato vines have died from the dry weather and the tubers have gained practically all of their growth. This is especially true of those early varieties of potatoes which reach maturity in July.

The ease with which this pest is poisoned is well known to many. There are at least two poisons which, if properly sprayed onto the plant, will give perfect results; paris green, 1 pound to 100 gallons of water, is the spray most commonly used. This spray carefully applied so that the leaves of the plants are thoroly covered should kill all of the larvae inside of 24 to 48 hours. Arsenate of lead, 1 pound of the paste of  $\frac{1}{2}$  pound of the powdered form to 50 gallons of water, is an equally effective poison.

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Cut Worms

by

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Much damage is done annually by cut worms to all kinds of garden crops. These worms work at night, and hide in the soil in the day time, a few inches below the surface, where it is often difficult to find them owing to their close resemblance to the soil.

There are many different kinds of cut worms, but their work is much the same, and to the untrained eye they look very much alike. When full grown the larvae average about an inch to an inch and a half in length and about one-fourth of an inch across. The adults of the cut worm are the ordinary gray mottled winged moths so commonly seen in all parts of the country flying about the light at night in summer. The eggs are laid in the spring by the adult female moth. They are deposited on a great variety of plants, depending much on the species of moth. The eggs hatch out into tiny cut worms which grow to maturity feeding the while on most kinds of garden crops, field crops, and many kinds of weeds. They pass the pupa stage under ground, the dark brown chrysalids being enclosed in an earthen cell.

There are several broods during the year, depending upon the climate, and more or less upon the local weather conditions. The winter is passed usually in the pupa stage under ground, but some of the adult moths are often seen in winter especially in our houses. Sometimes the winter is passed in the partly grown larva stage, and when spring comes they are ready to feed upon the first vegetation that appears.

Altho many control measures have been from time to time devised for the control of this pest there seems to be none that give perfect results. Clean culture is one of the most effective measures, however, and if consistently followed will give a good measure of success. Plow infested land in the fall to break up the pupa cells and destroy the over-wintering caterpillars.

One of the commonest treatments, however, and a very effective one, is to poison the worms with a poison bran mash. The poison mash should be planted along the row, and not around the field, for the worms are in the soil in the field. The following formula has given the best results:

A. 1 pound of Paris green

20 pounds of bran

Mix thoroly in a wash tub while dry. Then stir in the following (B) well mixed

B. 2 or 3 lemons or oranges, chopped fine

3 pints of cheap syrup

3½ gallons of water

The fruit juice may be squeezed in the water and the rind and pulp run thru an ordinary meat chopper.

The poison bran serves best when sown broadcast late in the evening, for then the mash retains its moisture longer and the worms care less for it when it is dried out. From five to ten pounds of the wet mash is sufficient to the acre but it is best to apply it here and there to the worst infested areas. After a few days the poison may be again distributed if deemed necessary.