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ROOT APHID ON SUGAR BEETS

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ROOT APHID ON SUGAR BEETS

[Following is a translation of an article by N. I. Pavlyuk, Poltavskiy Agricultural Institute, published in the Russian-language periodical Zashchita Rasteniy ot Vreditel'ey i Bolezney (Protection of Plants Against Pests and Diseases), No 6, 1963, pp.18-19. Translation performed by Sp/6 Charles T. Ostertag Jr.]

During the course of the last three years the sugar beets in the Poltavskaya Oblast have been damaged by root aphids.¹ In 1960 on the Golobordko State Farm in the Karlovskiy Rayon it was detected in an area of 250 hectares, and on the "Oktyabrskiy" (same rayon) in 100 hectares. In 1961 the pest was distributed in 14 rayons of the Oblast in an area of 3842 hectares. The most harm caused by the root aphid was in Lubenskiy, Kremenchugskiy, and Karlovskiy Rayons. For example, in an area of 32 hectares on the Chapayeva Collective Farm in Karlovskiy Rayon massive damage to the beets was observed.

In 1962 the root aphid was recorded already in 24 rayons (based on the old division) in an area of 10,911 hectares. Out of these, massive destruction of the young crops was observed on 447 hectares. From 70 to 100% of the plants perished. The largest areas populated by the pests were in Novo-Sanzharskiy (4,085 hectares, out of which 45 hectares were massively infected), Chutovskiy (1,187 hectares), Khorolskiy (895,102 hectares massively infected), and Mashevskiy (783) Rayons.

The root aphid is different from the common beet aphid by its yellow-white color and the absence of sap tubes and tail. The root aphid feeds on root crops by attaching by suction to lateral rootlets. As a result the arrival of water and nutrient substances into the plant is disrupted. They are strongly retarded in growth, the leaves wilt and wither. On the weakened root crops in the field and during storage various diseases develop (bacteriosis, fusarial wilt, and others).

Infection by the pest can be judged based on the conditions of the plants. In the field during the end of July and the beginning of August, foci (diameter from 5-15 meters and more) of damaged beets appear. Under optimum conditions for the development of aphids, the size of foci rapidly

increases and by harvest time the infection has become massive.

The aphids reproduce asexually in the fields from July through September. In individual years, flight continues to the end of October. On to which plants they migrate and where the wintering eggs are deposited has still not been established.

By digging it became apparent that larvae of various ages and wingless females winter in the soil. Under laboratory conditions, winged specimens appeared on the root crops in the end of May. At a temperature of 22-23° the larvae, on the tenth day after hatching, changed into adult asexual females, at 16-18° on the twentieth day. For a day or two before the hatching of the larvae began, the females ceased feeding and moving and covered themselves with a white, fluffy, waxy deposit. The winged specimens appeared in the end of May.

In the past year in former foci (1961) of mass beet damage the aphid, which had wintered in the soil, fed on the roots of pig weed (*Chenopodium album*) in the spring and by 10 August produced four generations on it. As it developed the aphid feeds and multiplies on pig weed growing not only in beet fields but on the young crops of beets, in tree belts, in corn fields, along the shoulders of roads, etc. The emergence of the first winged females was noted on 23 August 1962 and the mass emergence on 5 September.

In storage the aphid feeds and multiplies on rootlets of root crops. In the majority of cases it is found under a white, fluffy, waxy deposit (to 1 cm² of deposit there are approximately 30-50 insects).

A second species of aphid (*Trifidaphis phaseoli* Pass) is also found on beets. It often develops on the same root crops and this is described above. Mass outbreaks of the multiplication of this pest were noted in Poltavskaya Oblast in 1934.

In 1962 we set up an experiment (in the auxiliary enterprise of the Psychoneurological Hospital of Poltavskaya Oblast) on checking the action of 25% soil hexachloran on the root aphid. The preparation was applied under cultivation in doses of 30 and 40 kg/hectare. Plots (50 m² each) were marked out in the beet field where in 1961 extensive damage to the beets by the root aphid was observed.

The extent of beet damage turned out to be different on the test plots. By 25 August all the plants in the control were depressed, in 50% of them the leaves were withered. On the plot where 30 kg/hectare of GKhtsG was applied [GKhtsG --geksakhlorantsiklogeksan--hexachlorancyclohexane], focal damage was observed (diameter of foci from 3-5 meters); in the place where 40 kg/hectare of GKhtsG was applied two small patches appeared (their diameters were 1.5 and 2 m). By 30 August in the control on one root crop

there had arrived (in a focus) around 95 insects. In the test with the largest dose of hexachloran there were 23. The harvest of beets in the variant with 40 kg/hectare of GKht'sG was 206 centners/hectare, with 30 kg/hectare --134 centners/hectare, and in the control -- 97 centners/hectare.

For preventing the further spreading of the root aphid it is necessary to expose its foci and conduct measures to impede the wintering over of the pest.

It is advisable to seed the beets far away from the infected beet field.

We recommend generally to destroy the pig weed. In foci it is necessary to immediately harvest the root crops and use them for feed. All vegetative residue should be removed. It is advisable to widely apply 25% hexachloran to the soil on the basis of 40-50 kg/hectare.

In the mother seeding the injured root crops are harvested separately and used as fast as possible.

During storage they are easily damaged by pit mold and root crops transplanted with aphids yield a low harvest of seeds or do not form them at all -- the shoots wither. In the pits and storehouses it is necessary to thoroughly gather up the remnants of root crops and to destroy them.

Footnote 1. V. A. Mamontova (Zoological Institute of the Academy of Sciences of the USSR) regards it as belonging to the species Pemphigus fuscicornis Koch; M. P. Bozhko (Kharkov University) to P. populi Couch (?).

Figure 1 (page 18) The aphid Pemphigus fuscicornis Koch. on a root crop.

Figure 2 (page 19) The aphid Trifidaphis phaseoli Pass.