Aphid Control on Potatoes

experimental plots near Arvin and Shafter used to test effectiveness of insecticides

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Aphid control on potatoes by the use of some of the newer organic chemical compounds as aphicides was studied in the spring of 1948 in two series of small replicated plots in Kern County.

Damage inflicted by the feeding insects and the spreading of some of the important potato viruses create an important and difficult control problem.

The selected plot locations were approximately in the heart of the commercial potato growing area—one near Shafter and the other in the Arvin district—and presented differences in type of aphid populations and differences in dates of planting and harvesting.

The insecticides used were dusts and with the exception of one experimental dust—parathion—were commercial formulations of standard available insecticides.

Pretreatment and post-treatment samples were taken and the results were tabulated and analyzed. When the results are considered as a whole, all the insecticides used were of value.

DDT

The average rate of application of 5% DDT dust was 41 pounds per acre. Considered from a seasonal standpoint, and from its action in both of the plot locations, 5% DDT dust was found to be a more effective insecticide than nicotine and approached BHC—benzene hexachloride—and parathion in effectiveness.

The residual action of DDT was apparently of some consequence but the DDT did not begin to be very effective until after the second application of dust. Results indicate that DDT can be used fairly effectively as a preventive insecticide against the green peach aphid, but must be present in lethal quantities prior to population build up. If relatively high aphid populations already are present in the field some other material such as parathion should be used to bring an immediate reduction in the population.

Nicotine

The nicotine dust used—guaranteed 3.6% nicotine alkaloid—was somewhat effective in aphid control when applied at the average rate of 40 pounds per acre under the conditions of these tests. When used against a relatively high population—as in the Shafter area plots—it did not give the control that was obtained with DDT, BHC or parathion.

The conditions under which the nicotine dust was used were not favorable to this type of material. The temperature was too low and often a slight breeze was blowing which caused the dust to drift out of the plot area before sufficient time had elapsed for the material to reach its full potential of effectiveness.

Nicotine acts rapidly, so the immediate drop in population is noticeable but no residual action is apparent.

BHC

BHC cannot be recommended—although it is a very good aphicide—because in normal repetitive applications it has imparted a disagreeable odor and taste to the potato tuber.

Parathion

Parathion was tested at an average rate of application of 44 pounds per acre.

This organic phosphate is highly toxic—to man as well as to insects—and in these tests it was one of the best materials used.

By actual counts it caused the greatest reduction in numbers of any of the materials, and under the conditions of high population it was significantly better in its aphicidal action than the DDT.

Post-treatment counts indicated that the parathion acts rapidly in killing the aphids and that its residual action upon high populations is pronounced.

HETP

The average rate of application of HETP—hexaethyl tetraphosphate—was 61 pounds per acre. As a dust the material is highly unstable and consequently it must be used as soon as possible after preparation. This organic phosphate is also highly toxic to man and should be used with caution.

The aphid kill obtained with HETP in these experiments was immediate but residual action was lacking.

Indications are that the best utilization of HETP would be in conjunction with some other insecticide, such as DDT.

The primary species concerned in all areas sampled was the green peach aphid—which was approximately 95% of the aphid population counted—with the potato aphid and the pea aphid being the next most abundant species. A few other species were present and of these the cowpea aphid was encountered most frequently.

DDT in the replicated plots was not as effective in reducing the numbers of potato and pea aphids present as it was in reducing the numbers of the green peach aphid. This did not appear to be true with parathion.

Early Recognition

The necessity of early recognition of potential aphid populations in the field is a primary factor in aphid control. Early in an infestation quite a few winged aphids can be noted on the top leaves of the plants. In a short time these winged aphids will move to the base of the plants and produce their young.

Aphid population reduction below a level of effectiveness, in regard to virus spread, may or may not be possible.

Results indicate that a moving population of aphids in the early stages of development can be reduced to a certain extent and that an early, relatively stationary developmental population can be reduced to almost the point of nonexistence.

To accomplish these ends the proper insecticide must be applied early in the growing season when the potato plants are small enough to permit proper coverage of the bottom leaves.

If the insecticide application is delayed until current season spread of virus disease is visually obvious, the application of any insecticide is about three weeks too late.

The planting of clean seed at the proper season, early recognition of potential aphid populations, prompt treatment of the plants at the proper stage of development, and fairly continuous coverage during the time of potential population development and increase, are all cardinal rules which must be followed if any success is to be hoped for in the prevention of virus disease increase in potato fields.

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