

CONTROL OF APHIDS AND MITES ON POTATOES

D. M. Powell

Agricultural Research Service, U. S. D. A.
Yakima, Washington

Forty-three pesticides were used in the 1963 secondary screening experiments in a search for more effective chemical compounds for control of the green peach aphid, the two-spotted spider mite, the iris whitefly, the intermountain leafhopper, the onion thrips and the Colorado potato beetle. Preliminary evaluations were made at the Yakima laboratory but the most promising pesticides were applied to 626 field plots in cooperation with 16 eastern Washington potato growers. During the study 114,000 compound leaves or whole potato plants were examined for specific pests and numerous leaf and tuber samples collected for residue analyses. When unauthorized residues were found the plots were dug by hand and the tubers removed and destroyed.

In studies on the control of the green peach aphid, endosulfan, (Thiodan®) continued to be one of the better commercially available aphicides and there was no evidence that the aphids were developing resistance to it. Best control was obtained when endosulfan sprays or dusts were applied at temperatures above 75°F. Poor control, particularly with endosulfan dust, was obtained when treatment was made at temperatures ranging from 40° to 60°F. Dimethoate (Cygon®) sprays applied at the registered rate per acre with ground equipment and also with aircraft gave unsatisfactory aphid control. Endrin and diazinon sprays gave good control when applied with ground equipment.

Studies designed to improve the effectiveness of granular applications of the systemic insecticide Di-Syston® were continued. These experiments were conducted in 9 fields of potatoes and included the following variations in application of the 10% granules: (1) Pre-planting, broadcast applications mixed in the soil with tandem disk, (2) Placement of the granules in bands in the soil approximately 2 inches from each side of the row of seed pieces at planting time, (3) Side dressing the granules in the soil approximately 4 inches from each side of the planted row when the plants were 4 to 6 inches high, or 8 to 10 inches high, and (4) Dribbling the granules down on the row when the plants were 4 to 6 inches high, or 8 to 10 inches high. Counts made of aphids at intervals during the season showed differences in control between treatments but in general the better treatment was effective for from 40 to 60 days after application. The results further corroborated the recommendations given in the 1963 Potato Insect Control Calendar that early crops of potatoes should be side dressed with Dy-Syston® granules on May 15 and crops planted later be banded when planted. Some growers side dressed the granules too late in 1963. Under some conditions it may be necessary to apply endosulfan (Thiodan®) to the foliage later in the season after the granules have become spent.

Several pesticides tested gave adequate control of the two-spotted spider mite on potatoes when applied early enough and with good plant coverage. Each seemed to have certain limitations. Carbophenothion (Trithion®) and dimethoate (Cygon®) are relatively quick acting miticides and remained effective for 14 to 21 days after application unless subject to heavy reinfestation from outside the treated fields. In that case carbophenothion may be effective for only 7 to 10 days and dimethoate a few days longer. Dimite® and Kelthane® were shown to be relatively slow to kill mites, with little apparent control during the first 3 to 4 days, but becoming much more effective 7 to 14 days after treatment, even during migration of mites to the treated fields.

Results of these studies showed that slow acting miticides should be applied before many mites have migrated to potatoes but if applications are delayed then fast acting miticides are required to kill the mites before serious foliage damage occurs. In general, carbophenothion has given best control of mites except perhaps in the Quincy area where Kelthane® is reported to be more effective.

Table 1 illustrates the differences in effectiveness of several miticides applied to potatoes adjacent to and on the leeward side of a badly infested red clover field.

Table 1. -- Control of the two-spotted spider mite on Russet Burbank potatoes following a single application of various miticides.

Toxicant Spray	Mites per 150 potato leaves found on indicated number of days following treatment			
	3	7	14	Total
Dimethoate (Cygon®)	171	129	940	1,240
Dimite®	347	264	671	1,282
Kelthane®	609	341	520	1,470
Carbophenothion (Trithion®)	249	401	1,454	2,104