



Seed-borne leaf roll virus infected potato plant.

Di-Syston (disulfoton) is a systemic organophosphorous insecticide. The term systemic refers to compounds that are absorbed through the leaves or roots and carried through the plant system. Di-Syston is mainly effective against aphids, leafhoppers and other insects with sucking mouthparts that take in large amounts of plant sap.

This report is based upon several years evaluation of Di-Syston for control of potato insects on the Russet Burbank potato variety. Experiments were conducted in field plots at the Aberdeen Branch Experiment Station and in commercial potato fields in eastern Idaho. Fields treated by growers in both the eastern and western parts of the state were also observed.

APPLICATION OF DI-SYSTON

Di-Syston is usually applied to potatoes as a 10 percent granule at the rate of 25 to 30 pounds ($2\frac{1}{2}$ to 3 pounds actual toxicant) per acre. Higher rates have resulted in damage to young plants. Lower rates have not been effective. The most convenient method of application is with a potato planter attachment that distributes the granules near the seed pieces in the row. The granules may also be applied as a side-dress application after the plant emerges.

POTATO INSECT CONTROL

The green peach aphid is very important to potato production in Idaho because it is the vector of potato leaf roll virus. Also when exceptionally abundant, this insect can cause direct damage to the plant by feeding on it.

Di-Syston

For

Controlling

Potato Insects

APR 5 1967 By GUY W. BISHOP

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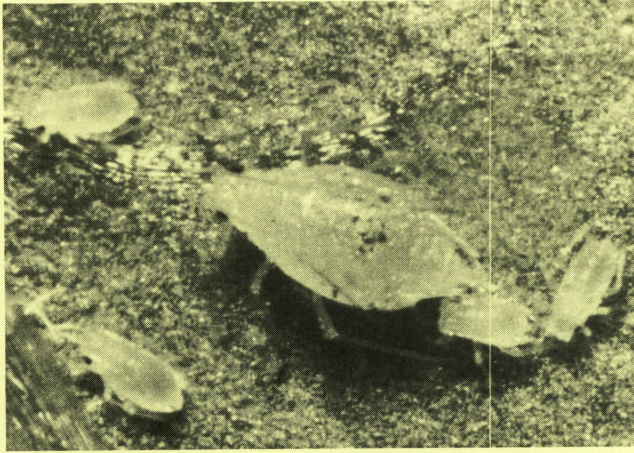
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Over a period of years Di-Syston applied at planting time has given control of this aphid through early August in plots at Aberdeen, and in Fremont and Caribou Counties. After mid-August the insecticide is ineffective, probably because of breakdown of the insecticide and the increased size and age of the plants.

Under the conditions of these tests there was no aphid build-up during late August and September, but such a build-up could occur in some areas under certain conditions.

Side-dress application of Di-Syston extended the life of the insecticide slightly longer into the growing season. When application was followed by an irrigation or by rain, the insecticide entered the plant and became effective within a few days. Without added moisture there was no evidence of control for a week or longer. However, side-dress application has the disadvantage of not protecting plants early in the season. This is especially important in leaf roll virus control since young plants are most susceptible to infection. Additionally, the process of side-dressing destroys many side roots.

Di-Syston applications gave effective control of the Intermountain potato leafhopper, the potato aphid, thrips, and other sucking insects that occasionally feed on potato plants. Control of the Colorado potato beetle was inconsistent since the material is effective against only very young larvae and for only a short time after the plant emerges. When the beetle is abundant, an additional insecticide treatment is usually required to prevent serious damage even though Di-Syston has been applied.



Green peach aphid adult and nymphs on a potato leaf.

EFFECT ON LEAF ROLL VIRUS SPREAD

Di-Syston treatment reduced leaf roll virus spread by inhibiting or preventing build-up of the green peach aphid. Its use is a valuable supplement to cultural practices employed in the production of certified seed, especially on seed plots.

Tests with aphids in individual leaf cages at Aberdeen have shown that a period of two weeks or longer may be required for aphids to accumulate a fatal dose of Di-Syston after entering treated fields. This probably explains the ineffectiveness of the insecticide in certain instances in preventing leaf roll virus spread in areas with high green peach aphid numbers. In other words, aphids entering the field with the virus could infect many plants. The virus could also be picked up from source plants within treated fields and transmitted to healthy plants.

In a field near Blackfoot, Idaho, with a seed borne leaf roll virus incidence of 5 percent, virus spread was only slightly less in treated blocks of the field (Table 1). The presence of winged green peach aphids in the treated blocks indicated that there had been aphid movement from untreated blocks and from other sources in the area. Examples such as this illustrate why Di-Syston should not be used as a substitute for high quality seed potatoes in virus control.

Table 1 Percent leaf roll virus spread in treated and untreated blocks of a potato field, Blackfoot, Idaho, 1963.

Block	Di-Syston Treated	No Treatment
1	23.5	33.3
2	58.3	55.3
3	26.5	19.3
4	40.0	54.4
Average	37.1	41.3

Di-Syston treatments at Aberdeen resulted in a substantial yield increase in one year out of five (Table 2). A small yield increase was observed, however, in three of the remaining four years. There was little difference in yield for the one year (1966) that the Colorado potato beetle was controlled in the plots with a separate application of DDT. This indicates that the yield increases observed the other years probably were due to partial control of the Colorado potato beetle as well as control of several minor insect pests.

Table 2. Effect of Di-Syston treatments on tuber yield of the Russet Burbank variety, Aberdeen, Idaho, (cwt. per acre).

Year	Di-Syston	No Di-Syston	Di-Syston Post Emergence
1962	171	155	—
1963	248 ¹	205	—
1964	219	188	189
1965	179	161	—
1966 ²	199	208	—
Average	203	183	

¹This yield was statistically higher than where no Di-Syston was applied.

²DDT was applied to all plots for Colorado potato beetle control.

EFFECT ON VERTICILLIUM WILT

Researchers in Washington report that Di-Syston treatment of potatoes delayed symptoms of Verticillium wilt. However, there was no evidence that this disease was suppressed in the treated plots at Aberdeen or at other localities where Di-Syston treatments were observed. Di-Syston treatment frequently resulted in vine growth that was darker green and apparently more vigorous than that of untreated plants. The cause of this response has not been determined.

CONSIDERATIONS NECESSARY

Whether or not the use of Di-Syston is profitable depends upon the nature of the insect problem. The kinds and numbers of insects vary among the different potato producing areas and frequently from year to year. Generally, foliage feeding insects that are effectively controlled by Di-Syston are not sufficiently abundant in Idaho to justify treatment unless there is an associated virus problem. The decision, however, must be based upon conditions on each farm. Yield and quality records from treated and untreated areas of potato fields will provide a valuable guide.

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