

Pests of Red Kidney Beans

increased yields resulted from proper timing and application of control treatments tested in 1952 trials

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Control of the two-spotted mite and the valley leaf miner—by a single application of an insecticide-acaracide combination—increased yields of red kidney beans in experiments conducted at Linden in 1952.

Most effective were combinations of 1.5% dieldrin with 3% aramite, or with 2% parathion. One dusting at the rate of 40 pounds per acre applied when most of the beans were set on the plants—about 30 days from harvest—gave control for the season.

The red kidney bean is particularly susceptible to damage by the two-spotted spider mite, *Tetranychus bimaculatus* Harvey. The mites feed on the undersides of the leaves, piercing the plant cells with their needle-like mouth parts, causing a devitalization of the plants, early leaf drop, and less beans per acre.

Another pest of the kidney bean—and of other beans, melons, and tomatoes—is the valley leaf miner, *Liriomyza subpusilla* Frost. The maggots of this small fly mine extensively in the leaves, and may cause premature leaf drop, discoloration of beans exposed to excessive sunlight, and decreased yields.

Experiments in 1952

In the first experiment to control the mite and the leaf miner, 16 different insecticide and acaracide mixtures were applied by rotary hand dusters on August 14, 1952. Randomized blocks six rows wide by 58' long—1/43 acre—were used, and four replications of each treatment were made. Spider mite populations were

counted at intervals, the prevalence of leaf miners was recorded, and yields—in terms of pounds of dry beans per acre—were taken of the treatments showing the best mite control. All dusts were applied at the rate of 40 pounds per acre.

The results indicated that a 3% aramite dust and a 7.5% ovotran plus 2% parathion dust resulted in good mite control and in the highest yields—1400 and 1590 pounds of dry beans per acre, as against 840 pounds in the untreated check plots. The next highest yields—1260 pounds of beans per acre—resulted from treatments with an ovotran-aramite mixture and a parathion-sulfur dust combination. Mite population 20 days following dusting averaged 950 active mites per leaflet in the untreated plots as contrasted with 39–85 mites per leaf for the effective treatments.

In these plots the leaf miner averaged only eight mines per leaf—not severe enough to cause measurable damage. However, significant reductions in leaf miner damage resulted from a 3% aldrin dust, a 2.5% heptachlor dust, and a 1.5% dieldrin dust.

In view of these results a combination acaracide-insecticide dust mixture was tested for control of the mite and the leaf miner because both pests often occur on the plants at the same time. Combination dusts incorporating 1.5% dieldrin with several acaracides—3% aramite, 7.5% ovotran, and 2% parathion—were applied by airplane and hand dusters to a second field in the Linden area.

Plane applications were made at the rate of 40 pounds per acre to 7.5 acre

blocks for each treatment on September 3, 1952. Commercial control of the two-spotted spider mite was obtained with the parathion-dieldrin combination, and with aramite-dieldrin dust. Mite counts 23 days after application showed the best combination to be aramite-dieldrin with an average of 26 active mites per leaflet as contrasted to 746 per leaflet for the untreated plots. The next best treatment, parathion-dieldrin-sulfur, averaged 89 active mites per leaflet. Leaf miner control was excellent in all cases—97% to 99% reduction in mines over 0.25' long.

A series of hand applications were made to determine optimum application rates and differences in the degree of control. An increase in the rate of application from 40 to 105 pounds of dust per acre of the aramite-dieldrin combination dust improved leaf miner control from 92% to 99% and mite control from 86% to 95%. These results indicated that the 40 pounds per acre dosage is a satisfactory rate, but that it is absolutely necessary, particularly with the aramite-dieldrin combination, to cover the plants thoroughly and deposit dust on the undersides of the leaves. The ovotran-dieldrin dust combination gave better control by hand application than by plane, but the other materials gave comparable results.

The single applications of the chemicals found satisfactory in the 1952 experiments may not always be effective when red spider mites or leaf miners cause severe damage prior to the setting of beans on the plants. Thoroughness of application is essential in all cases—whether dusts are applied by airplane or ground machine.

Until the full effects of these chemicals on kidney beans are determined, growers should use the combination treatments only in cooperation with local agricultural authorities because state and local restrictions govern the use of certain of these chemicals. The proper timing of the application of the chemicals also will depend upon local conditions.

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Average yields of red kidney beans per plot—125 square feet—at Linden as a result of two-spotted mite control with the following acaracides: from left to right, ovotran 7½% plus parathion 2%; aramite 3%; ovotran 7½%; and check, untreated.