

Flea Beetle Control¹

In the Montana District

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The potato flea beetle (*Epitrix cucumeris*)³ has, for the past two years, caused severe damage in the beet fields in the Milk River valley of Montana. During the spring of 1948 and again in the spring of 1949 high populations of flea beetles were noted throughout the district. It was not unusual to observe as many as from five to six flea beetles per seedling in many of the fields.

In 1948, in excess of 3,000 acres was replanted or abandoned. Stands were reduced severely in many cases and a major part of the entire acreage was damaged to the point that thinning was retarded two to three weeks. Late in the spring, a small acreage was dusted with a 5% DDT dust as recommended in 1946¹. It was observed that the 5% DDT dust gave good control on the potato flea beetles and likewise eliminated banded flea beetles, three-spotted flea beetles and lygus bugs which were also noted in the fields prior to dusting. After dusting had been completed for 8 hours, we were unable to find actively feeding flea beetles. With this experience in hand, we laid plans to go into commercial dusting of flea beetles the following year.

In the spring of 1949, our early plantings emerged and seemed well on their way to an early thinning. It was possible to see down the rows in many of the fields throughout the district. Then, beginning about May 5, our fieldmen began to report that the flea beetles were causing some damage. Before we could get sufficient dusting equipment into the fields, many of the stands had been severely damaged. Fields which had been scheduled for thinning in two weeks were, in many cases, found to be practically barren.

Four ground dusters were put to work but it soon became apparent they could not hope to get over the acreage in time to maintain proper control. On the 19th of May, arrangements were made to use an airplane in conjunction with the ground dusters, and on the 26th of May a second plane was put into dusting service.

The first dusting was done on severely damaged fields in an attempt to prevent total destruction with subsequent replanting. In such cases, the beets varied in size from the cotyledon stage to six true leaves. After damaged fields had been dusted, an attempt was made to dust all fields just as the beets were emerging. This was an attempt to stop the damage before it had begun and also to reduce the damage done by the flea beetles before the beets had actually emerged through the top soil.

The soils in the Milk River valley are generally of a heavy type, and each spring there is considerable crusting. Careful examination throughout

¹ The results reported in this paper are not the results of closely controlled experiments, but observations on a large scale commercial project.

² Utah-Idaho Sugar Co.

³ "Insects and Diseases of the Sugar Beet"—Asa C. Mazson: "Recent taxonomic studies by L. G. Gentner indicate that what is now called *Epitrix cucumeris* in the western states is not the same as the eastern form and therefore should be given a different name."

For a number of years, heavy potato flea beetle damage has been experienced in the Gunnison factory district of the Utah-Idaho Sugar Company in Utah. In 1946, at the request of the Utah-Idaho Sugar Co., Walter Peay and Howard Dorst of the Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture, tried several of the commercial insecticides in an attempt to determine a recommended control measure for potato flea beetles. They demonstrated that the 5% DDT dust would give effective control.

the spring pointed to flea beetle damage while the seedlings were still under crust. Many cases have been reported where the beetles were observed feeding from 3/4" to 1" below the soil surface in the cracks and under the crust. Much of this damage we had previously erroneously associated with damping-off or from the work of insect larvae living in the ground.

Table I.—Comparisons Regarding Acreage Dusted for Flea Beetles

Chinook District	Percent Replanted	Percent Abandoned	1949 Season Average Yield
Acreage Dusted	3.8	2.5	11.26
Acreage not Dusted	11.0	17.7	9.10

The planes used were Piper Cubs fitted with a hopper which held approximately 200 pounds of dust. The dust was fed through an adjustable slide gate in the hopper by a winddriven agitator and distributed from a homemade baffled Venturi tube fashioned by the owner of the plane. The Venturi tube was designed to provide coverage about 50' wide and strips were laid down on 33' centers to provide overlapping coverage. Refueling of the plane and refilling the dust hopper were accomplished in pastures or vacant fields adjacent to the beet area being dusted. Approximately 500 acres were dusted in one day by one of the planes.

Airplane equipment proved to be far superior to ground equipment in general. Some of the outstanding advantages noted are as follows: Mobility of the dusting units; ability to dust fields too wet to accommodate ground equipment; greater dusting capacity per unit; better penetration of dust into surface mulch and cracks; and less delay due to mechanical difficulties. Our experience indicated that airplane dusting costs with a well-planned operation appear to be very comparable with ground dusting costs.

A 5% DDT dust at the rate of 12 pounds per acre gave satisfactory control on all acreage where dusting conditions were favorable. During the peak of the dusting period we received precipitation totaling 3 1/2" of moisture. In many cases, rain fell on fields within a few hours after they had been dusted: No appreciable difference was noted in control in such cases. Ground dusters were able to work under almost all conditions and gave good control. The planes, however, did have to re-dust two fields which were dusted originally under unfavorable conditions.

A limited acreage was sprayed with high-pressure ground sprayers using approximately 1-1 1/2 pounds of technical grade DDT in 50 gallons of water applied to an acre. The spraying did not demonstrate as effective control as did the dusting.

The fields which were dusted which had been severely damaged and in which high populations of flea beetles were working recovered quickly after dusting. Where dusting was done prior to damage by flea beetles as a protective measure, the flea beetle populations were noted to be at a minimum throughout the thinning period. Observations indicated that nearly 100% kill was realized within 24 hours after dusting. Very often flea beetles would again appear in small numbers within a week or ten days. We observed no cases, however, where populations after dusting caused severe damage.

After considerable observation with the results of dusting, it is felt that many fields could be dusted to advantage which have in the past not been considered to have suffered too much damage.

The statement has been made in the Milk River valley that, regardless of when the beets emerge, thinning will not begin until approximately June 1. It is felt by the authors that this flea beetle damage very possibly has been responsible to a major degree for this situation.

The results of the past year's commercial dusting operation are best exemplified in Tables 1 and 2.

In Table 1 it is noted that the percent of acreage replanted was almost three times as great where the acreage was not dusted as where dusting was accomplished. On the acreage dusted, only 2.5% was abandoned as against 17.7% abandoned on the acreage not dusted. The dusted acreage showed an average yield of 2.16 tons per acre more than the average yield of the acreage not dusted.

Table 2.—Comparison of yield trends between contracts where beets were dusted and were not dusted for flea beetles.

Chinook District	Tonnage in better class than the average of the past 5 years		Tonnage in same class than the average of the past 5 years		1949 Season Tonnage in poorer class than the average of the past 5 years	
	% of		% of		% of	
	Acreage	Acreage	Acreage	Acreage	Acreage	Acreage
Dusted	1101.26	25	1819.19	41	1470.76	34
Not Dusted	409.00	11	1109.04	29	2319.60	60
Total	1510.26	18	2928.23	36	3796.36	46

Note: Tonnage brackets used were:

- (a) Over 13 tons per acre
- (b) 11 to 13 tons per acre
- (c) 9 to 11 tons per acre
- (d) 7 to 9 tons per acre
- (e) 5 to 7 tons per acre
- (f) Below 5 tons per acre

Yields used were average yields for the contract.

In Table 2 a comparison is made of yield trends between contracts where beets were dusted and where beets were not dusted for flea beetles. It is of interest to note that, of the dusted acreage, 25% was in a better class than the average of the past five years as against 11% for the acreage not dusted. Forty-one percent of the acreage which was dusted was in the same tonnage class as the average of the past five years as against 29% of the acreage not dusted, and only 34% of the acreage which was dusted fell in a poorer class than the average of the past five years as compared with 60% of the acreage which was not dusted. Yield results would possibly have been more marked had we not suffered a severe killing frost on the 12th of September which stopped growth on all beets.

An interesting example of the value of dusting can be cited in the case of eight farms in Valley county which were dusted during the second week of May. On May 28, while arranging for plane dusting in Valley county, a survey was made of the fields in that area. Beets were being thinned on all eight farms which had been dusted two or three weeks earlier. These were the only farms in Valley county which were being thinned.

After the experience of the past year, we are advising all beet growers throughout the entire district to dust every acre of beets at the time they are emerging through the ground. Practically all farmers whose acreage was dusted last spring are demanding that dusting facilities be available for the coming year.