

Which Is Better, Spraying or Dusting Potatoes?

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THE Question is often asked, "Might we substantially increase our potato yields by using a sprayer instead of a duster for insect and disease control?" The answer is No, **provided** equally favorable conditions prevail when applying both the dust and the spray. Dusters have been almost universally used in North Dakota, and generally satisfactory results have been achieved. However, we have had no experimental data which measure the relative efficiencies of the two types. It is difficult to evaluate the two. It is hard to apply just the right amount of dust or spray on the potato plots and be sure that each has the same amount of arsenic, copper or other active control chemicals.

An experiment was carried on in cooperation with the Walsh County Agricultural School at Park River to measure the tuber yield result-

ing from the two types of application. The formulae used and the approximate dosages of materials are as follows:

		Amount of material per acre	Pounds of metal copper per acre
Copper Dust	{ 75 lbs. hydrated lime 25 lbs. monohydrated copper sulfate	25 lbs.	2.2
Bordeaux Spray	{ 8.9 lbs. copper sulfate 5 lbs. hydrated lime 100 gallons water	100 gals.	2.2

These two mixtures were chosen since they are chemically similar. Monohydrated copper sulfate, $\text{CuSO}_4 \cdot \text{H}_2\text{O}$, is formed by finely grinding and heating copper sulfate (blue vitriol or blue stone), $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. When the monohydrated dust comes in contact with moisture on the leaf, it forms the original compound, copper sulfate.

Each treatment or check comprised 6 potato rows, 153 feet long, replicated three times. Three applications were made during the summer of 1943 with a wheelbarrow sprayer with a maximum pressure of a hundred pounds and a wheelbarrow type two-row Dobbin duster. The

dusts and sprays were applied on July 9, 21 and August 11 early in the morning when there was no wind and the foliage was slightly damp with dew. All the plots were first dusted with calcium arsenate to control the Colorado potato beetles. The following yield data, expressed in pounds, were obtained September 16 by digging 20 hills at random along the center two rows.

While these trials are definitely preliminary in nature and should be carried on in more detail before any definite conclusions can be drawn, the results of last season's data indicate the following tentative conclusions:

	Replicate I	Replicate II	Replicate III	Average
Bordeaux spray	30 lbs.	37 lbs.	38 lbs.	35 lbs.
Monohydrated copper sulfate dust	34 lbs.	35 lbs.	39 lbs.	36 lbs.
Check (no copper)	26 lbs.	26 lbs.	34 lbs.	29 lbs.

1. There was very little difference in the yield data between the spray and the dust. It must be kept in mind, however, that under the conditions of this experiment ideal dusting weather prevailed.

2. The use of copper increased yields from 17 percent to 20 percent over the plots which had not been treated with copper. The yield in the field where the experiments were conducted was approximately 150 bushels per acre. On this basis, an increase of about 30 bushels per acre would be expected if the entire field had been treated with copper.

QUESTIONS ABOUT POTATO INSECTS

How does spraying with Bordeaux mixture compare with the use of monohydrated copper dust on potatoes?

In triplicate trials at Park River, North Dakota in 1943 both the dust and the spray were about equally efficient in increasing potato yields over yields obtained from untreated Triumph potatoes. Three applications were made, July 1, 21, and August 11 under ideal conditions.

Which potato insects have been most abundant during the last four years?

J. A. Munro (Entomologist) and H. S. Telford (Associate Entomologist) find that flea beetles, leaf hoppers and Colorado potato beetles have been most abundant.

What was the extent of wireworm injury to potatoes in 1943 and in earlier years?

Through cooperation of Mr. W. H. White, In charge, Truck Crop and

Garden Insect Investigations of the Bureau of Entomology and Plant Quarantine, Messrs. J. A. Munro and H. S. Telford of the Department of Entomology were able to secure data on bin inspections of 113 separate bins in all of our potato growing areas. No tuber worms or tuber worm injury were discovered. The average wireworm injury was noted as follows:

What was the typical insect population in North Dakota potato fields in 1943?

H. S. Telford (Associate Entomologist) reports the relative proportion of insects in the potato sections of Northeastern North Dakota, sweep tests made largely on August 11 and 12, 1943, to consist of 52% flea beetles; 22% leaf hoppers; 18.2% Colorado potato beetles and larvae; 4.0% *Lygus* species (plant bugs); 0.2% alfalfa plant bug; 0.1% potato psyllid; 1.4% aphids; 0.3% ladybird beetles; 1.3% lacewing flies, and 0.4% *Nabis feris*.

	Average percent wireworm injury	Number of bins Examined
Triumph	16.4%	65
Cobbler	15.5%	29
Chippewa	19.9%	10
Early Ohio	24.2%	4
Warba	2.6%	3
Russet	16.0%	1
Green Mountain	26.0%	1

The average for all varieties in 1943 was 16.5%, in 1942 the comparable figure was 14%; in 1941, 16.4%, in 1940, 22.3%.