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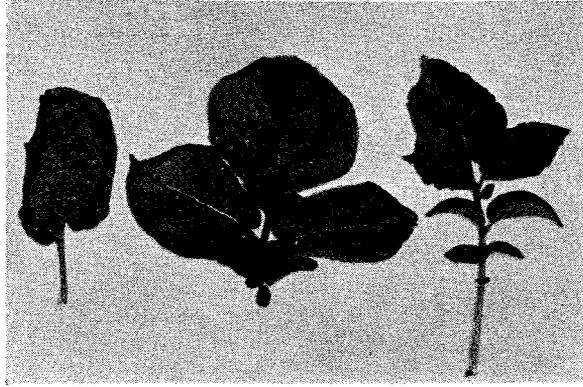
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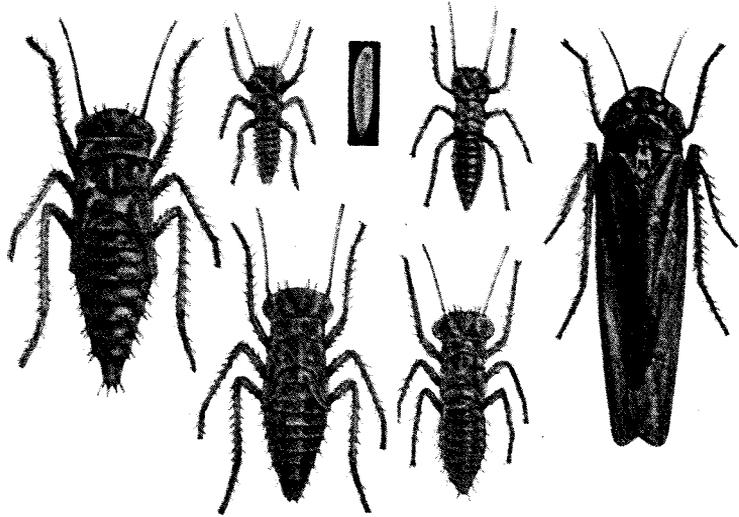
1945

EC 1529

The Potato Leafhopper and Its Control



Three Stages of Hopperburn



Egg, Immature and Mature Leafhoppers. Enlarged 15 Times

The Extension Service, College of Agriculture
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The Potato Leafhopper and Its Control

by H. Douglas Tate and Roscoe E. Hill

In 1944 eastern and central Nebraska experienced the most serious potato leafhopper outbreak on record and yield reductions of 50 per cent or more were common. Each year the potato leafhopper causes some damage to potatoes in the eastern half of the state. Although present at the higher altitudes of western Nebraska, it does not occur in this area in numbers great enough to be of commercial importance.

APPEARANCE OF THE POTATO LEAFHOPPER

The fully grown potato leafhopper is a small, pale green, wedge-shaped insect about $\frac{1}{8}$ of an inch in length which is usually found feeding on the under side of the leaves. It is inconspicuous and very active, quickly running, jumping or flying when disturbed. Both young, or immature stages, and adults can move backwards and sideways as well as forward. The young nymphs are very small and pale colored and when disturbed they generally move quickly to the opposite side of the leaf. Consequently they are easily overlooked by persons unfamiliar with their appearance and habits.*

TYPE OF INJURY

The feeding activities of the potato leafhopper, which is a sucking insect, causes, in some manner not fully explained, a condition known as hopper-burn. The first symptom of this trouble is the appearance at the tip of a leaflet of a triangular, pale green spot which soon turns yellow and finally brown. Similar areas may appear at the end of each lateral vein, or the entire leaf may roll upward and turn brown. This marginal brown area may increase in width until only a narrow strip along the midrib remains green. In case of heavy infestation the plants look as though scorched by fire or drouth. The effect on yield is in proportion to the amount of damage or hopper-burn, and stage of tuber development. For instance, if a heavy, early infestation occurs, the leaves may turn brown and die long before normal development of tubers has been completed, thus greatly reducing the yield of marketable potatoes.

SEASONAL DEVELOPMENT

All available evidence indicates that the potato leafhopper does not survive the winter in Nebraska and other northern states. In southern states it continues to breed throughout the winter on alfalfa, other legumes, and a number of other cultivated plants and weeds. Migration into the northern states apparently takes place each spring and summer. Large numbers of adults often appear suddenly on beans in Nebraska as soon as these plants come up in early June. These adults are not especially attracted to potato plants during the first two or three weeks of plant growth. There are from two to three generations of the potato leafhopper each season in this state.

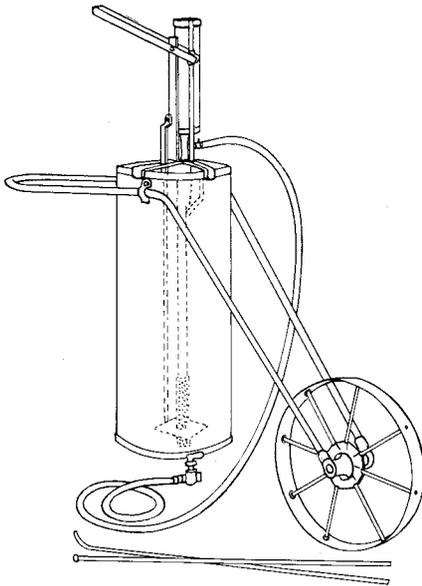
*Cover page illustration modified from bulletin by Fenton and Hartzell.

PLANTS ATTACKED

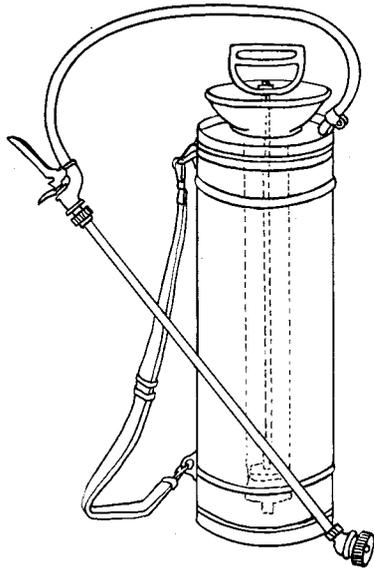
Potato leafhoppers feed on a wide variety of cultivated and wild plants. Among the more important cultivated hosts in Nebraska are potatoes, beans, alfalfa, soybeans, sweet clover and eggplants. In addition to hopper-burn of potatoes, these insects cause severe injury to alfalfa, producing as in 1944, a condition often referred to as "yellows" or "yellow top."

CONTROL

At present the only means known of effectively controlling the potato leafhopper on potatoes is through the use of sprays or dusts. There are three major factors to be considered in the successful use of insecticides: first, toxicity of the spray or dust; second, timeliness of application; and third, proper application. Spraying or dusting too late or too early and poor coverage will result in poor control regardless of how toxic the insecticide may be. All too often the insecticide is condemned when the real reason for failure is either that the application was made at the wrong time or that plants were not thoroughly covered with the material, or both.



Wheelbarrow Sprayer
Suitable for Home Garden



Compressed-Air Sprayer
Suitable for Small Gardens

SPRAYING

Bordeaux Mixture, which is also an important spray for certain potato diseases, is effective for leafhoppers, causing the young to die shortly after hatching. It is necessary to begin spraying as soon as the first leafhoppers appear or before a heavy population has developed. Application should be repeated at 1-week to 12-day intervals until four to six treatments have been made. Standard strengths of Bordeaux such as 4-4-50

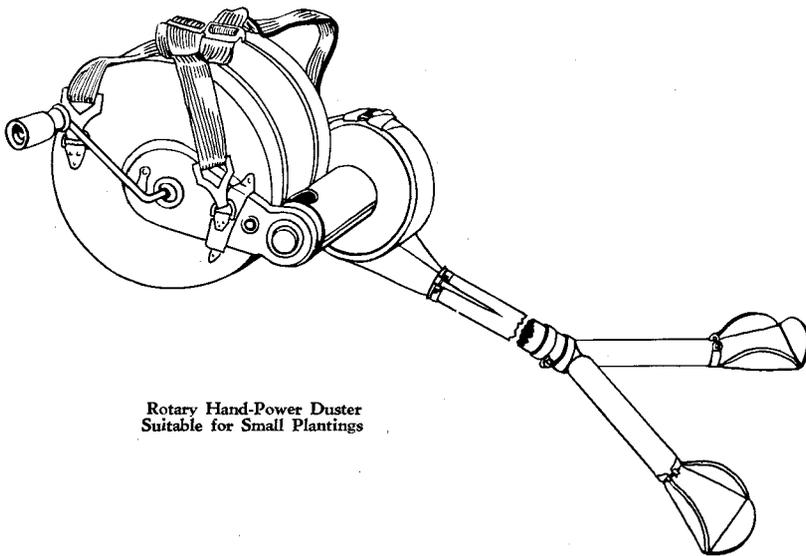
are satisfactory. Most small gardeners probably will prefer to purchase Bordeaux Mixture powder ready to use after mixing with water. However, it can be prepared at home.

Formula for making 4-4-50 Bordeaux Mixture:

	Field Formula	Garden Formula
Pure copper sulfate (bluestone) . . .	4 pounds	4 ounces
Hydrated lime	4 pounds	4 ounces
Water (cold)	50 gallons	3 gallons

Dissolve the copper sulfate in a small quantity of water in a wooden, glass or earthen vessel. Then dissolve the lime in the remainder of the water and while stirring pour the copper sulfate solution into the lime solution. This procedure should be carefully followed and the spray used the same day it is made.

The addition of **Nicotine Sulphate** (Black Leaf 40) at the rate of $\frac{1}{2}$ pint to 50 gallons ($\frac{1}{2}$ teaspoonfuls to 1 gallon) aids in quickly eliminating heavy infestations that developed before spraying started. To be effective, it is necessary that the nicotine sulphate come in direct contact with the leafhoppers. Colorado potato beetles and flea beetles can be controlled by adding **Zinc Arsenite** or **Basic Copper Arsenate** at the rate of 2 pounds to 50 gallons (3 tablespoonfuls to 1 gallon) of spray.



Rotary Hand-Power Duster
Suitable for Small Plantings

DUSTING

In the past few years, **Pyrethrum-Sulfur Dusts** have been relied on to quickly reduce heavy infestations of leafhoppers. The pyrethrum, now no longer available because of the war, was responsible, in such combinations, for the quick kill. However, sulfur alone, if applied early and before heavy infestations develop, can be used to advantage in preventing population build-ups. Chewing insects such as Colorado potato beetles and flea beetles may also be controlled with dusts by adding **Cryolite** or **Basic Copper Arsenate** at the rate of 1 part to 3 or 4 parts (by weight) of sulfur.

OTHER SPRAYS AND DUSTS

During recent years certain proprietary materials have been developed which show considerable promise in potato leafhopper control. One of these, "**Lethane B-71**", is a promising replacement for pyrethrum in the sulfur dust combination referred to previously. Another, "**Lethane B-72**", has been developed for use as a spray. These compounds may be combined with sulfur, cryolite or zinc arsenite to control other potato insects. Dust mixtures containing "**Lethane B-71**" probably will be available on the local market during 1945. "**DN-Dust No. 5**", a dinitro compound, has also been recommended for potato leafhopper control. These compounds are the result of extensive laboratory and field research and probably will give satisfactory control if used as directed. The writers have had only very limited experience with these materials.

Experiments in other states have shown that **Sabadilla** compares favorably with pyrethrum, Lethane and dinitro dust for leafhopper control. Sabadilla powder is the ground up seed of a species of lily which grows in certain areas of tropical and subtropical America. Considerable quantities will be available for field use in 1945. It should be used as recommended on the container label.

"**DDT**", technically referred to as "**Dichloro-Diphenyl-Trichloroethane**", a material largely developed since the war started and used extensively by our armed forces in protecting personnel against various insects, also shows great promise in controlling certain insect pests of crops. This material was tested in Nebraska and elsewhere for the control of various potato insects during 1944. It proved to be highly effective both as a spray and as a dust for potato leafhopper as well as for all other major potato insects in this state. Heavy leafhopper populations were practically eliminated overnight with a 1 per cent dust. At present (January, 1945) DDT is not available for civilian use.

APPLICATION OF SPRAYS AND DUSTS

As a general rule, sprays should be applied at the rate of 75 to 125 gallons per acre, depending upon the size of the plants, and dusts 25 to 35 pounds per acre. Since the potato leafhopper is a sucking insect and feeds on the under sides of leaves, it is necessary that the spray or dust nozzles be adjusted in such a way as to cover the under side of the leaves. Coverage of the upper surface only is practically worthless. A one-nozzle-per-row (fan type) power duster is not recommended for the commercial grower. It is suggested that those already having such machines rearrange the nozzles to provide two nozzles per row. Home gardeners can obtain satisfactory control with single nozzle hand-operated dusters or sprayers if care is exercised to obtain good coverage. With large plants it may be necessary to apply the dust or spray from each side of the row.



Four-Row, Two-Nozzle-Per-Row Power Duster



Four-Row, Three-Nozzle-Per-Row Power Sprayer

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