

VEGETABLE CROPS

INSECT OF VEGETABLE
Potato Leafhopper

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COOPERATIVE EXTENSION • NEW YORK STATE • CORNELL UNIVERSITY

potato leafhopper

Empoasca fabae (Harris)

INTRODUCTION

The potato leafhopper (PLH) is a serious pest of vegetable, forage, and fruit crops in the eastern and midwestern United States. PLH does not overwinter in the northern portion of its infestation range, since the insect can survive year-round only in certain areas of the southern United States where the frost-free period exceeds 260-270 days/year. Adults move northward each year in a mass migration in late April or early May. The first migrants are primarily females, and over half of these have been fertilized prior to migration. The number of annual generations in northern states varies from 1-6, depending on time of arrival, host availability, and temperature.

ADULTS

The potato leafhopper adult (Fig. 1) is highly mobile, wedge-shaped, iridescent green in color, and about 1/8 inch (3mm) long. The body is widest at the head and tapers toward the wing tips. The front margin of the prothorax (neck region on insect's back, directly behind the head) is usually marked with six white spots. In the northeast, the earliest migrant adults are

usually observed in alfalfa by the last week of May. The life span of adult females is about 30 days.

EGGS

Eggs are laid singly within the petioles and veins on the under surfaces of host foliage. The optimum temperature for egg laying is 76 F with no egg laying above 90 F or below 62 F. The eggs, which are about 1mm in length, hatch in approximately 10 days. Females may deposit 2-3 eggs per day over their life span.

NYMPHS

The potato leafhopper nymph (immature stage) (Fig. 2) passes through five distinct stages within a period of 12-35 days. Nymphal development is most rapid at 86 F, no development occurs below 54 F, and development is inhibited above 88 F. The total period from egg to reproductive maturity is about 28 days, under favorable conditions. Daily accumulations of

	Egg	Nymphs		Adult
Actual Size →	·	·	†	
		1st	5th	



Fahrenheit degree days can be calculated from the following formula:

$$\left[\frac{\text{Maximum daily temperature} - \text{minimum daily temperature}}{2} \right] - 54$$

Approximately 815 Fahrenheit degree days are needed for development from the first nymphal stage to adulthood. Nymphs are extremely sensitive to desiccation and to dislodgement from the host by wind-driven rain.

DAMAGE

The PLH is a sucking insect, removing plant sap directly from the vascular (water and food transport) system in the leaflet, petioles, and sometimes the stem. In the feeding process, the PLH injects a salivary toxin that causes injury to the plant. Feeding injury sometimes appears very similar to disease symptoms or nutrient imbalance. By adversely affecting the vascular system, PLH reduces photosynthesis, decreases productivity, stunts the plant, and sometimes kills young seedlings. The salivary substance forms a plug in the vascular system in addition to acting as a phytotoxin. Plant damage is frequently intensified during periods of moisture stress.

The complex of symptoms produced by feeding of PLH adults and nymphs on potatoes and beans has been termed "hopperburn". The first sign of hopperburn is whitening of the veins, which appears within 2 days of feeding. These areas soon become flaccid and yellow in color, after which they desiccate, turn brown, and die (Figs. 3 and 4). Leaf curling generally accompanies the necrotic symptoms resulting from PLH feeding. The entire process from the appearance of initial symptoms to death of leaves may take only 4-5 days, depending on the leafhopper population level, amount of feeding, and moisture stress on the plant. Other symptoms of feeding injury on beans include stunting, decrease in internodal growth, and dropping of flowers and pods. Photosynthesis is adversely affected on PLH-infested potato plants, and marketable tuber yields can be reduced as much as 80 per cent.

On alfalfa, PLH feeding normally results in V-shaped yellow areas at the tip of the leaf (Fig. 5) and produces a generalized yellowing, reddening, or bronzing of foliage (Figs. 6 and 7). Advanced symptoms of injury include decrease in internodal growth and reduction in quality and quantity of foliage.

PEST MONITORING

The presence of adult PLH can be readily determined by use of a sweep net or by yellow sticky traps placed at the edge of the field. Nymphs are best sampled by visual examination of leaves (particularly the under surfaces) taken from the lower one half of the plant. The nymphs may blend in with the green foliage, but once disturbed are easily detected by their rapid sideward movement.

CONTROL

Although PLH is attacked by several predators, parasites, and fungal pathogens, complete biological control of the pest is seldom obtained. Effective control often requires the use of chemical insecticides. These should be applied when potato leafhopper populations reach specific economic threshold levels and before symptoms of feeding injury become widespread. On beans, a population equal or exceeding an average of 1 nymph/trifoliolate leaflet or 50 adults/10 sweeps can cause economic loss and indicates the need for control. For potato, control measures should be initiated if the population equals or exceeds an average of 10 nymphs/100 leaves. Leaf hairs (trichomes) on the undersurface of snap and dry bean leaves provide partial control of very young nymphs. These hairs can ensnare small leafhoppers by their hooks.

PLH is economically the most important insect affecting alfalfa in the northeastern United States because the alfalfa plant is more sensitive to feeding by PLH than to feeding by any other insect. Therefore, economic reductions in yield are caused by much lower population densities of PLH than by other insect pests of alfalfa. Seedling alfalfa and plants in early stages of regrowth are very sensitive to leafhopper feeding and can undergo extensive damage if not treated or harvested early. In general, if the alfalfa plant is over 14 inches tall before PLH infestation, no reduction in yield will result. However, if PLH infests the alfalfa when it is 2-6 inches tall, population densities as low as one per sweep can cause economic loss and require control.

Consult your local extension recommendations to determine the timing and most effective insecticides for control of PLH in your area.