OHIO STATE UNIVERSITY EXTENSION

AGRICULTURE AND NATURAL RESOURCES FACT SHEET

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Potato Leafhopper on Alfalfa

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The potato leafhopper (PLH) is a small, bright green leafhopper (fig. 1), which lives year-round in the Gulf Coast region and is carried north each spring via weather fronts. In Ohio, PLH begins to appear in the spring when 1st cutting of alfalfa is nearing harvest. The 1st cutting is not affected by their feeding, but subsequent cuttings during the summer can be severely impacted. The life cycle of PLH includes the egg, five nymph stages (fig. 2), and the adult. About three weeks are required for PLH development from egg to adult.

Symptoms

Potato leafhopper is a sucking insect. As leafhoppers insert their piercing-sucking mouth parts into plant tissue, the combination of a pulverizing feeding motion and injection of saliva blocks the normal flow of nutrients in the plant. Initial damage to alfalfa is exhibited in the form of wedge-shaped yellowing of leaf tips, which is commonly called hopperburn (fig. 3) and may be confused with boron deficiency symptoms. More important than the hopperburn symptom is the stunting of plants (fig. 4), resulting in yield loss.

Heavy PLH infestations will stunt alfalfa stand development, especially the early development of new stands and regrowth following harvest. Excessive stress on alfalfa due to PLH feeding activity may reduce yield of both the current cutting and following cuttings. In addition, stunting and slower regrowth of damaged alfalfa result in a less competitive crop, leading to weed invasion.

Harvesting of an alfalfa crop will temporarily eliminate the presence of PLH nymphs and cause the dispersal of PLH adults from an alfalfa stand. About one to two weeks following harvest, regrowth will attract PLH adults, and nymphs will begin to appear soon thereafter. If an alfalfa stand is allowed to grow for more than three weeks, PLH nymphs mature to the adult stage and the numbers of PLH adults increase significantly. PLH adult numbers may increase at any time due to immigration from neighboring or distant sources such as late-harvested hay fields. PLH activity tends to peak in July and decline in August. If weather conditions are favorable, PLH populations remain abundant until early September.

Management

Losses in alfalfa yield due to PLH feeding activity can be reduced by (1) growing of glandular-haired, PLH-resistant varieties; (2) timely implementation of harvests; and (3) application of insecticide treatments when warranted.

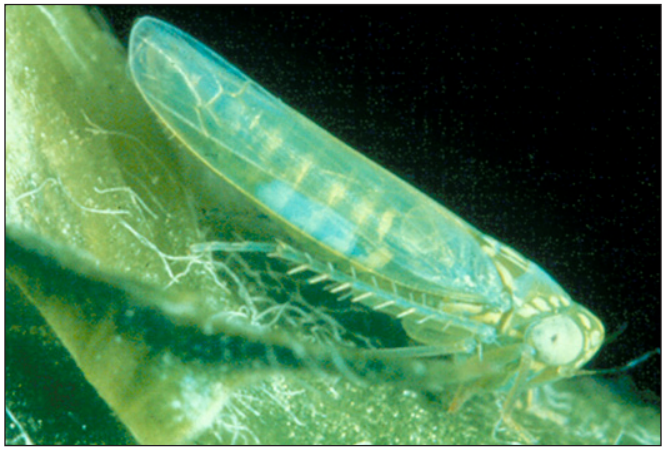

Figure 1. Potato leafhopper adult

Figure 2. Potato leafhopper nymph

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Figure 3. Potato leafhopper injury on alfalfa

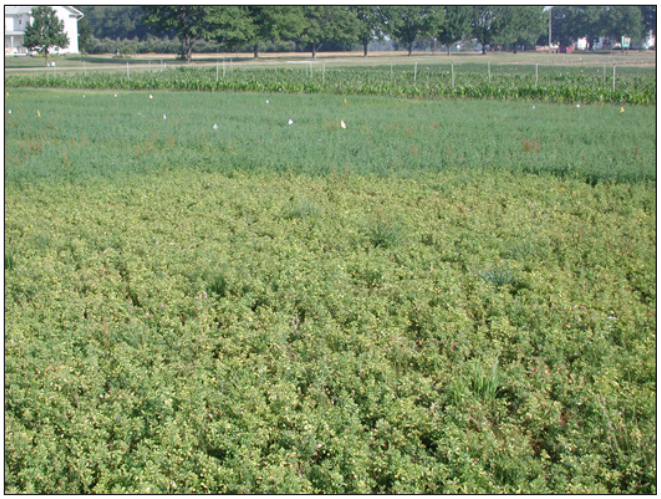

Figure 4.

1. Use of glandular-haired, PLH-resistant alfalfa varieties significantly reduces yield losses due to PLH feeding activity. The presence of glandular-hairs on PLH-resistant alfalfa reduces PLH feeding and nymph development. The efficacy of PLH-resistant varieties to tolerate PLH infestations has improved in both yield and PLH resistance since the introduction of PLH-resistant varieties in the mid-1990s.
   Under conditions of moderate to heavy PLH infestation, yields of glandular-haired, PLH-resistant alfalfa may be optimized by application of insecticides, especially during the season of stand establishment. However, yields of PLH-resistant alfalfa will be higher than untreated non-PLH-resistant alfalfa when significant infestations of PLH occur. Thus, application of a foliar treatment to prevent yield losses in PLH-resistant alfalfa may be warranted under conditions of abundant PLH activity.
2. The delayed harvesting of alfalfa stands encourages multiplication of PLH populations because PLH nymphs are able to reach the adult stage and reproduce. A timely harvest schedule will reduce PLH abundance. There is more opportunity for PLH to multiply to high levels under a lax 3-cut schedule than a 4-cut per season schedule.
3. The timely application of foliar insecticide treatments to reduce PLH activity will optimize alfalfa yields of both PLH-resistant and nonresistant alfalfa. Reduction of PLH activity by insecticide treatment is justified when assessment of PLH population abundance by sweep net sampling demonstrates the presence of economic levels of PLH activity.
   The economic value of an alfalfa stand is also a key factor in a treatment decision. Treatment of a 1st or 2nd year stand of alfalfa may be justified, whereas treatment of an older, thinner alfalfa stand may not be warranted unless the PLH infestation is very heavy. In the case of a new alfalfa seeding, treatment may be warranted for marginal infestations of PLH to insure stand establishment.

Scouting

Assessment of PLH population abundance requires the use of a standard sweep net, which has a 16-inch rim, a heavy cloth or synthetic net, and a 3-foot handle. When sampling alfalfa, 10 pendulum sweeps should be taken from each of three to five locations in a field. After taking each 10-sweep sample, contents of the catch should be inspected and the number of PLH adults and nymphs counted. Nymphs tend to collect near the rim of the net when conditions are damp. Adverse environmental conditions such as wet foliage or wind at the time of sampling may reduce the catch of PLH in a sweep net. In general, alfalfa should be sampled when a field is dry and wind conditions are calm.

In the case of non-PLH-resistant alfalfa, corrective action is warranted when the number of PLH adults plus nymphs collected per 10 sweeps is greater than the stem height of alfalfa expressed in inches (e.g., a catch greater than 8 PLH per 10 sweeps of alfalfa having a stand height of 8 inches indicates a need for rescue treatment) (see table 1). Treatment decisions may be adjusted based on (1) environmental conditions at the time of sampling (time of day, wind, etc.); (2) alfalfa growing conditions (vigor or stress); and (3) relative value of the crop. A dominant factor governing the impact of PLH on alfalfa is the condition of the host crop. Vigorous growth may enable alfalfa to tolerate PLH feeding activity. In contrast, the presence of environmental stress due to heat or drought may make alfalfa more susceptible to PLH feeding. Thus, the economic threshold may be doubled or cut in half depending on the condition of the host crop (table 1).

Table 1. Action thresholds for control of potato leafhopper

	Alfalfa tolerance for stress		
Stand height	**Low**	**Normal**	**High**
Inches	***Action threshold of PLH per 10 sweeps***		
6	3	6	9
8	4	8	12
10	5	10	15
12	6	12	18
14	7	14	21
16	8	16	24
18	9	18	27
20+	10	20	30

Low: Alfalfa under environmental stress and very susceptible to PLH injury.
High: Alfalfa exhibiting vigorous growth and capable of tolerating some injury.

In the case of PLH-resistant alfalfa, research has determined that corrective action is warranted when the number of PLH adults plus nymphs collected per 10 sweeps is 3 times greater than the stem height of alfalfa expressed in inches (e.g., a catch greater than 24 PLH per 10 sweeps of alfalfa having a stand height of 8 inches indicates a need for rescue treatment). Experience suggests that these higher populations are usually not obtained in PLH-resistant alfalfa unless PLH populations are extremely high throughout an entire geographical area. Growers should consider the same adjustments for PLH-resistant alfalfa as suggested for regular alfalfa as described in the above paragraph.

See Ohio State University Extension Bulletin 545, Control of Insect Pests of Field Crops, for those insecticides labeled for potato leafhopper, or for all insecticides labeled on alfalfa. Bulletin 545 can be accessed at **http://entomology.osu.edu/ag/**.

Additional information is available from your local OSU Extension office or The Ohio State University Entomology Agronomic Crops Insects web site (**http://entomology.osu.edu/ag/**).