Potato Leafhopper Damage in Hopyards

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Recently, injury and even death of hop plants from potato leafhopper feeding has been observed in Vermont. Leafhoppers are damaging insects that have an appetite for more than 200 crops. The potato leafhopper (*Empoasca fabae*) is considered an economic pest of other common northeast crops such as alfalfa, clover, potato, beans, raspberries, and even young maple trees. Interestingly, grasses are not considered a host. This article will help you identify leafhopper infestation as well as provide direction on how to control this damaging pest.

Symptoms and Pest Identification

The most tell-tale sign of the leafhopper is what is known as "hopper burn", or necrosis of the leaf where the outer edges and tip of the leaf turn brown, forming a distinctive "V" (Figure 1). This pest feeds by sucking the juices out of the veins, leaving behind saliva toxin that blocks the veins and prevents nutrients from reaching the rest of the leaf. The first sign is yellowing of the leaf at the tip followed by necrosis and leaf curling. Other symptoms include shortening of internodes, stunted growth, and fewer flowers or cones. Many of these symptoms are also signs for other disease or nutrient deficiencies, so proper identification is crucial. The leafhopper is a tiny wedge-shaped insect that inhabits the underside of leaves. The nymphs are wingless, pale green to yellow, and extremely fast; the rapid side-to-side movement is their signature. In the adult stage they are pale green, equipped with wings, and only about 1/8inch long (Figure 2).

Figure 1. This hop leaf is exhibiting hopper burn.

Figure 2. An adult potato leafhopper, courtesy of the University of Kentucky

Life cycle

Leafhoppers love warm conditions and are very common in the southern states where they overwinter. The insect does not overwinter in the north. This small insect is swept in storm systems from the south to the north in a matter of days - a long trip for an insect with the lifespan of about one month. First signs of leafhoppers generally occur in mid-May with slow growth in the spring. The females lay one to two eggs per day in the leaf stems or veins of the hop and seven to ten days later, the nymphs will emerge. Two weeks after hatching, the nymphs have reached maturity. As temperatures increase, the growth cycle of the leafhopper shortens. Leafhoppers can have

explosive populations so scouting is essential to control the pest prior to extreme damage to the crop. In addition, it is important to be especially prudent if the hopyard is planted near alfalfa fields. Alfalfa is the primary host for the potato leafhopper in Vermont. Once the first cutting of forage is harvested, these insects will move into other susceptible hosts such as hops. If leafhopper populations are high, it can quickly cause significant damage to your crop.

Control

Before using chemical control methods it is important to determine if your infestation level surpasses the economic threshold level. The economic threshold is the level at which pest control methods should be implemented to prevent the population from reaching economic-injury level. There is no established economic threshold level for leafhoppers in hops. However, threshold levels have been set for other crops such as alfalfa, raspberries, and potatoes. Based on threshold levels for these crops, it may be best to use an economic threshold level of an average two leafhoppers per hop leaf. To determine the infestation level, scout the yard weekly for leaf hoppers. For commercial producers, standard protocol entails, scouting the underside of two to three leaves per 25-30 plants and then determining the average number of leafhoppers per leaf. If this number meets or exceeds the threshold level, chemical control methods should be started. If the level is below the threshold number, a biological method of control is advised such as releasing beneficial insects into the hopyard. The predatory mirid eats a variety of mites, aphids, small caterpillars, and, most importantly, leafhoppers (Figure 3). It can consume 400 mite eggs and 10-20 mites per day. A female can lay up to 250 eggs in her lifetime and two generations are produced between May and September. The predatory mirid has the ability to consume a large amount of pests rapidly. It is an excellent insect to control leafhoppers before infestation levels have been reached. Beneficial insects can be purchased from a variety of sources. Leafhoppers can easily be controlled chemically, both organically and otherwise. Always thoroughly read the label of any chemical product and be sure that it is registered for use on your crop and for the specific pest in your state. For further information and recommendations contact your local Extension agent or pesticide distributor.

Figure 3. Adult Predatory Mirid, courtesy of the Washington Hops Commission

References

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