Beet Leafhopper Monitoring with Yellow Sticky Cards

Andrew Jensen, WSPC

Beet leafhopper (BLH) transmits the BLTVA phytoplasma to potatoes, which causes the disease known as purple top. BLH also transmits beet curly top virus (BCTV) to various other crops. An effective way to monitor for the presence of BLH, and to follow its populations, is trapping with yellow sticky cards. This year, starting in April, the WA State Potato Commission will provide interested WA growers with the materials necessary to monitor BLH with yellow sticky cards.

Supplies Needed

Trapping supplies include double-sided 4X6" yellow sticky cards, wooden stakes, large binder clips to secure the cards to the stakes, and a magnifying glass for counting BLH on the cards (Figure 1). The magnifying glass is essential to correctly identify BLH, and sometimes even picking leafhoppers out from all the other insects caught on a card requires a magnifier.

Figure 1. Supplies provided by the WSPC for BLH trapping.
**How to Deploy Traps**

Yellow sticky cards should be set up as shown in Figure 2. It is important to keep the traps low to the ground as shown because BLH move about very close to the ground. Even with a very low mount like shown in Figure 1, the bottom half of the trap will often catch almost all the BLH on the trap.

![Figure 2. Proper mounting for yellow sticky card trap. Both sides of the trap should be uncovered and counted.](image)

**Where to Place Traps**

Beet leafhoppers occur in almost all kinds of habitats we see near potato fields. There are, however, habitats that they prefer such as unirrigated low weedy vegetation composed of mustards and grasses (during early spring) or kochia and Russian thistle (during late spring, summer, and fall). When monitoring for BLH with yellow sticky traps, the traps should be placed outside potato fields in unirrigated weeds. When siting your traps, focus on the more disturbed areas around potato fields where annual weeds predominate. Perennial grass or native shrub habitats are not good places for BLH traps. Finally, at least two traps should be deployed per field. This is because BLH populations can be very spotty. More traps make it more likely that an infestation will be detected.

**Checking the Traps**

Traps should be checked every few days during the first 8 weeks after crop emergence. Traps should be changed once a week, or whenever they become covered in insects, dirt, feathers, fur, dead lizards and mice, etc.

**Counting the Beet Leafhoppers**

Here is the tricky part. The first step is recognizing the leafhoppers from amongst all the insects that yellow sticky cards catch. Figure 3 shows many of the leafhopper species we catch near potato fields.

![Figure 3. A multitude of leafhopper species. Leafhoppers are elongate and tapered from head to tail, hold their wings roof-like at rest, and vary in size from about 3 to 10 mm long. BLH are marked in the figure.](image)
Figure 4 shows a sticky trap with many BLH, little dirt and debris, and few other insects. If only all sticky cards were this easy to count.

Figure 5 shows a trap that will be much harder to count.
Figure 6 demonstrates what a little magnification can do.

Figure 6. A piece of Figure 5 magnified a little, about what your new magnifying glass will do.

Spotting the leafhoppers is easy in Figure 6, but which ones are BLH? It is definitely NOT safe to assume that all leafhoppers on sticky cards are BLH. The other species of leafhoppers shown in Figure 3 can be very common. Those other species do not transmit BLTVA to potatoes, or cause any problem for potatoes. Therefore, it is important to know when you are and are not looking at BLH.

**Recognition features for beet leafhopper**

1. **Size.** BLH is one of the smaller species on the cards. Most of the straw-colored specimens shown in Figure 4 are BLH. See Figure 7 for some pictures of BLH with other common species to get a feel for relative size.
2. **Color.** BLH are relatively pale, lacking strong pigmentation on the head and body. See Figure 8 for some information on BLH variation and comparison of pigmentation to other species.
3. **Shape.** Of the leafhoppers of similar length, BLH is relatively broad in the body. Another critical feature is the gently curved front of the head (as viewed from the top). Some other species have pointed heads, as you can see in Figure 8.

Figure 7. A few common leafhoppers compared to BLH.
Figure 8. Information on the light and dark forms of BLH, and how they compare to some other common species.

**How to Interpret BLH Trap Catch Numbers**

Unfortunately, nobody knows how many BLH on sticky traps next to a potato field are enough to warrant treatment of that field. What we do know is that exposure to large populations of BLH during the first 8 weeks or so of plant growth is a bad thing. So all we can do today is offer guidance on what a “large population” is, as detected with yellow sticky cards. We have been conducting region-wide trapping of BLH for four years now, and we can turn to our data for some guidance. Our highest number of BLH caught on a single trap in a week was 471. A more typical weekly catch during a peak of BLH activity is 100. A common scenario for a well-placed trap is to see very few (less than 10 per week) BLH until sometime in mid- or late May. A peak will quickly occur, rising from very low counts to 40 or 50 per week and then to about 100 per week, and then the third week will see very few BLH caught. It is this rapidly peaking flight that is important to detect.

As noted above, it is important to have more than one trap deployed per field, and to check them regularly. When the average catch rate increases toward the equivalent of 40-100 per week, that might be a good time to get worried. We very much hope to get more research done in coming years that will help us fine tune our monitoring for BLH.

Please feel free to contact Andy Jensen at the commission office with any questions about leafhoppers or purple top management.
Volunteer Potato Outlook

Rick Boydston and Marc Seymour, USDA-ARS, Prosser.

Winter soil temperatures recorded at the USDA-ARS research site near Paterson, WA indicate that soil temperatures were low enough in late January to kill tubers above 8 inches deep. Potato tubers normally are killed when they reach temperatures \( 28^\circ \text{F} \). This winter in the south Columbia Basin region, soil temperatures reached a minimum on January 25 and 26. Data from the Agrimet weather station in Odessa, WA indicated that lowest soil temperatures also occurred on January 26 and tubers above 7 inches likely froze depending on local snow cover.

If growers avoided deep tillage (plowing) following 2007 potato harvest and kept tubers near the soil surface, volunteer potato problems in 2008 should be reduced compared to many years and those potatoes that do emerge should be from deeper depths and somewhat delayed.

For more information on volunteer potato control visit the Prosser USDA-ARS website at; http://www.ars.usda.gov/main/site_main.htm?modecode=53-5400-00

---

Wanted

Reliable person with reliable car to collect insect monitoring traps one day per week, April 2008 through October 2008.

- Work will be with the Washington State Potato Commission.
- One day per week (preferably Friday or Saturday), every week, for seven months.
- About 200 miles driving each week on highways, back roads, and gravel roads all within about 40 miles of Pasco.
- Must be able to read and follow maps, adjust to or know how to use a GPS unit. Attention to detail is important.
- Compensation is an hourly wage plus mileage reimbursement of 48.5 ¢ per mile.

Interested persons contact Andy Jensen, Director of Research, at 765-8845 or ajensen@potatoes.com.