

## ASTER LEAFHOPPER INTEGRATED MANAGEMENT IN CARROTS AND CELERY

Aster leafhoppers are a significant insect pests of fresh market vegetables primarily because they transmit *aster yellows phytoplasma*, which is a disease of celery, carrots, lettuce and, occasionally, onions and potatoes. Disease symptoms vary from crop to crop, but affected plants typically have distorted, discolored foliage, taste bitter and are therefore unmarketable (Fig. 1).

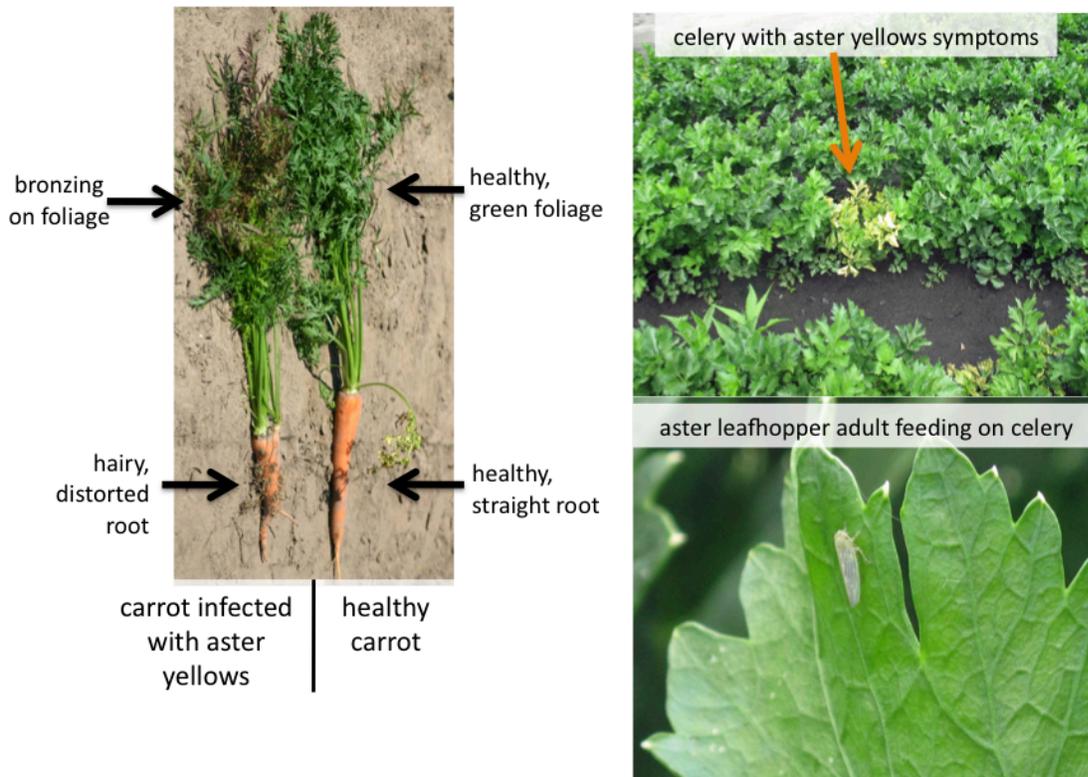


Figure 1. Aster yellows symptoms on carrot and celery.

### MANAGING THE ASTER YELLOWS - ASTER LEAFHOPPER COMPLEX

1. The cornerstone of aster yellows management is the use of foliar insecticides to reduce leafhopper pressure.
2. Insecticides are applied based on threshold, where available. **Thresholds are determined based on the level of phytoplasma in the insects → the higher the infectivity the lower the threshold.**
3. Thresholds are crop species dependent, for example lettuce is more sensitive than celery, and celery is more sensitive than carrots. So carrots typically have the highest threshold out of these three crops.
4. The level of infectivity in the leafhoppers is measured by PCR reaction in the MSU Plant Diagnostic Lab. The typical turnaround for a sample from submission to results is 2-4 days. Crop scouts and extension personnel then use this to inform growers whether their fields are below or above threshold.
5. Thresholds from the diagnostic lab are given as follows: 4 leafhoppers / 100 sweeps.

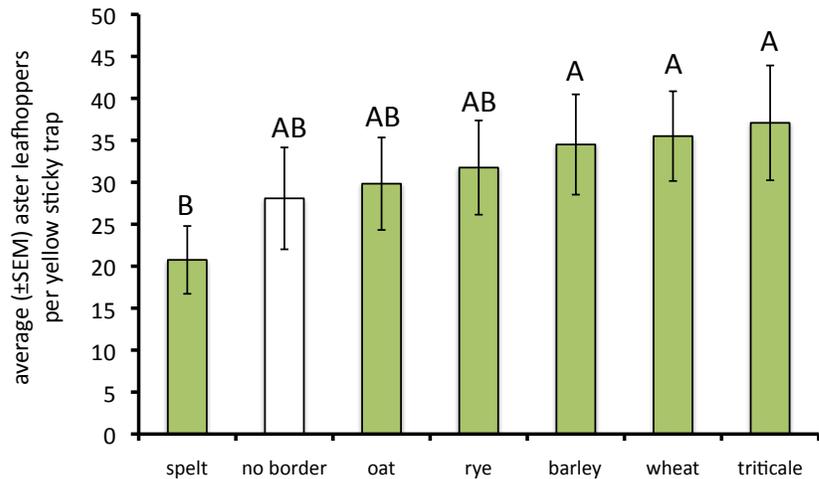
## RESEARCH ON ASTER LEAFHOPPERS

### Interaction of non-crop plants with aster leafhoppers.

Both the aster leafhopper and the aster yellows phytoplasma can use many plant species as hosts. Cover crops, as well as the weeds, provide alternative hosts for the leafhoppers and a source for picking up the aster yellows, therefore its important to understand how the presence of these non-carrot plants affect leafhopper abundance in the carrot crop.

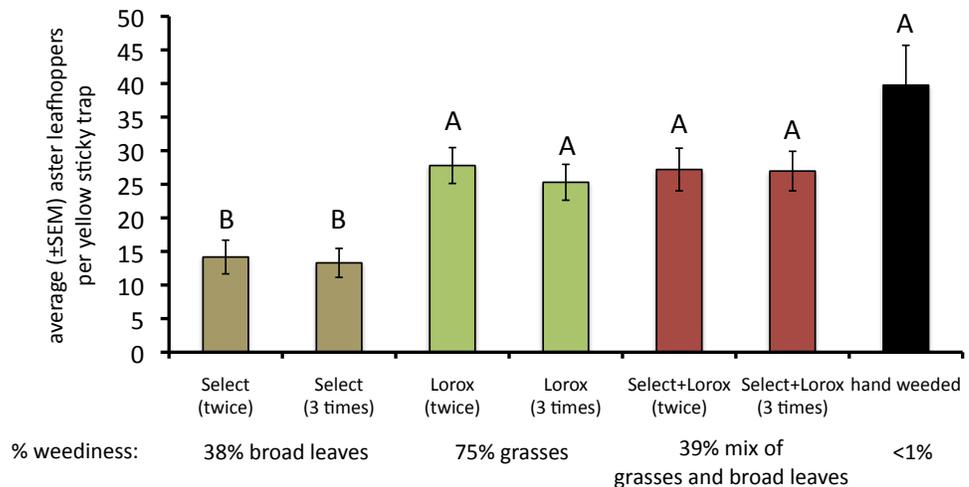
### The effect of cover crop border treatments on aster leafhopper abundance in carrots.

Oat, rye, barley, wheat, and triticale borders increased the numbers of leafhoppers in the carrot plot relative to the no-border treatment. Carrot plots with spelt borders had the fewest leafhoppers on average, and this number was significantly less when compared to barley, wheat and triticale border treatments. The presence of triticale almost doubled the average number of leafhoppers in the carrot plot relative to the spelt.



### How do aster leafhoppers respond to different types of weeds?

Aster leafhoppers were most abundant in hand weeded plots, which did not have weeds. Plots that were hand weeded had similar leafhopper abundance as plots that had grassy weeds. Eliminating grasses but leaving broad-leaved weeds in the plots significantly reduced the abundance of leafhoppers in carrots, when compared to all of the other treatments.



**SUMMARY:** These findings taken together mean that cereal cover crops likely attract more leafhoppers to the field early in the season when the plants are most sensitive to picking up the disease and that during the course of the season broad-leaf weeds are not likely to attract more leafhoppers to the field.

**ONGOING RESEARCH AT THE UNIVERSITY OF WISCONSIN BY DR. RUSSEL GROVES** is investigating the use of at-planting application of neonicotinoids for early season aster leafhopper management in carrots. He is also looking at the risk-window, to determine when leafhopper infectivity is high in the year, and crops are at their most sensitive stage.