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Aster yellows and aster leafhopper control in Lettuce

Casey Hoy

Aster leafhoppers collected June 12 on the Celeryville muck were tested for infection with the aster yellows phytoplasma by the polymerase chain reaction (PCR) assay Sally Miller's laboratory by Jianhua (John) Zhang. The percentage of aster yellows phytoplasma infected leafhoppers was estimated at 5- 7%. Infected plants are starting to show symptoms in untreated lettuce plantings at the Muck Crops Branch farm, approximately 10% diseased last week. These conditions warrant control of leafhoppers in lettuce crops until the disease is not present at harvest. Adult leafhoppers can easily be sampled with a sweep net. The aster leafhopper has six black spots on the front of the head. The body color is more olive green compared with the bright green of the potato leafhopper, which can also be found in lettuce fields. Nymphs, which do not have wings, are pale yellow or beige. Past research has identified two key times for applying insecticides to control the leafhopper vectors of aster yellows: approximately 10-14 days after transplanting and approximately 14 days before harvest. The first application would protect the treated lettuce field from infection by incoming adults, so the insecticide used should have a long period of residual activity. The second application would protect neighboring younger lettuce fields by killing any infected leafhoppers that could otherwise carry the disease out of the treated field, so the insecticide used should be fast-acting and effective but needn't have long residual activity. Planting lettuce as far as possible from any earlier infected lettuce plantings can also greatly slow the spread of the disease.

Insect Notes

Celeste Welty

Cucumber beetles:

There seem to be plenty of cucumber beetles still around to infest late-planted pumpkin fields. In research plots at Columbus, most are the striped cucumber beetle but a few spotted cucumber beetles have also been found. The preferred feeding location of the beetles at this stage of crop growth is on the undersides of the cotyledons, even on plants that have four true leaves. Scouts assessing the population density should be sure to check the cotyledons even if they are half-buried in soil. Preliminary evaluation of Admire insecticide used at planting shows that it is looking good for beetle control; this is the first year that Admire is registered for use on vine crops. On farms that had bacterial wilt in pumpkins last year, control of the beetles that vector the disease should be important this year. From what little is known about bacterial wilt on pumpkins and squash, plants are

most susceptible to the disease in the seedling stage. It is likely that good control in early summer, when plants are small and the canopy easier to cover by sprayers, will be the key to keeping this disease to a minimum. Our tentative action threshold, based on melon research in Indiana, is 3 beetles per plant.

Cabbage pests:

Yesterday in Sandusky County, several cabbage fields scouted were similar in showing a mixed population of diamondback moth and imported cabbageworm. Most of the diamondbacks found were fully grown larvae (about 1/3 inch long) or pupae, while the cabbageworms range from young (1/4 inch) to fully grown (1 inch). The good news is that there is evidence of parasitism in the diamondback populations. Healthy pupae are green when young and brown when older, whereas pupae turn white if parasitized by the tiny wasp called Diadegma. Some diamondback pupae that looked healthy when collected yesterday have turned white by today, which indicates that the parasitism rate might be quite high. Management of diamondbacks by B.t. products (DiPel, Javelin, MVP, etc.) is an excellent strategy for control at this time of year because it controls the caterpillars and does not harm the beneficial wasps that parasitize the caterpillars.

European corn borer:

We seem to finally be past the peak emergence of corn borer moths. Our blacklight trap at Fremont caught 32 moths during the past week, which is down from 132 the previous week. Pheromone trap counts for corn borer moths in the past week were 5.5 in Gallia County, 53 in Clark County, 1 at Columbus, 36 in Summit County, 1 at Fremont. Scouts from various parts of Ohio report that many sweet corn fields show small holes in whorl leaves that are evidence of borer feeding, but few live larvae are found if whorls are pulled. It is likely that there has been high borer mortality due to frequent heavy rains. Presence of live larvae should be assessed once tassels start to push up out of the whorls. During the emerging tassel stage, the threshold is 10% of plants damaged AND infested with live borer; plants damaged but without evidence of live borers should not be counted as infested.

Corn earworm:

the number of corn earworm moths caught in pheromone traps during the past week was 3 at Columbus, 0 in Summit County, 0 at Fremont.

Variegated cutworm:

Pheromone trap counts for the past week were 38 at Columbus, 15 at Fremont.

Squash vine borer:

Pheromone trap counts for the past week were 17 at Columbus, 0.25 at S. Charleston (Clark County), 0 at Springfield (Clark County), 3 at Fremont.

Vegetable Crop Weed Management Workshop
Kelly Fath and Doug Doohan

June 27, 2000 9 AM - 1 PM,
OARDC's Vegetable Crops Branch - Fremont

The Vegetable Crop-Weed Management Workshop will be of interest to IPM scouts, crop consultants, agents, and growers. The workshop offers demonstrations of

vegetable crop sensitivity to herbicide carryover, sweet corn variety tolerance to herbicides, a weed identification clinic, and information on time of emergence of weeds in vegetable crops. Participants will also have the opportunity to preview vegetable crop weed management trials underway at the station, and visit with OSU/OARDC faculty involved in weed research.
>>> Pre-registration is required and will be restricted to the first 30 applicants. A registration fee of $10 will be charged and this will include lunch.<<<
. Call 330-202-3593 or 419-332-5142 for registration and information.
The Program (concurrent sessions):
9:00 AM Registration and Refreshments,
9:15 AM -12:00 PM,
Vegetable Crop Sensitivity to Soil;
Residues of Corn & Soybean Herbicide;
Response of 15 Sweet Corn Varieties to Pre- and Post-emergence Herbicide,
Weed Identification Clinic featuring seedling and mature weeds;
Emergence Cycle of Weeds in Vegetable Crops;
Demonstration of the OSU webpage "Weedy and Invasive Plants" Program

Tips on How to Recognize and Minimize the Occurrence of Blossom-End Rot, Tipburn, and Internal Brown Spot
Matt Kleinhenz, Extension Vegetable Specialist
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The Ohio State University OARDC
Blossom-end rot, tipburn, and internal brown spot market disorders are prevalent in a large number of high value vegetable crops, including tomato, pepper, eggplant, lettuce, cauliflower, and potato. In some cases, declines in marketable yield and profit due to these disorders are severe. Although edible, crops with a high incidence of these defects do not pass the beauty contest that vegetable crops must survive in order to be considered marketable. These disorders are referred to as physiological because they are not caused by another organism (as in a disease). They are also different from many diseases in another respect. Unlike many diseases, once physiological disorders are detected, they are often difficult or impossible to correct. This article describes the appearance and causes of blossom-end rot, tipburn, and internal brown spot. Tips on how to minimize their occurrence are also presented.
Recognizing the Disorders. Blossom-end rot (BER) refers to dry sunken lesions found on the blossom end (opposite end to where the fruit attaches to the stem) of tomato, pepper, or eggplant fruit (see Figure 1).

BER lesions are usually dark, leathery, firm and dry but may be covered with secondary growth of mold or fungus. Water-soaked areas at the blossom end of the fruit are often the first symptom of BER. Lesions enlarge as fruit develop and are often the point of entry for disease organisms, leading to fruit breakdown. The disorder may occur at any time in the season but tends to occur more frequently in the earliest fruit set.

Tipburn is a term used to describe brown-black lesions seen at the edges of leaves or other harvested portions of vegetable crops such as lettuce, cabbage, cauliflower, and broccoli (see Figure 2). Tipburn occasionally resembles some foliar disease and insect feeding symptoms.

Therefore, it is important to examine the crop and rule out that the lesions are not caused by diseases or insects. Tipburn lesions may also begin during various stages of crop development but are most common and problematic when appearing soon before harvest.

Internal brown spot (IBS) refers to brown flecks of tissue scattered throughout the internal flesh of potato tubers (see Figure 3). There is some debate around the use of the terms internal brown spot, internal heat necrosis, and brown center most of the confusion centers on where the lesions occur and their cause. Nevertheless, IBS lesions are usually internal to the vascular ring which surrounds the tuber a fraction of an inch beneath the skin. IBS lesions are typically tan, roughly circular, and approximately 1/8 of an inch in diameter.

BER, tipburn, and IBS lesions may have slightly different appearances but their underlying cause appears to be the same: cell death. It is generally true that tan-dark lesions not caused by another organism (i.e., insect, disease) signify that cells have died in the discolored area. The technical term for this is necrosis. How or why do these necrotic lesions form?
Causes of the Disorders. Although studied intensively, the exact causes of BER, tipburn, and IBS are not completely known. However, two related factors appear to underlie development of the disorders. Nutrient and/or water deficiencies are usually associated with BER, tipburn, and IBS. Growing leaves, for example, inside developing heads of cabbage or lettuce, or immature fruit or tubers may not receive enough water or nutrients (particularly calcium). Interruptions in the water or calcium supply to young tissues may cause localized areas of cell death necrotic areas which later show up as BER, tipburn, or IBS.
The roles and movement of calcium in plants and its association with physiological disorders will be described in detail in a later article. At this time, lets focus on two facts. One, calcium moves primarily in the plants transpiration stream, that is the channels carrying water to various plant parts. So, any factor which influences the transpiration stream will affect the movement of calcium in a plant. This brings us to the second fact. Young, developing tissue (fruits, leaves, tubers) may receive very little water from the transpiration stream, especially when the plants overall demand for water is high. Putting these two facts together suggests why calcium deficiencies, setup by slow movement of water to young tissue, are most often thought to cause BER, tipburn, and IBS. Management of BER, tipburn, and IBS must

take into account that the movement of water and calcium in a plant are closely related.

Tips on Minimizing the Occurrence of BER, Tipburn, and IBS. Physiological disorders are difficult to correct. Once symptoms are visible, corrective measures often are not economically viable. Therefore, focus on prevention. A number of steps may be taken to minimize the occurrence of BER, tipburn, and IBS. First, plant resistant varieties. It is well known that some varieties are more prone to develop these disorders. Exactly why is not understood and is a fertile area of study (this will also be discussed in a later article). Consult Cooperative Extension and seed trade publications and representatives for information on varietal susceptibility to physiological disorders. It is also important to manage soil pH and fertility based on soil tests. Soil pH should be close to neutral (7.0). Nutrients should be present in adequate levels and in appropriate ratios. For example, it is often suggested that calcium be present at twice the level of magnesium and that magnesium be present at 1.5 times the amount of potassium. Appropriate liming programs usually provide enough calcium for plant growth (dolomitic lime also contains magnesium). But, there is some evidence that soluble calcium applied to the region containing developing potato tubers may reduce the occurrence of internal brown spot. Blossom-end rot may be more likely to develop when ammoniacal nitrogen is used since ammonium ions may limit calcium uptake by the plant. Maintaining soil moisture at optimal levels is another important step in reducing the occurrence of physiological disorders. Interruptions in calcium and/or water supply are especially damaging to young fruit, leaves, and tubers. Maintaining optimal soil tilth may also help reduce the onset of calcium-related physiological disorders. Calcium is taken up by young root tips. Compacted or poorly aerated soils limit root growth and, therefore, calcium availability. Also, it may be worthwhile to consider harvesting before the occurrence of BER, tipburn, or IBS increases dramatically. Fewer or less damaged harvested units are easier to cull, require less labor to do so, create fewer breakdown problems, and increase crop marketability. Scout the crop regularly as it approaches maturity and weigh the advantages of delaying harvest against the disadvantages of a greater incidence or severity of physiological disorders. Finally, foliar applications of calcium-containing fertilizer rarely prevent or correct BER or IBS. As will be discussed later, calcium applied to foliage does not move to areas where BER or IBS occur. Frequent calcium-containing sprays directed to young fruit may not limit the incidence or severity of BER. In some cases, tipburn may be reduced by foliar calcium applications.

For More Information

Jackson, L., K. Mayberry, F. Laemmlen, S. Koike, K. Schulbach, and W. Chaney. 1996. Leaf lettuce production in California. Univ. of California Div. of Agric and Nat Res Publication 7216.

Kleinhenz, M.D., J.P. Palta, C.C. Gunter, and K.A. Kelling. 1999. Impact of source and timing of calcium applications on 'Atlantic' potato tuber calcium concentrations and internal quality. J Am Soc Hort Sci 124(5):498-506.

Miller, S.A., R.C. Rowe, and R.M. Riedel. 1996. Blossom-end rot of tomato, pepper, and eggplant. The Ohio State University Extension. Plant Pathology. Fact Sheet. HYG-3117-96.

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Crop Reports
Hal Kneen

SouthEast:
How quickly the droughts of '98 and '99 are forgotten when local growers received between two to four inches of rain this past weekend. Farm work piled up, as rain interfered with spray, cultivation and fertilization programs. Monies spent on irrigation systems were needed earlier in the season and may still be needed as the crops get ready for harvest.
On to brighter things! Harvest continues in the cabbage fields with yields above average however price is still low especially with fifty pound cardboard crates selling for $1.55 apiece. Harvest will continue for another week to ten days.
Some tomatoes and sweet corn will be ready for the 4th of July market. Early plastic covered corn is starting to be picked but is all pre-sold while the earliest tomatoes (Sunstart) are beginning to ripen for local markets. Both crops look good and are sizing up well due to the moisture and warm temperatures. Plants could use a little more sunshine as weather stations predict rains to occur daily for the rest of the week.
Early blight is being spotted within the region and spraying is required to lessen the spread of disease as moisture and temperatures are ideal for fungus growth. Quadris, Dithane and Bravo seem to be the fungicides of choice.
Seeing a little (1 to 2 plants per hundred) European Corn Borer damage to sweet corn tassles . As silking continues, we expect to see more corn earworm moths trapped in locally set up helio traps as the moths migrate North from the Southern States.
Cantaloupe vines are running and fruit 2-3 inches have begun to form. However the trap count ending 6/12/00 was European corn borers 9, corn earworm 2.
Walking sweet corn fields I am seeing 1to 2 lead tassles per hundred fallen over and finding European corn borer larvae in the tassle.

TomCast Report
K. Scaife

At Fremont,. The total DSV's as of 20 June are 236. Last week, 14 June 17 DSV's. Daily accumulations for Fremont will be reported on the Tomcast page at the VegNet website but updated only once or twice a week.

What's New At The VegNet Web Site

Pumpkin Production Chart

Originally available only in the print version of the 2000 Ohio Vegetable Production Guide, this WEB version can be found in "The Pumpkin Patch" The chart is a quick guide and timeline to key factors necessary for a successful pumpkin crop.

Another NEW! VegWeb Fact Sheet.

Table on Susceptiblity of sweet corn hybrids to Stewart's Bacterial Wilt as rated by Jerald Pataky (Univ. of Illinois). Adapted by Dr. Celeste Welty, Extension Entomology, OSU Columbus. This table was published in last week's VegNet Newsletter. A WEB edition is now available from the VegNet homepage. More information on Stewart's wilt and its history in Ohio will be available soon.

Vegetable Faculty WEB Pages.

Dr Matt Kleinhenz has recently posted his faculty webpage. At the site you can find his research projects, results and review his presentations made this past winter. A link from VegNet will be provided soon. To visit Matt's homepage, go to: http://www.oardc.ohio-state.edu/kleinhenz/

From Dr. Brent Rowell, Univ of KY,
email: browell@ca.uky.edu

Our new KY Vegetable Recommendations book is on the web now. A print version is also available. The introductory section on marketing might be of interest to southern OH tobacco growers.
http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm
The marketing section is also available as a separate publication.
http://www.ca.uky.edu/agc/pubs/id/id134/id134.htm

Visit: "The Library, Online Edition of the 2000 OH Vegetable Production Guide, NOW AVAILABLE.

The OH Vegetables Production Guide ranks #22 in top downloads from OSU Extension Ohioline with over 1,000 downloads. Most of the new features are available in the online edition including the New Insecticide Efficacy tables. The new Pumpkin Production Chart is not there but I hope to have it posted soon in "The Pumpkin Patch" section of the VegNet website.

NEW! VegWeb Fact Sheets.

This new feature offers some valuable information on certain aspects of vegetable production that you can print out directly in your home or office. The first two are by Dr. Mac Riedel, OSU Plant Patholoy, and are available from the VegNet homepage.
Fungicides Labeled for Pumpkins

Confused by the many new fungicides now available for pumpkins. Check out this fact sheet to see how to use these fungicides.
Fungicide Activity For Control of Tomato Diseases Which fungicide is best for a particular tomato disease.
Available from the Vegetable Crops Homepage, Click Here!
The 1999 Pumpkin Review and Slide Show.
Yield Data plus pictures of pumpkin cultivars from this year's trials. Also, see pumpkin varieties rated for powdery mildew resistance. There are many new and interesting pumpkin varieties in all size categories.
Visit: 'The Pumpkin Patch' for pictures and yield data.

The 1999 Green Pepper Evaluation and Slide Show.
Yield Data Slide Show From The Muck Crops Branch at Celeryville,
From The Enterprise Center
Comparison of Disease Control on Fresh Tomatoes using TOMCAST and SKYBIT to Time Fungicide Applications.
Evaluation of WaterMelon Cultivars for Southern Ohio, 1999
1999 Ornamental Corn Evaluation
Evaluation of Eastern Style Muskmelons for Southern Ohio, 1999
Link To Research Summaries From The Enterprise Center at Piketon.

Return to Vegetable Crops Homepage | Ohio State University Extension

We appreciate very much the financial support for thisseries of vegetable reports which we have received from the board of growers responsible for the Ohio Vegetable and Small Fruit research and Development Program. This is an example of use of Funds from the "Assessment Program".