Foliar Diseases of Asparagus and Impacts on Subsequent Production
Michelle Infante-Casella, Agricultural Agent and Andy Wyenandt, Ph.D., Specialist in Vegetable Pathology

Asparagus is a high value, perennial vegetable crop grown in New Jersey for both retail and wholesale distribution. Today, 1,000 acres of asparagus are grown in the state. In years when the growing season includes many days of rainfall and high humidity, asparagus ferns remain wet for long periods of time, and foliar diseases can flourish and negatively impact the health of the crop. When these conditions occur, ferns can die prematurely before the translocation of carbohydrates (i.e., next season’s energy source) can reach the crown. In the fall, ferns will begin to senesce or die back naturally, first turning yellow and then drying back to a tan color. If foliar diseases prematurely kill the fern this natural die back does not occur and the energy needed to support strong, healthy, and prolonged spear production the following spring is greatly compromised. Additionally, crowns that are weak and unnourished will also be more susceptible to diseases like Fusarium crown and root rot caused by \textit{F. oxysporum} f. sp. \textit{Asparagi}.

Many of the asparagus varieties now have tolerance to the common diseases that infect the crop. However, under extreme environmental conditions and with weakened growth, the crop can succumb to infection, causing future yield decline and crop damage.

Professor Emeritus Dr. Steve Garrison notes the 1970 growing season shared similar conditions to the 2011 year. Excessive moisture caused severe disease infection and a weakened crop the next spring. Harvesting beds for the traditional 8 to 10 week period the next growing season caused further stress on beds and many beds never recovered.

To avoid stressing asparagus beds it is important to monitor harvests very closely during the first three to four weeks of cutting the spring following a season with severe foliar infection. \textit{If daily bed yields have dropped off from previous years, or spear diameter starts falling off quickly during early harvest, the harvest season needs to be shortened dramatically to protect the future investment life of the production field.} The over cutting of beds will be detrimental to the long term future health of the field. Even if prices are high towards the end of harvest, one should think long term when considering cutting asparagus fields. A healthy and productive asparagus field is a long term investment.

\textit{See Asparagus Diseases on page 2}
**Purple spot**

Purple spot of asparagus is caused by the fungus *Stemphylium vesicarium*. The pathogen produces overwintering structures that contain and release sexual spores, or ascospores, in the spring. Rain splash and wind can cause the primary infection for the new growing season. Purple spot shows up as small (1-2 mm), elliptical, slightly sunken, purplish spots. This disease rarely shows up on spears in New Jersey during production and is mainly found when the crop is in fern stage. Following initial infection, the fungus will go through many disease cycles throughout the growing season depending on the weather. Spores cause secondary infections under favorable environmental conditions by entering plant tissue through wounds (often caused by sand blasting or insect feeding) and stomata, the pores of a plant used for gas exchange. Damage to the fern results in premature defoliation that reduces the flow of carbohydrates to the roots and lowers next year’s yield.

Good field sanitation is important in managing purple spot and other asparagus diseases. Burying last season’s fern growth at season’s end is a common practice in commercial asparagus production in New Jersey and is a good way to reduce purple spot inoculum. Some growers choose to burn dried asparagus fern, however chopping and incorporating fern has also been shown to be as effective in managing asparagus diseases. If burning is chosen, be sure to obtain a burning permit through the NJ Forest Fire Service. Applications need to be signed by your local Rutgers NJAES Cooperative Extension Agricultural Agent for infested plant burning.

**Asparagus Rust**

Many of the varieties grown today have resistance to rust. Asparagus rust is most common on fern growth. Infections begin in spring from spores that overwintered on last season’s crop debris. These infections produce orange spore (i.e., rust) stage of the disease. Spores produced are airborne and travel in the wind to new fern growth. When infection occurs, brick-red colored pustules develop on stalks, branches, and leaves of the fern. The disease will spread and infect fern as long as weather conditions are favorable for disease development. The disease causes fern yellowing and browning, defoliation, and if uncontrolled complete dieback of the fern. When ferns mature and senesce in fall, teliospores (i.e., black spores) may develop from the same pustules that produced the red spores. Teliospores are the overwintering stage of the fungus. Asparagus rust, if severe enough in the previous season’s fern, will reduce plant vigor the following year and reduced yields. Asparagus rust can be managed using an integrated approach of planting rust-tolerant varieties, applying fungicides at the correct timing, and using good sanitation practices to destroy last season’s fern.

During fern growth, field should be scouted on a regular basis. When environmental conditions, like extended dew or rainy periods, are favorable for disease development, fields should be scouted daily and protective applications should be applied. Additionally, disease forecasting systems can assist in timing of fungicide applications. Please check the 2012 *Commercial Vegetable Production Recommendations* for New Jersey for currently recommended fungicides. See the website [http://njaes.rutgers.edu/pubs](http://njaes.rutgers.edu/pubs) and search by title or for E001.

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**Pesticide Container Recycling from page 5**

4. Mini-bulk, saddle tanks and nurse tanks, which can be made of fiberglass;
5. Pesticide containers with lids; or
6. Containers that held any type of petroleum oil product or antifreeze.

**Non-Waxy Cardboard Collection**

Atlantic and Salem County collection sites: Helena Chemical will also be accepting, at no charge, non-waxy cardboard from their customers since their products are sold to the end user in cardboard boxes. Every Friday during the months of April through October 2008 from 1 p.m. to 3 p.m and during the scheduled pesticide container collection times, cardboard will be accepted. Clean non-waxy cardboard must be broken down and flattened. The flattened cardboard must be tied for the Atlantic County collection site. Tying in not required at the Salem County collection site. Clean Non-waxy cardboard will also be accepted year-round at the Cumberland County Solid Waste Complex’s Convenience Center.

**Other Rigid Plastic Recycling**

If you generate other clean non-petroleum containing HDPE plastic (crates, buckets, pales, etc.), the Cumberland County collection site may accept the material. Contact Karen Kritz, Recycling Manager, NJDA, 609-984-2506, or Dennis DeMatte, Cumberland County Recycling Coordinator, at 856-825-3700 to see if the plastic can be recycled. If you have large plastic containers that you cannot cut up, contact Karen Kritz to see if accommodations can be made to accept them at one of the sites.
Organic Insecticides... What Works and What Doesn’t
Scott Guiser, Horticulture Educator, Penn State Cooperative Extension

Reprinted from The Vegetable & Small Fruit Gazette, Penn State Extension, March 2012.

In late January I was fortunate enough to hear Dr. Galen Dively of the University of Maryland give an overview of organic insecticides at the Mid-Atlantic Fruit and Vegetable Grower’s Conference. Did you miss it? I’ll try to provide a recap.

I have a copy of the Conference Proceedings (write-ups of the presentations) as a reference which will help me recall key points. If you missed the Mid-Atlantic Conference, mark your calendar for Jan 29-31, 2013… it’s a fantastic educational (and social!) event.

Galen prefaced his remarks about specific products with these observations:

In organic systems, insecticides are used as a tool of last resort… after all non-chemical approaches have been employed. They are not intended as the basis for insect management in these systems. This often puts the products at a disadvantage because they frequently work best on immature stages of pest’s life cycle.

Many pest control products are listed at OMRI (Organic Materials Research Institute) and are approved under the USDA National Organic Program but double check with your certifying agency before proceeding.

Organic insecticides have several problems or limitations compared to conventional insecticides, including:

- Short residual activity
- Most have limited contact activity, requiring ingestion to be effective
- Less effective on mature insects, requiring precise timing to hit immature insects
- None have systemic activity
- Short shelf life
- Lacking in reliable efficacy (do they work?) data
- Expensive

Interesting…an article in the February 2012 issue of Vegetable Growers News echoed Galen’s points about the limitations of these products. Still, growers found them useful. So, despite these limitations, organic growers have several good tools for insect management. Here is an overview:

**Azadirachtin products**, such as Neemix and Aza-Direct are extracts of oils found in the Neem tree. These products are insect growth regulators and prevent insect molting (slow) and also serve as feeding deterrents and repellents. Fair to good control of beetles (Cuke, Colorado potato, Mexican bean, and flea) is reported. Note however, that with cuke beetles, even minimal feeding can transmit the bacterial wilt organism to cucumber and cantaloupe.

**Pyrethrum** is the naturally derived insecticide found in daisy flowers and commonly marketed as Pyganic. Quick knockdown but very short residual activity are key traits. Fair to good control of aphids, whiteflies, thrips as well as knockdown of cuke, Colorado potato and flea beetles were noted.

A new product called **Azera** is a combination of a pyrethrum (like Pyganic) and azadirachtin (like Aza-direct/Neemix). Control of Japanese beetle, aphids, imported cabbage worm, leafhoppers and cucumber beetles was improved over use of azadirachtin alone in recent studies. It even provided good squash bug control if timed to target nymphs, just after egg hatch. The limitations of one ingredient are partially covered by the other.

**Bt products** are well known for their ability to control lepidopteron (caterpillar) larvae such as imported cabbage moths in cole crops. Good spray coverage and repeat applications are important. Some Bt strains control non-lepidopterons. Not all Bts are alike and some are not labeled for organic production.

**Spinosad**, sold as Entrust to the organic market, provides very good control of caterpillars and thrips. Fair to good control of flea beetles and Mexican bean beetle was noted. Some growers note control of Colorado potato beetle.

**Soaps and oils** – provide good knockdown of soft bodied insects such as aphids and mites. Repeat applications and excellent plant coverage are important. Oils provide more residual activity than soaps but still this effect is short lived. Both soaps and oils have potential for phytotoxicity.

**Plant Extracts** such as d-limonene (citrus) and rosemary extracts disrupt insect neuroreceptors and act as anti-feedants. Fair to good control of aphids and spider mites reported. □
Weekly Weather Summary
Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged near normal, averaging 44 degrees north, 47 degrees central, and 47 degrees south. Extremes were 71 degrees at Pomona on the 29th and 25 degrees at Charlotteburg and Flemington on the 28th and 30th. Weekly rainfall averaged 0.87 inches north, 0.79 inches central, and 0.38 inches south. The heaviest 24 hour total reported was 0.62 inches at Flemington on the 30th to 31st. Estimated soil moisture, in percent of field capacity, this past week averaged 91 percent north, 87 percent central and 78 percent south. Four inch soil temperatures averaged 48 degrees north, 50 degrees central and 50 degrees south.

The following table contains meteorological information since the start of the growing season March first. The table is updated each Monday and the following is an explanation for each column. WEEK=TOTAL RAINFALL FOR THE PREVIOUS 7 DAYS ENDING MONDAY MORNING TOTAL=TOTAL RAINFALL SINCE MARCH 1ST DEP=DEPARTURE FROM NORMAL OF RAINFALL SINCE MARCH 1ST. A NEGATIVE SIGN INDICATES BELOW NORMAL AND NO SIGN INDICATES ABOVE NORMAL. MX=HIGHEST TEMPERATURE FOR THAT 7 DAY PERIOD MN=LOWEST TEMPERATURE FOR THAT 7 DAY PERIOD AVG=AVERAGE TEMPERATURE FOR THAT 7 DAY PERIOD DEP=DEPARTURE FROM NORMAL OF THE AVERAGE TEMPERATURE FOR THAT 7 DAY PERIOD TOTAL=TOTAL NUMBER OF GROWING DEGREE UNITS SINCE MARCH 1ST DEP=DEPARTURE FROM NORMAL OF GROWING DEGREE UNITS %FC=PERCENT OF FIELD CAPACITY (SOIL MOISTURE)

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<th>WEATHER STATIONS</th>
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WES KLINE -- GDD BASE 40 PINHEY HOLLOW*
LAST WEEK (146 Ending 3/26/12)
THIS WEEK (44 Ending 4/2/12)
* FEBRUARY GROWING DEGREE DAY TOTALS 59

Counties for Weather Station Locations

<table>
<thead>
<tr>
<th>Belvidere Bridge</th>
<th>Warren</th>
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<tbody>
<tr>
<td>Canoe Brook</td>
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<td>Trenton</td>
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<td>South Harrison</td>
<td>Gloucester</td>
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**Southern New Jersey 2012**

**Plastic Pesticide Container Collection Schedule**

(It’s **FREE** and one core credit will be issued to participants with a NJDEP Pesticide license)

<table>
<thead>
<tr>
<th>County</th>
<th>Location</th>
<th>Time</th>
<th>Dates</th>
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</thead>
</table>
| Atlantic      | Helena Chemical 66 Route 206 (North of the Route 30/206 intersection) Hammonton, New Jersey | 9:00 a.m. to 3:00 p.m. | Thursday, April 5  
Friday, May 4  
Friday, June 1  
Friday, July 6  
Friday, August 3  
Thursday, September 13  
Friday, October 5 |
| Cumberland    | Cumberland County Solid Waste Complex 169 Jesse Bridge Road (located off Route 55, Exit 29) Deerfield, New Jersey | 9:00 a.m. to 12 Noon | Friday, May 18  
Friday, June 15  
Friday, July 20  
Friday, August 17  
Friday, September 21  
Friday, October 19  
Friday, November 16 |
| Salem         | Helena Chemical 440 N. Main St. Woodstown, New Jersey | 9:00 a.m. to 3:00 p.m. | Friday, April 13  
Friday, May 11  
Friday, June 8  
Thursday July 19  
Friday, August 10  
Thursday, September 14  
Friday, October 12 |

This program is offered to agricultural, professional and commercial pesticide applicators who hold a NJDEP pesticide license. State, county and municipal government agencies may also participate. A representative from the New Jersey Department of Agriculture will be on-site to inspect the containers and issue one core credit to pesticide license holders who follow all of the required processing steps. To receive credit, participants must bring their pesticide license to the collection site and must follow all of the processing steps. Core credits will not be issued to participants who fail to follow all of the pesticide container processing steps.

**Plastic Pesticide Container Processing Steps & Size Limits**

1. All pesticide containers must be either triple rinsed or pressure rinsed, drained and dry inside;
2. All pesticide containers must be free of residue (other than stains);
3. The booklet must be removed (it is not necessary to remove the paper labels glued to the container);
4. Foil seal must be removed;
5. Only non-refillable pesticide containers will be accepted – you must drill a ¼-inch hole in the bottom of the container or with a utility knife make a 6-inch slit in the bottom of the container so the container will not hold liquids;
6. Only pesticide containers embossed with HDPE or the recycling #2 will be accepted;
7. Pesticide containers up to 55-gallons in capacity will be accepted. 5-gallon pales must be cut in half; 30-gallon containers into at least 4 pieces; and 55-gallon containers into at least 8 pieces. This can be accomplished using a sawzall, chainsaw, circular saw, or reciprocating saw. It is not necessary to cut up containers less than 5-gallons; and
8. Pesticide containers must have originally held an EPA registered pesticide.

**Items That Will Not Be Accepted and Will be Returned to the Recipient:**

1. Pesticide containers with dried formulation on the container, pour spout or the spout threads;
2. Pesticide containers with any liquid residue;
3. Pesticide containers where the insides are caked with dried residue;

*See Pesticide Container Recycling on page 2*