VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

Liz Maynard, Editor
600 Vale Park Road
Valparaiso, IN 46383
(219) 531-4200
emaynard@purdue.edu

vegcropshotline.org

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IN THIS ISSUE

Comparison of Powdery and Downy Mildew of Pumpkin - (*Dan Egel, **egel@purdue.edu**, 812-886-0198*) - It is perhaps unfortunate that two such very different diseases were given such similar names.

- The fungus that causes powdery mildew forms resistant structures that overwinter in the Midwest. The fungus that causes downy mildew doesn't overwinter in Indiana and must 'blow' in each season.
- Downy mildew has pathotypes of the causal fungus that affects cucurbit species differently. For example, cucumbers and cantaloupe are affected by all five pathotypes. Pumpkins are affected only by pathotype five. Powdery mildew seems to affect most cucurbits without regard to race (watermelon don't seem to be susceptible in Indiana). See Figures 1 and 2.
- Powdery mildew is caused by a fungus that is related to many other plant pathogenic fungi. Downy mildew is caused by a fungus-like organism that is more closely related to a brown alga. This is why the products that are most effective against downy mildew are often not effective on other cucurbit diseases. See Figures 3 and 4.

Fortunately, the disease symptoms are fairly different - at least to a plant pathologist. The photos of downy and powdery mildew in Figures 1 through 4 should help one distinguish between these diseases. For more information about downy mildew of cucurbits, see this youtube video, **http://www.youtube.com/watch?v=sz0vZ-t0gyg**.

This article was originally published September 8, 2014 at the Veggie Disease Blog **veggiediseaseblog.org**.

Figure 1. Downy mildew on the upper side of a pumpkin leaf. The lesions are not a bright yellow, but almost a mustard yellow. The lesions tend to be angular and the margins of the lesions are definite. (*Photo by Dan Egel*)

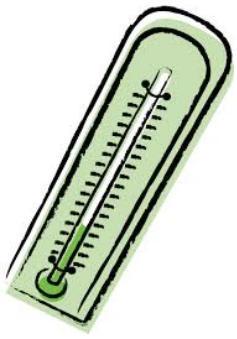
Figure 2. The underside of a pumpkin leaf with downy mildew. Note that the lesions appear 'dirty.' This appearance is from the spores of downy mildew that grow on the leaf bottom under moist conditions. A 10X hand lens will help to see this growth. (*Photo by Dan Egel*)

Figure 3. The most recognizable symptom of powdery mildew is perhaps the white growth of the fungus. Under some circumstances, powdery mildew causes a chlorosis (yellowing). Note that the chlorosis on this pumpkin leaf caused by powdery mildew is not angular and the margins are not definite (compare with above photo of downy mildew). The silvering that can be observed above at some places where the veins meet is not caused by a disease. Healthy pumpkin leaves often have this feature. (*Photo by Dan Egel*)

Figure 4. In this photo, I have flipped the leaf in the above photo upside down. The chlorotic (yellow) areas in the above photo correspond to the growth of the powdery mildew fungus seen here. The powdery mildew fungus can sporulate on either side of a leaf. (*Photo by Dan Egel*)

Chilling Temperatures - (*Liz Maynard, **emaynard@purdue.edu**, 219-531-4200 ext. 4206*) - Night temperatures have dipped to the 40's in recent weeks. Chilling sensitive crops can be injured below 50-55°F. For tomato, pepper, eggplant, cucumbers, summer squash, winter squash, pumpkins and melons, chilling temperatures can lead to more postharvest decay, sunken spots on the fruit, and reduced shelf life. Decay may not be apparent immediately, but can develop rapidly under warmer temperatures. Tomatoes don't ripen properly at chilling temperatures. Chilling injury is cumulative: the more hours at chilling temperatures, the greater the injury. Growers may wish to consider the following to reduce impact of chilling:

- Harvest chilling sensitive crops soon, and store to avoid additional chilling. See Vegetable Crops Hotline No. 576, Sept. 19, 2013, for information on storage.
- Take extra care during harvest and postharvest handling to discard product with signs of chilling injury.
- In high tunnels, manage venting to keep temperature above 55°F as much as possible.
- As appropriate, communicate with customers about effects of chilling on the product.



Vegetable Price Information - (*Liz Maynard, **emaynard@purdue.edu**, 219-531-4200 ext. 4206*) - A question recently came in about whether there is a list of average sale prices for vegetables in Indiana. I am not aware of a list like that, but there are sources for information about vegetable prices, current and past. This article describes some of the reports available with examples of current pumpkin prices. The Purdue Fruit and Vegetable Connection site provides quick links to those discussed below at **https://ag.purdue.edu/hla/fruitveg/Pages/market.aspx**.

The USDA Ag Marketing Service (AMS) Market News Site (**http://www.marketnews.usda.gov**) has terminal market, shipping point, retail and some local market prices. Daily terminal market prices for Chicago, Detroit, and other major markets are available. These represent prices for wholesale lots paid by buyers to

wholesalers at the markets. Comments on supply are included.

For example, on Sept. 16 at the Chicago Terminal Market, pumpkins were available, but offerings were 'fairly light.' Miniature pumpkins in 1/2-bushel cartons from Ohio and Michigan were sold for $16-$18 (Ohio) and $17-$18 (Michigan). White minis from Michigan brought $18/carton. Medium-sized pie pumpkins in 1-1/9-bushel cartons from Illinois and Indiana sold for $18/carton and from Ohio for $16-$18/carton. Fairytale pumpkins from Indiana in 24-inch bins went for $200/bin. Finally, Howden-type pumpkins in 36-inch bins from Indiana were priced at $125/bin, and from Illinois at $135/bin. Figure 5 shows the text-only version of the report that is updated daily at **http://usda.gov/mnreports/hx_fv020.txt**. A more easily readable version is available on the new USDA AMS Market site from the link above.

If your package sizes match those in the report, it is easy to compare. If not, it is helpful to know the weight of the common package sizes. For many products this information is listed in the help section of the Market News site. For pumpkins, ½-bushel cartons are about 40 lbs., 1-1/9 - bushel cartons 40–50 lbs., and bulk bins 900–1200 lbs. Using these figures to convert the prices for Indiana products above to a per-pound, basis, the pie pumpkins are $0.36–$0.45 /lb.; Fairytale types $0.16–$0.22/lb., and Howden types $0.10–$0.13/lb.

Shipping point reports provide information on prices for freight-on-board (F.O.B.) from major shipping areas of the U.S. During the season there are daily reports for the Benton Harbor, MI, market, and for melons from SW Indiana and SE Illinois, as well as other areas. The weekly shipping point trends (**http://www.ams.usda.gov/mnreports/wa_fv154.txt**) provides current F.O.B. price ranges and quantities shipped for the previous 3 weeks, and comments on the market. The Sept. 16 shipping trends report lists just one shipping point for pumpkins: Virginia, with shipments fairly light—movement expected to increase, and trading fairly active. Prices for 36-inch bins of 30–45 count Howden-type pumpkins were mostly $80 to $100.

Another source of price information is reports from produce auctions. Some of these are available online from USDA AMS, including the Indiana's Adams County Flower & Produce Auction (**http://www.ams.usda.gov/mnreports/aa_fv160.txt**), and several in Ohio and Kentucky. The most recent report for the Adams County auction reported a variety of pumpkin sales, with pie-types sold by the piece for $0.45–$1.20 each, and regular pumpkins sold at prices ranging from $0.10–$4.00 each. Prices for other auctions are typically available by contacting the auction.

For those who sell direct to the final consumer, knowing retail prices can be helpful. USDA provides a weekly report of advertised retail prices, broken down by region of the country. For Sept. 12 the report indicated 279 stores in the Midwest advertised pumpkins at prices ranging from $3.99–$4.99 each, with a weighted average of $4.44.

Price information can be used in many ways. I am not an economist so have just one comment on that topic (at the risk of stating the obvious): don't assume that your prices must match or beat prices you see in reports. The pumpkins (or whatever) you are selling may have the same product name as listed in the reports, but the value of your product to your customers may be more or less, and your cost of production and marketing strategy may dictate different prices.

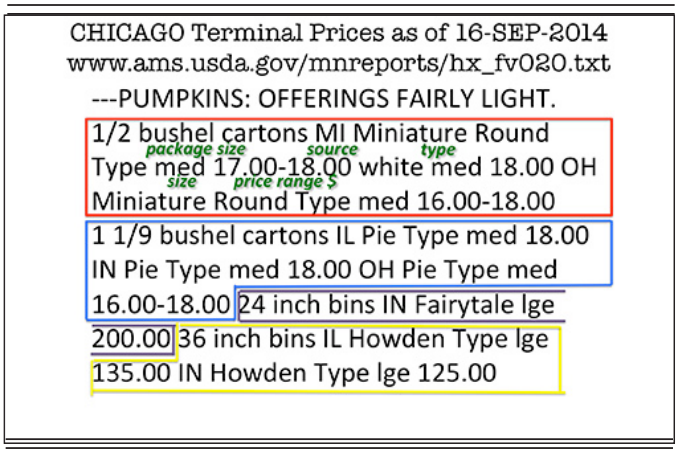


Figure 5. Text version of the Sept. 16 Chicago Terminal Market Report for pumpkins, with annotations.

Expanding Horizons in Sustainable Agricultural Practices: An Inter-Agency Working Group is Born Out of a Trip to Pennsylvania

- (*Tamara Benjamin, **tamara17@purdue.edu**, 765-496-1930*)

-This past May, a group of 19 educators from Purdue University, NRCS (Natural Resources Conservation Services), and SWCD (Soil and Water Conservation District) converged on Kutztown, Pennsylvania to learn more about the practices Rodale Institute has conducted in organic agricultural production since 1947 (more than 60 years). From this trip an inter-agency working group was formed to assist organic farmers as well as conventional farmers and growers in Indiana who would like to adapt and/or adopt alternative sustainable practices that fit within their management system (such as no-till and cover crops), such as can be seen at Rodale. The group spent time visiting portions of the farm that produce organic grains and vegetables. They also visited an organic dairy operation and walked around the pastures where the cattle were grazing. Discussions focused on soil health, cover crops, CSA sales (Community Supported Agriculture), crop rotations, and roller crimping (a form of mashing the cover crop to allow it to protect the soil and reduce weed problems while the new crops are growing).

As a result of this trip, which was supported by SARE, NRCS, and the USDA-NIFA Organic grant, the group set a number of tasks to accomplish over the next year. As can be imagined, in any new or modified system there will be debate on the risks and benefits of change. As such, there is a need to bring experts together to talk about the scientific studies or lack thereof that have been conducted on the different topics, so that more information can be brought to educators throughout the state. The hope is to create regional roundtables where people can discuss alternative practices. These roundtables can serve two purposes: bringing information to farmers and educators who are interested, and also helping to better unify the message as to what has potential benefits and what some of the real risks are of investing in some of the practices. These roundtables will also help to create farmer and educator networks throughout the state to better determine farmers' needs and foster collaboration.

A need was also expressed that the state should develop an inventory of all that is available to farmers and growers interested in alternative sustainable agricultural practices. The group compiled contact information of the members who traveled to Rodale in a directory as a start to identify people around the state that would potentially have information to support farmers. A list was also started pertaining information on available machinery that could be rented or shared, such as roller crimpers, with or between farmers. An inventory will also be conducted for relevant publications and websites to ensure that growers and educators have access to sound information.

Demonstration plots have been set up to create and gain more knowledge about these farming practices. For example, there are research demonstration plots on utilizing the roller crimper and producing organic vegetables at some of the Purdue Agricultural Centers (PACs). The working group hopes to utilize these initiatives to conduct demonstration workshops for local farmers at these trials as well as on farms across the state.

The working group will continue to meet on a quarterly basis to talk about new programs coming up or to discuss potential collaborations for the future. They hope to be able to help promote webinars pertaining to alternative practices that have the potential to be beneficial to the sustainability of different farming systems. Since the group traveled to Pennsylvania, presentations and topics that were learned on the trip have been shared at various workshops, programs, and field days. Members from the group are also available to work one-on-one with landowners in the state to improve their farming system. The hope is that this will continue and that more visibility will help other farmers and educators to network with this working group to bring alternative practices to farming in Indiana. For more information contact Kathleen Sprouse, **ksprouse@purdue.edu**, 765-641-9514, or Tamara Benjamin, **tamara17@purdue.edu**, 765-496-1930.

Food Safety Practices for the Packing Shed

- (*Manpreet Singh, **manpreet@purdue.edu**, 765-494-0823)*

- Packing sheds are a major area of concern for food safety, therefore generating the need to prevent cross-contamination. At this stage of post-harvest of produce, any contaminated commodities being shipped could spell large implications for the producers as a potential hazard for foodborne illnesses and its economic impact. All individuals involved with the production, handling, packing, and transportation of produce should be vigilant of safety practices in addition to GAPs to reduce the risk of post-harvest contamination. As evident from a few outbreaks in the recent past, irrespective of where the link of the food safety chain was broken to propagate foodborne illnesses, the responsibility always falls back on the producer. To this extent, water being used in the packing shed should be potable and if ice is being used for packing purposes it should be from potable water. Some of the general areas in a packing shed that can be potential risks include floor drains and areas with high traffic of people. It is necessary to keep the risk to a minimum by frequently using wash water at adequate pressure to remove any debris, avoid clutter in the shed, and most importantly having a pre-cleaning step where produce that enters the shed does not pose a threat of contamination. Floor drains should be inspected regularly and clogging the drains should be avoided to prevent contamination. Following certain Good Manufacturing Practices (GMPs) such as hand washing, maintaining clean rest rooms and break areas, and maintenance of sanitation records can be useful in preventing food safety issues in the packing shed. Following GMPs includes but is not limited to:

a. Worker hygiene
b. Preventing workers from eating, drinking, and chewing in the packing areas
c. Wearing personal protective equipment (PPEs) such as gloves and aprons
d. Training
e. Pest control programs
f. Accountability/ responsibility for cleaning and sanitation including record keeping programs

*Information for this article was obtained from several cooperative extension programs that focus on produce safety. Resources used included:
NCSU coop extension (**http://ncfreshproducesafety.ces.ncsu.edu**)
TAMU AgriLife extension (**http://aggie-horticulture.tamu.edu**)

Surveys: A Chance to Direct Research, Extension, and More - (*Liz Maynard, **emaynard@purdue.edu**, 219-531-4200 ext. 4206*) - Notices of surveys in my email seem more and more common these days. In this newsletter we share those that seem relevant to Indiana vegetable growers from reputable organizations. By responding you can help shape research, extension, and other activities. If you have questions or concerns about the survey, confidentiality, or how the data will be used, contact the survey administrator. They have a responsibility to answer questions.

Greenhouse Tomato Survey - The Ohio State University would like to invite growers who propagate or produce greenhouse tomatoes in the United States and Canada to participate in an online survey at **http://go.osu.edu/tomatosurvey**. This survey will provide our research and extension project team with valuable feedback on disease management and food safety issues that are relevant and important to you. Survey responses will guide the development of educational materials and best management practices and resources for the industry. The survey will involve approximately 20 to 30 minutes of your time. For additional information, comments, or questions, please contact Beth Scheckelhoff, OSU Extension Educator for Greenhouse Systems at 419-592-0806 or at **Scheckelhoff.11@osu.edu**.

Organic Seed Survey - The Organic Seed Alliance requests input from certified organic growers about their seed needs, perspectives, and experiences. Take the survey here: **https://www.surveymonkey.com/s/JFRSKKZ**.

Upcoming Events

High Tunnel Webinars and Workshops. Purdue Extension is offering a series of free webinars and workshops providing essential how-to and background information on topics related to year-round growing. No registration is required for the webinars, just visit the links provided below.

NCRS High Tunnel Program: 10-11 a.m. EDT, Sept. 23. Presented by Adam Heichelbech, Environmental Quality Incentives Program specialist of the U.S. Department of Agriculture's Natural Resources Conservation Service. **https://gomeet.itap.purdue.edu/nrcsht/**

The Influence of Cultural Practices on Tomato Diseases in High Tunnels: 10-11 a.m. EDT, Sept. 25. Presented by Purdue plant pathologist Dan Egel**. https://gomeet.itap.purdue.edu/tomatoesht/**

Insect Management in High Tunnels: 10-11 a.m. EDT, Oct. 9. Presented by Rick Foster, Purdue Extension entomologist. **https://gomeet.itap.purdue.edu/insectht/** .

Crop Selection in High Tunnels: 10-11 a.m. EST, Nov. 20. Presented by by Liz Maynard, Purdue Extension vegetable crops specialist. **https://gomeet.itap.purdue.edu/cropsht/**

Workshop at Aspire Harvestland Farm, 6775 State Route 32, Anderson: 6-8 p.m. EDT Sept. 23.

Workshop at Harvest Moon Flower Farm, 3592 Harvest Moon Lane, Spencer: 4-6 p.m. EDT Oct. 7. Preregistration required, call 812-349-2575 or email **monroeces@purdue.edu**

Workshop at Paramount School of Excellence, 3020 Nowland Ave., in Indianapolis. 5-7 p.m. EDT Oct. 23. Contact Emily Toner, **eegglest@purdue.edu**, or 317-275-9269.

Illiana Vegetable Growers Symposium. Tuesday, January 6, 2015. Teibel's Restaurant, Schererville, IN. Program available in early December. Sign up to be on the mailing list at **https://ag.purdue.edu/hla/fruitveg/Pages/MailListSignup.aspx**, or call 219-531-4200 ext. 4201.

Indiana Horticultural Congress. January 20 – 22, 2015. Wyndham Indianapolis West, Indianapolis, IN. **www.inhortcongress.org**. Contact: Lori Jolly-Brown at 765-494-1296 or **ljollybr@purdue.edu**.