

VEGETABLE CROPS HOTLINE

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

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DOWNY MILDEW OF CUCURBITS UPDATE - (*Dan Egel*) -
This disease has not been reported in Indiana in the 2012 season. However, growers might be interested in where the disease has been found in nearby states. Here is a brief background about downy mildew of cucurbits.

The fungus that causes downy mildew does not overwinter in Indiana. Therefore, downy mildew spores must blow into Indiana. This doesn't happen each year and when it does happen, it usually isn't until August or September. Management of downy mildew requires specialized fungicides that may be relatively expensive. Therefore, I do not recommend applying specialized fungicides unless the disease has been reported in your area.

Symptoms of downy mildew include chlorotic lesions on leaves that may be angular in appearance. The fungus that causes downy mildew may cause the lower surface of leaves to look 'fuzzy' in wet conditions.

To follow the downy mildew of cucurbits epidemic, continue to read the *Vegetable Crops Hotline*, or visit this website: <http://cdm.ipmpipe.org/>.

Downy mildew of cucumbers and has been found in the southwest corner of Michigan, across the border from La Porte and St. Joseph Counties in Indiana. Cucurbit growers in northern Indiana should consider applying specialized fungicides to their crops. Keep reading for more information on these products. It is possible that the strain of the downy mildew fungus that is in Michigan may affect other types of cucurbit such as muskmelon, pumpkin and watermelon.

Downy mildew has also been reported in northern Ohio on cucumbers, muskmelon and pumpkin. Southern Ontario has also reported downy mildew on cucumbers. Prevailing winds normally blow spores from these areas away from Indiana.

Products that have proven efficacious on downy mildew include: Curzate®, Gavel®, Presidio®, Previcur Flex®, Ranman® and Tanos®. Gavel® is a combination of technical ingredients and therefore offers protection for more than just downy mildew. Tanos® is also a combination of technical ingredients and has activity on more than just downy mildew (Tanos® must be tank mixed with another product with a different mode of action). However, Tanos® has proven somewhat less effective than the other products on this list.

Please see BP-134-W or BP-135-W or the *Midwest Vegetable Production Guide for Commercial Growers 2012* (ID-56) for additional information. Please read the label that comes with the product. Contact Dan Egel if you have questions or comments.



PUMPKIN FRUIT DEVELOPMENT - (*Liz Maynard*) -
Pumpkin crops around the state may be at various stages of development depending on when they were planted. Some are setting the first fruit, many have developing green fruit and are still setting more, and some may have fruit starting to turn orange. This article will discuss considerations for each stage of fruit growth.

In order for fruit set to take place, male and female flowers must be open on the same day (see Figure 1), pollinating insects must be active, the plant must not be too stressed and it must have an adequate level of carbohydrates. Growers can influence some of these conditions.

Pumpkin Flowers

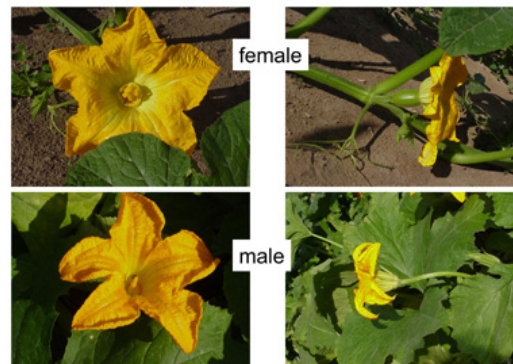


Figure 1: Male and female pumpkin flowers look different. (Photo by Liz Maynard)

High temperatures promote death of female pumpkin flowers while still in the bud stage (see Figure 2). I don't know of a way to avoid this problem during the season. If the first female flower bud on a vine dies, it's important to make sure that the next flower that opens sets. Varieties differ in their sensitivity to high temperatures, and so gathering information about variety performance in hot conditions should help growers identify those that won't have such a big problem in future hot years.

Pumpkin flowers are usually pollinated by honey bees, squash bees, and bumblebees. Pollination occurs in the morning when flowers are open and bees are active. Multiple bee visits to a flower are needed in order to transfer enough pollen for fruit set. Each



Figure 2: These pumpkin female flower buds have aborted before opening, probably due to heat or other stress. (Photo by Liz Maynard)

flower is open for just one day, and if a female flower doesn't get pollinated on that day it will gradually yellow and fall off. To know whether bees are active in a field, take a look in the morning before it gets hot and flowers close. If bee activity is spotty and there aren't any honey bee hives present, it may be worthwhile to bring hives in. Research in Illinois showed an advantage to having honey bee hives present for pumpkins. On the other hand, work in New York indicated that native populations of squash bees provided ample pollination for good pumpkin yield. I suspect that the benefit for any particular field will vary depending on the populations of native squash bees and other pollinating bees. For more information, see Using Honey Bees in Pollination (E-216-W).

To avoid killing or repelling pollinators, apply insecticides only when needed based on the presence of insects in the field at damaging levels. Choose insecticides with lower toxicity to bees, if possible, and apply late in the day after flowers have closed and bees are not active. See the *Midwest Vegetable Production Guide* (ID-56), and Cucurbit Insect Management (E-30-W) for more information about managing insects in pumpkins, and refer to Protecting Honey Bees from Pesticides

(E-53-W), and How to Minimize Pesticide Damage of Honey Bees (E-260-W) for information about protecting honey bees. According to these publications, dust formulations of insecticides are more toxic to bees than liquid formulations and should be avoided.

After pollination (when pollen is transferred to the female flower) pollen grains must germinate and grow to fertilize each ovule that will develop into a seed. Without this step, the seeds won't start to grow and if seeds don't grow the pumpkin fruit will die and fall off. If only seeds at one end or on side one side of the fruit start to grow, the pumpkin will be lopsided. High temperatures can prevent proper pollen tube growth, and so even if flowers open and get pollinated, fruit may not set.

Growing a pumpkin fruit and the seeds inside requires a lot of energy from the plant, along with water and mineral nutrients. Energy comes from carbohydrates produced by the plant through photosynthesis. If the plant doesn't have enough energy, female flower buds and fruit may stop developing, yellow, and die. High temperatures, particularly at night, make the plant burn energy more quickly. If there isn't enough water, or there is too much shade from weeds, photosynthesis is reduced and fewer carbohydrates are produced. There is evidence that shading the one leaf near a female pumpkin flower can reduce fruit set for that flower. Foliar diseases also reduce photosynthesis, and the plant may also divert energy to fight the disease. Generally, stressed plants have low energy reserves.

Basic good management practices will help the pumpkin plant meet the energy demand of growing fruit. If it stays dry, irrigation is likely to be important. Drip irrigation can be used on pumpkins and in many situations it may be relatively simple to set up (see Figure 3). See Drip Irrigation for Vegetables from Kansas State University <http://www.ksre.ksu.edu/library/hort2/mf1090.pdf> and Drip Irrigation Systems from the University of Florida <http://edis.ifas.ufl.edu/hs388> for basic information about drip systems. Contact Irrigation Extension educator Lyndon Kelley 269-467-5511, kelleyl@msu.edu or me for additional information.



Figure 3: Drip irrigation on pumpkins in a research plot. (Photo by Liz Maynard)

Weed control is important, not only to avoid shading, but also to reduce competition for water. In some fields uneven emergence and plant size may make normal cultivation difficult or less effective at eliminating weeds. Hoeing or hand-weeding, or spot treatments with herbicides may be warranted. If using herbicides, take care to follow precautions on the label to avoid causing even more problems than the weeds: glyphosate accidentally sprayed or drifted onto a pumpkin leaf will move along the vine and injure leaves and flower buds.

The dry year has meant fewer foliar diseases in many crops, but it is still important to monitor for diseases, be aware of environmental conditions and apply fungicides when conditions warrant.

Fruit will mature quickly with high temperatures. A pumpkin is fully mature when it is completely orange and the seeds inside are fully developed. The final stage of seed development takes place after most of the color change. Once a pumpkin is mature, it is ready to be cut from the vine.

If pumpkins mature much earlier than needed for market, there are several factors to consider when deciding what to do (see Figure 4). If the vines are healthy, pumpkins may be left on the plant for a while. If there are smaller fruit still developing on the plants, minimizing damage to them and to the plants that would be caused by harvesting the mature pumpkins is a good idea. However, if high temperatures and sunny conditions prevail, the mature pumpkins may essentially 'bake' and/or get sunburned. This is especially likely if there is little vine cover. If pumpkins are likely to be in that situation for several weeks to a month, cutting pumpkins from the vine and moving them to a cooler, shaded environment would be best if that is practical.



Figure 4: This pumpkin was partly orange on July 13. Pumpkins are that completely orange well before market may need protection from overheating, disease, and insect damage. (Photo by Liz Maynard)

I have not seen the protectants discussed in the previous issue (number 555) of this newsletter used to prevent sunburn on pumpkins, but that may be worth considering. A final note about orange pumpkins: pumpkins on a seriously sick plant often turn orange or yellow-orange more quickly than they would otherwise. These pumpkins aren't likely to be of good quality and won't keep well. A few of them in a field don't necessarily mean the rest of pumpkins are mature too.

Note: Purdue publications mentioned in this article may be found by searching for the title at <http://the-education-store.com>.



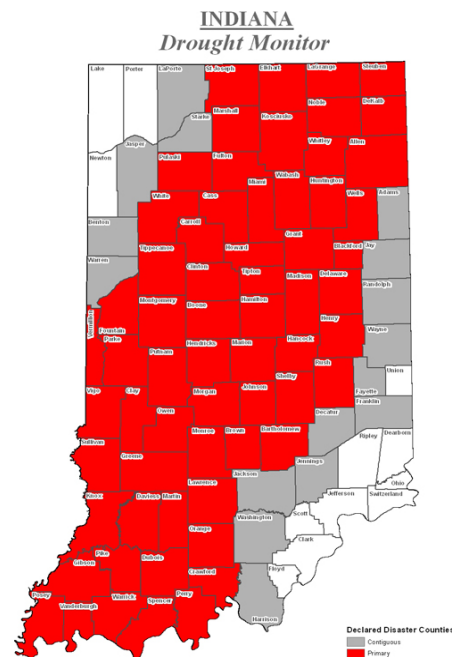
USDA DISASTER DECLARATION NOW INCLUDES 64 COUNTIES IN INDIANA - (Liz Maynard) - On July 25 the USDA Farm Service Agency Indiana state office reported that the USDA has added 14 counties to the original 50 counties in Indiana declared as primary natural disaster areas due to extreme drought. The 64 counties are listed on the next page in Table 1.

The sixteen counties listed in Table 2 are next to these primary natural disaster areas counties and also qualify for natural disaster assistance.

The map below (Figure 5) shows the disaster counties designated through July 25.

Contact your local FSA office, and if appropriate, your crop insurance representative to learn about what disaster relief programs you may be eligible for, and to report losses.

Figure 5: Counties designated as disaster areas as of July 25, 2012. Source: USDA FSA, Indiana State Office.



Source: USDA Farm Service Agency July 25, 2012

Table 1: Indiana counties listed as primary natural disaster areas as of July 25, 2012.

Allen	Bartholomew	Blackford	Boone	Brown
Carroll	Cass	Clay	Clinton	Crawford
Daviess	DeKalb	Delaware	Dubois	Elkhart
Fountain	Fulton	Gibson	Grant	Greene
Hamilton	Hancock	Hendricks	Henry	Howard
Huntington	Johnson	Knox	Kosciusko	LaGrange
Lawrence	Madison	Marion	Marshall	Martin
Miami	Monroe	Montgomery	Morgan	Noble
Orange	Owen	Parke	Perry	Pike
Posey	Pulaski	Putnam	Rush	Shelby
Spencer	St. Joseph	Steuben	Sullivan	Tippecanoe
Tipton	Vanderburgh	Vermillion	Vigo	Wabash
Warrick	Wells	White	Whitley	

Table 2: Indiana counties adjacent to counties designated primary disasters areas as of July 25, 2012

Adams	Benton	Decatur	Fayette
Franklin	Harrison	Jackson	Jasper
Jay	Jennings	LaPorte	Randolph
Starke	Warren	Washington	Wayne



UPCOMING EVENTS

Hoophouse/High Tunnel Construction Workshop, Saint Joseph's College, Rensselaer, IN. July 30 8:00 am to 7:00 pm CDT and July 31 8:00 a.m. to 4:30 pm CDT. At this hands-on construction workshop participants will learn how to build a high tunnel from Four Season Tools Agricultural Specialist Mike Bollinger. The cost of the workshop is \$35. For more information on the workshop or to reserve a space for the workshop, contact SJC Associate Professor of Education and Project Coordinator Dr. Lana Zimmer at lanaz@saintjoe.edu or 219-869-1926.

Sweet Corn Sampler, Pinney Purdue Ag Center, 11402 S. County Line Rd., Wanatah, IN. August 2, 5:30 to 8:00 p.m. CDT. To register call 219-465-3555 or register online at <http://bit.ly/LceYZb>. Flyer available at <http://www3.ag.purdue.edu/counties/porter/Documents/sweet%20corn%20sampler%20flyer.pdf>. This event will include

a tour of sweet corn variety trial plots, presentations on insect management in sweet corn and preserving sweet corn, and taste testing of sweet corn varieties from the trial plots and local producers. **If you grow sweet corn in northwest Indiana and would like your corn included in the taste test, we would like to buy it!** Please contact Cassandra Galindo at 219-531-4200 ext. 4201 or ws_bc@pnc.edu by July 31. We would need two dozen ears of one variety, picked on August 2, and delivered to a Purdue Extension office in Lake, Porter, or LaPorte Counties, or the Pinney Purdue Ag Center.

Organic Variety Selection and Seed Saving Workshop, Purdue University Meig's Horticulture Research Farm, 9101 South 100 East, Lafayette, IN. August 16, 7:30 a.m. to 12:30 p.m. EDT. To register contact Dr. Lori Hoagland, lhoagland@purdue.edu or 765-494-1426. Flyer available at <http://www.hort.purdue.edu/fruitveg/events/organicfarmerworkshop2012.pdf>.

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