VEGETABLE CROPS HOTLINE

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

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In This Issue

Harvest and Postharvest Storage of Pumpkins and Winter Squash

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With the start of pumpkin harvest, it is a good time to review important considerations for harvest and postharvest storage of pumpkins and winter squash (butternut, acorn and hubbard squash etc.).

Pumpkin and winter squash should be harvested fully mature to reach their optimal quality and fulfill their potential for long shelf lives. Characters indicating fruit maturity include loss of rind surface gloss, ground spot yellowing, and hardening of the skin to the level that it is resistant to puncture with a thumbnail. Except for some striped varieties, mature fruit should have solid external color. If fruit have to be harvested pre-mature because of plant decline, these fruit won't store as well as mature fruit. The best practice is to harvest the fruit as soon as they are fully mature and then store under proper conditions. If mature fruit are left attached to the vines, it increases the chance of disease infection on stems and fruit. For example plectosporium blight causes cosmetic damage on handles, and bacterial spot reduces quality and longevity of fruit. In addition, if diseases such as powdery mildew and downy mildew cause significant loss of foliage, fruit left in the fields are likely to suffer sunscald (Figure 1) and low quality handles as explained in this article https://vegcropshotline.org/article/powdery-mildew-of-cucurbits/. The high temperatures and bright sunshine experienced over the past few weeks in Indiana might help explain the increased reports of sunscald (or sunburn) that has been reported. Sunburn may start as minor skin discoloration in the field. The symptoms of such fruit may expand upon harvest, particularly if the fruit is stored in the sun.

In some situations like pick-your-own where mature fruit have to be held in the field, scout carefully to manage diseases and insects to maintain healthy vines and protect fruit. Recommended fungicides can be found at the *Midwest Vegetable Production Guide for Commercial Growers*.

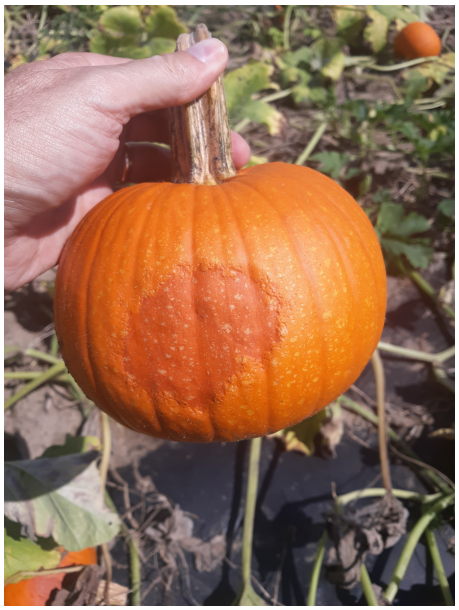

Figure 1. A pumpkin fruit with sunscald due to lack of vine canopy (photo: Dan Egel)

After harvest, pumpkins may benefit from curing, especially when fruit show non-hardened skin and surface damage. Curing is conducted under temperatures between 80 to 85°F in a shaded area for about 10 days. Studies have shown that curing heals wounds, hardens the rind, enhances fruit color and increases sugar content. If pumpkins are washed after harvest, be sure to dry them thoroughly before curing. It should be noted that curing is detrimental to acorn squash; it accelerates skin color change, deteriorates fruit texture and

taste, and stimulates fruit decay.

Pumpkins and winter squash are best stored at temperatures between 50 to 55°F and relative humidity between 50 to 75%. With higher storage temperatures, excessive loss of weight, color and eating qualities might be experienced. When temperatures are above 55°F, the surface of acorn squash becomes yellow and flesh becomes stringy. Under the optimal storage conditions, acorn squash can be stored for 5 to 8 weeks, pumpkins and butternut squash for 2 to 3 months, and hubbard squash for 5 to 6 months. Both pumpkins and winter squash are sensitive to ethylene. They should not be stored near apples, ripening tomatoes or cantaloupes. When temperature is below 50°F, fruit might develop chilling injury (Figure 2). Pumpkins, butternut and acorn squash may survive one or two cold nights in the field, however, a frost might lead to fruit rot. If fruit is displayed in the field or a farm stand, they should be protected if frost is anticipated.

Figure 2. Chilling injury on butternut squash.

Late Season Pumpkin Disease Management

(Dan Egel, egel@purdue.edu, (812) 886-0198)

Several pumpkin growers have asked me when to stop managing for pumpkin diseases. That is, when should a pumpkin grower stop applying fungicides? I cannot provide a definitive answer for this question; every grower will have to make his or her own decision. Below, however, are some factors to consider.

Estimate the crop yield-walk through the field and evaluate the yield of pumpkins that are ready to harvest. Be sure to only consider fruit of marketable quality. If the yield is at or above what is expected, it may be time to put the sprayer away.

Estimate when harvest will take place-Pumpkins that are scheduled for harvest in the next week or two are less likely to need any fungicide treatment. A longer period to final harvest may indicate that there is time for immature fruit to ripen. For example, pumpkins that are to be picked by the consumer up to Halloween may have time to mature.

Estimate the ratio of mature to green fruit-When growers scout fields to assess yield, it may be beneficial to also estimate fruit close to maturity. Growers should be realistic about how long it will take for green fruit to mature. Figure 1 shows two pumpkin fruit, one clearly orange and mature and the other green. It is impossible to estimate how long it will take the green fruit to properly mature. However, factors include weather, variety and health of vines. Warm weather, in general, favors ripening. For the most part, larger varieties will take longer to mature than smaller ones. Green, healthy vines tend to promote proper fruit maturity over yellow vines.

Figure 1. It may not be cost-effective to apply late season fungicides in order to get this green, immature pumpkin to ripen.

Jack-o-lantern pumpkins are estimated to need 60 to 90 days to go from pollination to market maturity under warm growing conditions (see Table on page 33 of the 2018 *Midwest Vegetable Production Guide* mwveguide.org). Even when pumpkin fruit color change has taken place, fruit quality may be improved by leaving the fruit on the vine for another 10 to 20 days. Look again at the green fruit in Figure 1. The green fruit may be 2 to 4 weeks away from proper maturity. Additional fungicides applied to attempt to bring this fruit to maturity may be wasted depending on the estimated harvest date.

Figure 2, on the other hand, shows a mature orange pumpkin and another yellow one that sports a bit of green yet. The yellow pumpkin in figure 2 is more likely to mature properly in the next few weeks than the green pumpkin in figure 1. Depending on circumstances, this fruit may benefit from additional disease management.

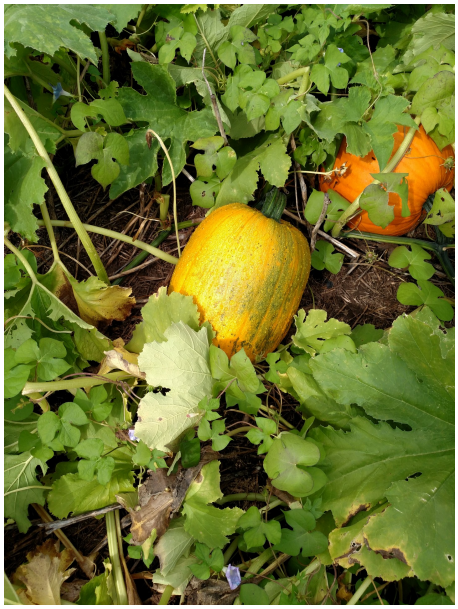

Figure 2. The yellow pumpkin with a bit of green is more likely to ripen with additional late-season management than the green pumpkin in Figure 1.

Determine which diseases are present-Foliar diseases will vary in how much yield or fruit quality loss may be observed late in the season.

- Downy mildew affects leaves only. Fruit quality is unlikely to be affected by late season outbreaks. I have observed minor outbreaks of downy mildew on cucumber in Indiana, but no downy mildew on pumpkin in 2018. Late outbreaks of downy mildew on pumpkin may reduce foliage without reducing fruit quality. In this situation, downy mildew may make pumpkin harvest easier!
- Powdery mildew – my Purdue mentor, Dr. Rick Latin, advised pumpkin growers to protect pumpkin plants from powdery mildew through September. Growers who follow such advice will make a final powdery mildew fungicide application in mid-September. However, many pumpkin growers now harvest pumpkins in late August or early September. Such growers will want to apply a final systemic fungicide application for powdery mildew in early to mid-August.
- Plectsporium blight can cause lesions on pumpkin handles. Regular fungicide applications during the season can lessen the severity of this disease. It is unclear if late applications of fungicides after the disease has been discovered can be helpful.
- Bacterial spot-this disease may affect the fruit directly, causing scabby, lesions on the fruit surface. However, fruit infections are more likely in the first two weeks after pollination. Therefore, new infections of bacterial spot are less likely close to harvest.
- Phytophthora blight-this disease affects both foliage and fruit of pumpkins. Immature and mature pumpkins can be affected. It may take several days from first infection of a pumpkin fruit to when lesions become visible. Therefore, it would be possible to ship an apparently healthy pumpkin only to have the infection become obvious in shipment. Therefore, growers who have had problems with Phytophthora blight may find it useful to apply a final specialized fungicide 7 to 10 days before harvest.

I hope growers who are deciding on whether or not to apply another fungicide application will weigh the benefits outlined here of a treatment with the expense of such an application. A more general article about when to stop applying fungicides can be found here https://vegcropshotline.org/article/when-to-stop-spraying-fungicide/.

What's Eating my Squash?

(Laura Ingwell, lingwell@purdue.edu)

Many of us may forget about the pesky squash vine borer until it's too late. This pest of cucurbit crops tends to be sporadic in our region; you are either battling it every year or it hardly makes an appearance. The squash vine borer is a member of the clear-winged moths, a unique group of moths that are active during the daytime. They are very beautiful with their bright colored orange tufts on their legs (Figure 1), but can be devastating. The insect overwinters as a late instar larvae or pupa in the soil. When the weather warms, they mature and adults emerge. You can scout for the first generation of adults in the spring and should target pesticide applications at the base of the plant when adults are first spotted and for two weeks thereafter. If you wait, the eggs will hatch and the larvae will bore into the stem where they can no longer be reached with chemical applications. In spring, the larvae feed within the vines, resulting in wilt of the plant and plant death. The second generation, which can be found in late summer/early fall, feed in the ripening fruit (Figure 2 and 3). You can find holes in the fruit and sawdust-looking frass indicating larval infestation. At this point in the season chemical applications are not going to rescue the crop. To avoid damage next year, be sure to destroy crop residues and rotate away from infested areas. A diligent scouting program in combination with pheromone traps, can help detect adults during their mating flights and target application before the larvae hatch and bore into vines and fruit. As always, consult the *Midwest Vegetable Production Guide* (ID-56) when selecting a pesticide and be sure to check the label. Best of luck!

Figure 1. Squash vine borer adult (Photo by: John Obermeyer)

Figure 2. A larvae of squash vine borer feeds on a mature pumpkin fruit (Photo by: John Obermeyer)

Figure 3. A larvae of squash vine borer inside a mature pumpkin fruit (Photo by: Dan Egel)

Farm to School Survey

Indiana State Department of Agriculture/Indiana Grown was recently awarded a grant in partnership with the Indiana State Department of Health, Indiana Dept of Education and Purdue Extension to create an all-inclusive local food sourcing guide for schools, called **Indiana Grown for Schools: School Food Service Resource Guide**. This two-year project will start with gathering information from Indiana farmers, producers and distributors then compiling it into a county by county guide that will be dispersed to all schools in the state of Indiana.

If you want to have your information included in this guide, please fill out this survey https://goo.gl/forms/GFyrZrlUjxA0xZhx2 The deadline to fill out the survey is October 31, 2018. The survey also has some helpful links about Indiana food safety requirements – which may help those who are still unsure as to whether or not they qualify to sell to schools in Indiana.

If you have any questions, please contact Heather Tallman at HTallman@isda.in.gov

Save the Date! Extension to Host PrimusGFS v3.0 Training

(Scott Monroe, jsmonroe@purdue.edu, (812) 886-0198)

Purdue Extension will be hosting a three-day PrimusGFS v3.0 Training at the Southwest Purdue Agricultural Center on December 5, 6, and 7. This training will provide basic information for those who anticipate using the PrimusGFS v3.0 system or will be transitioning from previous versions.

Each day will cover a specific portion of the new version 3.0 system. Day 1 will cover Food Safety Management Systems. Day 2 will cover GAPs. Day 3 will cover GMPs and HACCP. To register, go to www.SafeProduceIN.com and click on the "Training" option. For additional information, contact Scott Monroe at (812) 886-0198 or (765) 427-9910.

The 2019 North Central Region – Sustainable Agriculture Research & Education Grant Opportunities

Farmer Rancher Program

These grants are for farmers/ranchers to explore innovative sustainable agriculture solutions to production, marketing, labor, and other problems. There are three types of competitive grants: individual grants ($9,000 maximum), Team of Two grants for two farmers/ranchers from separate and distinct operations who are working together ($18,000 maximum), and Group grants for three or more farmers/ranchers from separate and distinct operations who are working together ($27,000 maximum). Projects may last up to 24 months. Interested applicants can find the call for proposals online as well as useful information for completing a proposal at https://www.northcentralsare.org/Grants/Our-Grant-Progra

ms/Farmer-Rancher-Grant-Program. Proposals are due on December 6, 2018.

Partnership Program

The Partnership Grant program funded by the North Central Region Sustainable Agriculture Research and Education (NCR-SARE) program is intended to foster cooperation between agriculture professionals and small groups of farmers and ranchers to catalyze on-farm research, demonstration, and education activities related to sustainable agriculture. Partnership Grants are funded for up to 24 months. Up to $40,000 total funding request per application is allowed. The deadline for Partnership Program proposals is October 24, 2018. Interested applicants can find the call for proposals online https://www.northcentralsare.org/Grants/Our-Grant-Programs/Partnership-Grant-Program

Sustainable farming funding opportunities, find out more, at free S.A.R.E. workshops

Purdue Extension and Indiana SARE will offer free workshops for those interested in applying for a SARE grant. The workshops will take place:

9/24/18: Purdue Extension -Hancock County, 802 Apple St., Greenfield, IN 46140, 6-8 pm

10/3/18: Purdue Extension -Monroe County, 3400 South Walnut St. Bloomington, IN 47401, 6-8 pm

10/9/18: Purdue Extension- Newton County, Government Center, 4117 S 240 W Suite 600, Morocco, IN 47963-0678, 2-4 pm

9/25/18: Online webinar/ conference call. Available by phone or computer- 10:00 am- *log in instruction will be sent via return e-mail. Recording to be made available to registrants.*

To register, please complete the registration form located here: http://bit.ly/INSAREGRANTS2019 or by calling (812) 349-2575. The registration deadline is three days prior to each specific workshop.

If you have questions about the grants and workshops, please contact Roy Ballard, Indiana SARE Coordinator by calling (317) 462-1113 or by e-mail at **rballard@purdue.edu**. Please contact Roy if you need a hard copy or an email version of the call for proposals. Revisions are made to calls for proposals each year, which means it is crucial to use the most recent call for proposals and application.

Upcoming Events

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

Produce Safety Alliance Grower Training

Date: September 28, 2018, 9:00 am – 5:00 pm (EST)

Location: Southwest Purdue Agriculture Center, 4369 N. Purdue Rd., Vincennes, IN

Purdue Extension will be hosting a Produce Safety Alliance (PSA) Grower Training on September 28th. The training will be held in the basement of the SWPAP building at the Southwest Purdue Agricultural Center, 4369 N. Purdue Rd., Vincennes, IN 47591.

This program meets the training requirements of the Food Safety Modernization Act Produce Safety Rule. Cost is $100 and covers course manual, completion certificate, and lunch. Register by going to www.SafeProduceIN.com and clicking on the “Get Trained” option. Participants must pre-register. Registration will be closed on 9/26/18.
For more information, contact Scott Monroe at (812) 886-0198.

Southwest Indiana Melon and Vegetable Growers’ Technical Meeting

Date: November 15, 2018 5:00 pm to 8:00 pm (EST)

Location: Southwest Purdue Ag Center (SWPAC), 4369 N. Purdue Road, Vincennes, IN

The meeting will start at 5:00 pm for board members to discuss topics for the March meeting, which will be held in French Lick, IN. Any member who wants to participate in the discussion is welcome. At 6:00 pm, dinner will be served. Following that, we will showcase variety trials conducted at SWPAC in 2018, which includes seedless watermelons, melons, seeded watermelons, and personal-sized watermelons. Any grower interested in becoming a member is invited to attend. Membership dues are $15 per year and can be paid at the meeting. To register please call (812) 886-0198. Registration is due by Nov. 7. Any questions, please contact Wenjing Guan guan40@purdue.edu

Illiana Vegetable Growers Symposium

Date: January 8, 2019 8:00 am – 4:00 pm Central Time

Location: Teibel's restaurant in Schererville, IN.

This symposium, sponsored by Purdue Extension and University of Illinois Cooperative Extension Service, offers commercial vegetable growers and market farmers opportunities to learn more about pest management, production practices, variety selection, and marketing; visit with vendors; and network with other growers.

Information about registration and more details about the program content will be available online in late November at http://tinyurl.com/ivgs2019. For more information regarding the program, contact Nikky Witkowski at (219) 755-3240, or at nikky@purdue.edu.

Midwest Mechanical Weed Control Field Day

Date: Sept. 26, 9:30 am -4:00 pm Central Time

Location: PrairiErth Farm, 2073 2000 Ave, Atlanta, IL 61723

Registration is $20, register online at www.thelandconnection.org/farmers

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