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Crop Conditions

Blackberries are in bloom to petal fall, Strawberry harvest will begin soon, grapes are at pre-bloom.



Peach: Fruit over 1" diameter



Apple: fruit drop taking place. Fruit about 20 mm



Black raspberry: fruit set



Strawberry: harvest approaching



Grape: fruit set



Thornless blackberry: fruit development



Sweet cherry: fruit about 12 mm diameter

Apple Fruit Drop

The level of fruit drop is almost complete across the state and in some cases we likely have some hand thinning ahead of us. Fruit is generally 20 mm or above which means it's too late for most chemical thinners. If spurs in your trees look like those in the apple photo in Crop Conditions, then the smaller fruit is likely to drop and this is a pretty good situation. On the other hand, if spurs look like Figure 1, then it's hard to say how many of these fruit are likely to drop, except the answer is probably "not enough". The picture will be much clearer in a week or two, but in the meantime it would be a good idea to line up some labor for hand thinning.



Figure 1

Important Pre-bloom Sprays for Grapes

Grapes in the southern half of the state will soon be reaching the critical pre-bloom stage, which is a key time to control important diseases such as black rot, downy mildew, and powdery mildew. The three or four sprays made from immediate pre-bloom to 4 weeks post

bloom are critical for controlling fruit infections. Growers should pay extra attention to coverage, especially in the fruit zone, and use the best fungicides available. The Midwest Fruit Pest Management Guide lists recommended products. A protectant (FRAC M) such as mancozeb or captan plus one of the sterol inhibitors (FRAC 3) such as Bayleton, Mettle, Procure, Rally or Tebuzol is the recommended fungicide treatment. Rotating with a different mode of action, such the strobilurins (FRAC 11) Abound, Sovran, or Flint is a good option as well. The combination products such as Pristine, Inspire Super, Revus Top, Quadris Top and Adamant are also effective for broad-spectrum disease control. Be sure to read the warnings about phytotoxicity with fungicides containing difenoconazole. These next few sprays are critical to producing sound, clean fruit. Pay attention to detail now to assure excellent fruit quality at harvest. This is the most important time of the year for disease control. Once we get 4 to 5 weeks past fruit set, disease pressure drops significantly.



Grape cluster at immediate pre-bloom stage



Grape cluster at early bloom

Tipping bramble primocanes

Tipping of primocanes (new vegetative canes from the ground) is an important management practice for summer bearing blackberries and black raspberries. Tipping the new primocanes causes lateral branching and most of the fruit production next year will be from buds on those lateral branches rather than buds off the main cane. Tipping also helps increase the diameter and strengthen the main cane. Height to tip is relative to vigor. Vigorous thornless blackberries can be tipped at 40-48 inches for best results. Black raspberries should be tipped no higher than 30-36 inches to help develop a stout cane capable of supporting itself. Ideally primocanes should be tipped as they reach the appropriate height with minimal tissue removed. Just pinch or break the tip off. However, if some canes have escaped notice and are taller than desired, it's still preferable to tip at the appropriate height, even if that means removing a foot or more of cane. Tipping red raspberries and all primocane fruiting brambles is not recommended.



Primocane before tipping



Tipped primocane



Development of lateral branches below tip



Well branche primocane

Phytophthora of Tree Fruit

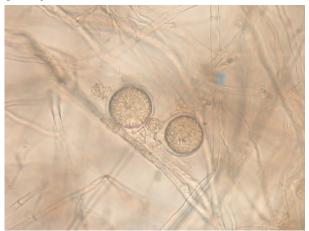


Fig.1a Phytophthora micrograph, zoosporangia Photos by Janna Beckerman

Wet weather continues to be a problem, not just for foliar disease, but root and crown rot, as well. Phytophthora root and crown rot is observed in wet spots: low-lying areas of orchards with heavy, poorly-drained soils. These pathogens can infect all fruit producing plants. Occurrence of this disease is sporadic and tied to wet weather, but unfortunately, is likely to occur wherever susceptible rootstock is planted on a poorly drained site. The disease is caused by members of the genus *Phytophthora*, a type of 'water mold' and not a 'true fungus' (Fig. 1). *Phytophthora* species prefer

cool, wet weather, like what we have been experiencing now. Phytophthoras can infect the roots, the crown and the graft union. Of these, collar rot is more lethal and can cause rapid tree death, especially if it is a small tree. In apples, Phytophthora crown rot is commonly observed on 3- to 8-year-old trees grown M.7, MM 104, MM.106, and even MM.111 rootstocks; B.9 is considered resistant, but do not equate resistance with immunity! Excess nitrogen can make resistant rootstocks susceptible, and susceptible rootstocks really susceptible.



Fig.1b Phytophthora micrographs, oospore Photos by Janna Beckerman

Phytophthora Symptoms



Unthrifty growth of crown rot infected tree Photo by Janna Beckerman

Diagnosing Phytophthora crown rot is difficult. First examine the crown and rule out any type of mechanical damage, including rodent damage. Early symptoms of root and crown rot include delayed bud break, small leaves (often with leaf discoloration), and twig dieback. Bark discoloration, unthrifty growth, and premature leaf drop may occur later in the season (Fig. 2). Adding more nitrogen to trees symptomatic trees will actually worsen the problem!

Later symptoms, particularly for collar rot, often resemble rootstock blight, caused by the fire blight bacterium. Water-soaked, red-brown blight often extends throughout the susceptible tissue.

Disease Management

Although not always possible, avoid planting in lowlying, flood prone areas. Control weeds around the trunk of apple trees, as many serve as alternate hosts for the crown rot fungus(especially nightshades). Reduce nitrogen application on young trees, and trees with excessive growth as they are more susceptible to crown rot.

As there are different species of *Phytophthora* (like *P. cambivora*, *P. cryptogea*, and *P. cactorum*, to name a few!) resistance isn't as straightforward as it might appear (See reference at end of this article). Bud. 9 and Emla provide the most reliable resistance in published studies.

To slow lesion growth (canker) on partially girdled trees, expose the crown, scrape away infected bark and air dry. Remember to replace earth around trunks before winter. Right now, Aliette and phosphorous acid derivatives like Alude or Rampart can be sprayed on the foliage of non-bearing trees at 30 to 60 day intervals beginning at tight cluster. For infected trees, in the fall, Ridomil can be applied as a drench around the trunk (best for preventing crown and collar rot) or as a banded treatment within the drip line (best for root rot). A Ridomil drench can be applied in the early spring before growth begins, or in the fall after harvest but before the ground freezes. Ridomil and Aliette rates can be found in the Midwest Fruit Pest Management Spray Guide.

Stone fruit are susceptible to Phytophthora, as well. For new plantings, make the first application 2 weeks after planting. Additional applications should be made at 2–3 month intervals or to coincide with periods most

favorable for root, crown, or collar rot development (like now). For established plantings, the application should be made in spring before the plants start growth. Additional applications should be made at 2–3 month intervals or to coincide with periods most favorable for root, crown, or collar rot development(now).

Note: Do not dip roots of trees in, or spray bare roots with, solutions containing Ridomil. Do not apply to stressed trees.

Phytophthoras are a serious problem with small fruit, as well

References:

Brown, T. and Mircetich, SM. 1993. Relative resistance of thirteen apple rootstocks to three species of *Phytophthora*. Phytopathology 83:744-749.

http://apsnet.org/publications/phytopathology/backissues/Documents/1993Articles/Phyto83n07_744.PDF

Spring frost damage in grapes

Growers across the state experienced some damage from frost and freeze events on May 7, 8, and 9. Damage is scattered across the state and ranges from minor to severe. We did not have damage in the Lafayette area, but areas of northern and northeastern Indiana were hit. Surprisingly some damage occurred in south central and east central regions as well. It was an unusual weather situation where dew point temperatures were very low. That means the the air was very dry, which allowed the temperatures to drop more than usual. Temperatures ranged from 31° to 35°F across the state at the Purdue Ag Centers. But as in all radiative events, site elevation was critical. Lower elevations saw the coldest temperatures and the most damage. Some areas had light winds that helped reduce the temperature inversions that normally occur.

There is little that can be done at this point. If the entire primary shoot was killed, secondary buds will break and grow. Depending on variety, there can be a partial or nearly full crop from secondary shoots. However, in this event, many shoots are only partially killed. Usually several of the youngest leaves and the shoot tip was damaged. Flower clusters may or may not have been killed. In these situations, lateral shoots will usually grow from the leaf axils at the base of the primary shoot, rather than the secondary shoot growing. This can result in low yields and an undesirable situation next year

where most canes are branched and small in diameter, poor quality for fruiting spurs.

We had a very similar frost event in 2010 so I did a study on six different varieties to evaluate management strategies. I looked at different strategies for dealing with the partially killed primary shoots, from tipping the primary shoot, removing the shoot entirely, or removing the spur entirely. On varieties where flower clusters were not damaged, the highest yields occurred where we either tipped the damaged shoots or did nothing at all. But when the flower clusters were damaged and there was little potential for a crop, we found that entirely removing the spurs resulted in the best situation the following year. That treatment lead to an abundance of healthy canes to select from. Basically it allowed us to "renew" the cordon without removing the cordon. My conclusion was that growers should consider complete removal of frost damaged shoots, and spurs on cordons that need renovation, if practical, to insure availability of high quality fruiting spurs the following season. This frost event gives growers the opportunity to clean up old cordons and encourage new spur development. What's the saying? When life gives you lemons, make lemonade!



Marquette with dead shoot tip



Shoots tipped



Shoots cut back to basal nodes



Spurs removed



New spur development when spurs removed



Poor quality canes when shoots were tipped

Indiana Fruit and Vegetable Field Tour

We are pleased to announce that the fruit and vegetable growers will be joining together for a summer field tour being hosted by Tuttle Orchards in Greenfield, IN on Wednesday, June 28. Topics to be covered include fruit production, vegetable production, farm marketing, and agritourism. There's something here of interest to everyone so I hope you will plan on joining us. Although we encourage membership in grower organizations such as Indiana Horticultural Society (IHS), Indiana Vegetable Growers Association (IVGA) and Indiana Farm Marketers Association (IFMA), membership is not required to attend the field day and all those interested are welcome to attend.



Tuttle Orchards

Tuttle Orchards was founded by Roy Tuttle who was born on the farm in 1893. The farm has been operated over the years by Virginia & Raymond Roney (2nd generation), by their two sons Mike and Tom Roney (3rd generation), and Thomas & Ruth Ann Roney (4th generation). Currently, Mike & Helen, Thomas, and Ruth Ann are managing the daily operations of the orchard along with a staff of approx. 100 in peak season.

Tuttles is a diversified operation that includes apple production (8,000 trees on 45 acres), cider production (23,000 gallons annually), vegetable production (30+crops on 30 acres), agritourism (corn maze, kids' area), field trips & tours (approx. 15,000 annual tour attendees), farm store (open year round), CSA (approx. 100 summer/50 winter members), retail greenhouses, high tunnels (3 houses in tomatoes/winter greens), events. About 95% of the orchard income is retail sales. Very limited wholesale to other growers, cideries, farm markets, and local stores. Tuttle's newest venture is an onsite café and sweet shop that will be open year round. More information on the farm is available at their website:

http://www.indianapolisorchard.com

This is a the 5th time Tuttle Orchards has hosted the summer meeting of the Hort Society, and the first time without Tom Roney (Tom passed away recently). We'll have a short tribute to Tom and other fruit and vegetable industry leaders who have passed away recently.

We are anticipating a large crowd for this field day, so we plan to split into four groups. After about an hour at each stop we'll rotate so everyone will have the opportunity to see everything.

Fruit Production: tour of apple plantings including

- new orchards planted in 2014.
- Vegetable Production: tour of vegetable crop plantings, high tunnels, and chemical storage facilities.
- Produce Packing tour: tour of apple grader, cold storage, cider production, vegetable washing, CSA packing, and food safety compliance areas.
- Retail/Agritourism tour: overview of farm store, food service on the farm, agritourism, staffing, POS system.

Wednesday June 28, 2017

Tuttle Orchards

5717 North 300 West, Greenfield, IN

9:00 am Registration at the farm

9:30 am Welcome, introductions, comments from

Purdue Fruit Extension Team

9:45 am Organize into 4 groups

10:00 am Session 111:00 am Session 2

12:00 pm Buffet lunch at the farm

1:00 pm Session 3 2:00 pm Session 4

3:15 pm Closing comments / discussion

4:00 pm Adjourn

Registration and meals

Registration is on-site starting at 9:00 am on June 28. There is no advance registration. Registration fee is \$5.00 per person (includes drinks throughout the day) and the buffet lunch at the farm is \$10 per person.

Directions

Tuttle Orchard, 5717 North 300 West, Greenfield, IN



Specific location



General location

Sponsored by:







Upcoming Events

Indiana Horticultural Society Field Day June 28, 2017

Tuttle Orchard

Greenfield, IN

More details to come but mark the date on your calendar and plan to attend

Indiana Winery and Vineyard Association Summer Meeting and Vineyard Tour

July 18-19, 2017

Brown County Inn, Nashville IN

More details to come, but mark the date on your calendar and plan to attend

Indiana Horticultural Congress

February 13-15, 2018

Indianapolis Marriott East

Indianapolis, IN

For further information contact Lori Jolly-Brown @ljollybr@purdue.edu or visit www.inhortcongress.org

for more details.

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