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Crop Conditions

Apple harvest is winding down with late varieties such as GoldRush and Pink Lady being harvested. Quality has continued to be good, although some stem-end cracking has shown up on some cultivars. We have continued to run about a week early throughout the season.

Late Season Leaf Diseases of Grapes

Powdery and downy mildew can develop on grapes in the late season, post harvest. It is important to keep vines as healthy as possible going into winter. With the long fall we are experiencing, downy and powdery mildew are both becoming prevalent in many vineyards. Growers should consider a late season application of fungicides to keep these diseases under control to protect the foliage and assure adequate cold acclimation. Downy can be controlled with phosphorous acid products, mancozeb, or captan. However, none of those

fungicides will control powdery mildew. So a tank mix including one of the above with a sterol inhibitor such as Rally or Tebuzol would be a good approach.



Powdery mildew on grape leaf



Downy mildew (and powdery)

Crown Gall of Grape Vines

Crown gall is a common disease of many perennial plants. It causes fleshy tumors to develop on the plant and usually results in plant death. Grapes are among the most sensitive fruit crop to crown gall.

The disease is caused by the bacterium *Agrobacterium tumefaciens*. This is the same bacterium that is used to genetically modify important crops. There are at least three biovars of *A. tumefaciens* that cause crown gall. The particular strain that infects grapes is biovar 3. This strain was renamed *Agrobacterium vitis* since it only infects grape vines and close relatives.

The life cycle of *Agrobacterium* is interesting. The bacterial cells infect the plant through wounds. These can be caused by insects, mechanical damage, or in the case of grape vines, cold injury. Once the tissue is damaged, the bacterial cells can attach to the plant cells. However, rather than causing a canker or rot by replicating inside the plant tissue, the bacteria release a tumor-inducing plasmid, or circular piece of DNA, into the plant cell. It is this TI plasmid that causes the plant to react. The DNA from the plasmid gets inserted into the plant genome and infected cells begin to divide and proliferate rapidly, producing callous tissue that forms the galls that are visible on the plant surface. The rapid proliferation of callous disrupts the vascular tissue at the site of the gall and causes a reduction in water and nutrient movement in the plant. Infected plants typically die from a type of induced water and nutrient stress.

Starting with clean plant material is the best method of avoiding crown gall. Planting on well drained soils is also important. Once infected,

plants cannot be cured. However, bringing up new shoots from below the gall to establish new trunks is one method of managing crown gall disease. Often the plants must be completely replaced. Economic losses to crown gall can be significant when cold tender cultivars are grown in regions where cold injury is likely.



Crown gall on grape trunk

Will Low Tunnels Provide New Opportunities for Strawberry Production in Indiana?

Strawberry production in Indiana primarily utilizes the matted row system in which bare root strawberry plants are set in the spring, fruit is first harvested in the second year and plants are maintained for a few seasons. Strawberry production using an annual plasticulture system is popular in the southern states, where strawberries are planted in the fall and harvested in the next spring. In the annual plasticulture system, strawberries have a longer harvest period and produce fruit with better quality. Growing strawberries as an annual crop is a challenge in Indiana. This is because our short fall makes it difficult for plants to reach the desirable size that leads to a sufficient yield in

the following spring. This situation can be changed with the use of high tunnels that provide additional heat units and moderate frost protection. In a trial conducted in a 30 x96 high tunnel at Southwest Purdue Ag Center, strawberries were planted in Sep. 2015. The majority of strawberries were harvested in April and May 2016. A total yield of 1,295 lbs of strawberries were harvested from the 0.07 acre area, which is very promising. However, we realize that space in high tunnel is extremely valuable. We have to consider high tunnel returns on a per square foot, and a per month basis. In this regard, strawberries that take eight months from planting to harvesting may not be the top crop to achieve the best returns. If a grower only has one or two 4-season high tunnels, strawberry is probably not



Strawberry
production



Strawberry
production

he top choice of crops.

With these considerations in mind, we initiated a new project to evaluate another system to grow strawberries, the retractable low tunnel system. This system requires an initial investment about one third the cost of a high tunnel. We planted strawberries on Sep. 13 of this year. The low tunnel was set up on Oct. 6. Eight varieties are being grown side-by-side under low tunnels and the open field. We are going to compare effects

of the heat accumulation under low tunnels with open-field on strawberry growth and yield. We will also compare effects of frost protection of traditional straw mulch with fabric row covers in the winter. Updates about the trials will be published on Facts for Fancy Fruit and Vegetable Crops Hotline Newsletters over the next few months. Please follow us to learn more about using the low-tunnel system for growing strawberries in Indiana.

Rot Redux

Summer rots continue to rear their ugly heads (Fig. 1). This year, we are even seeing them on late season apples like Evercrisp (Fig 2) and GoldRush.

On the plus side, we are seeing some level of control with all fungicides in our trials (data will be presented at the Indiana Hort Congress); unfortunately, on highly susceptible varieties like Honeycrisp, we need to do more research to figure out how to better control these pathogens. Treatments that provided reasonable control in Golden Delicious suffered 10 times more infections on Honeycrisp. Future research will examine the role of timing and fungicide choice on infection.

As always, please contact me if you are seeing new problems, increasing severity of problems, or you can surprise me and tell me what a great year you had! As you can see, Jojen loved the harvest, and has decided like most children, that Honeycrisp and Evercrisp are his favorite apples, followed by Golden Delicious (Fig. 3).



Fig 1 White rot
(left) and bitter

rot (right)



Fig 3 Jojen gives his approval but really wanted Honeycrisp, instead



Fig 2 Evercrisp,
sack of apple
sauce,
compliments of
white rot

Upcoming Events

Indiana Horticultural Congress

February 13-15, 2018

Indianapolis Marriott East Indianapolis, IN

Contact Lori Jolly-Brown

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Visit www.inhortcongress.org for more details

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