Impacts of High Spring Temperatures on Fruit Crop Management

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The record breaking temperatures this March have brought all of our fruit crops into full swing about one month earlier than normal. While there were a few management techniques to slow things down for a few days, there is nothing we can do to keep those buds from breaking with the sustained temperatures. All of our fruit crops have broken bud and as they continue to develop are increasingly susceptible to frost damage. In most years, we are not out of the danger of frost until Mid-May, (recall 2010's mother day frost!) so when making management decisions consider the high possibility of having a reduced crop load this year.

Nutrient Management.

Typically, we apply nitrogen as the growth begins in the spring. It is highly advisable this year to split your nitrogen application. In the next few weeks, apply 35-50% of your annual N application and then wait to see what potential frost damage we have. If the crop is low due to frost/freeze damage the total amount of N applied to the crop must be adjusted.

There is a lot of discussion about the use of foliar nutrient applications to improve the cold tolerance of fruit crops. There is no conclusive work that has shown any reduction in cold damage. There have been some suggestions that a foliar urea spray on fruit trees may improve cold tolerance, but there is no consensus on what the physiological mechanism might be or a recommendation on concentration or timing. There is also a lot of discussion among grape growers about the use of potassium sprays prior to a frost to improve tolerance of buds to cold damage, however there is no research indicating that this will improve cold tolerance of buds.

Pest Management. Insect life cycles are controlled by growing degree days and as we are way ahead in growing degree days this year, the insects are also starting to emerge much earlier than normal. We are advising growers that they need to be in the fields scouting for insects. Growers are not typically thinking about scouting in March, so it is easily missed. Scouting is essential as it is expected that insects and disease will be appearing earlier than normal.

Disease Considerations

Because the recent heat wave is unprecedented, we don't have experience to draw on, much less research-based information, to guide us in managing fruit crops this spring. So consider the following comments an exercise in speculation. With that, there are three main concerns regarding diseases. First, you have to manage diseases based on plant phenology, even if the phenological stages are a month or more ahead of "normal." Second, if you had not completed pruning and other sanitation efforts prior to the onset of warm weather, you might be at risk for spreading pathogens, especially if you carry out these activities in wet conditions. Third, a return of freezing temperatures could predispose plants to certain diseases. These concerns apply more to some fruit crops than others, as detailed below.

1. **Managing diseases according to plant phenology.** Apple growers might wonder if this early spring has caught the apple scab fungus off guard. Could it still be dormant while the trees are at green tip? Not a chance! The scab fungus has been ready to go with mature ascospores since about late February. Likewise, the fire blight pathogen comes to life as soon as the trees do. Unless you are beyond ½ inch green tissue, it is still safe to apply a copper-based fungicide. This will control scab and might help slow down fire blight. If green tissue is unprotected, and there is rain, you are at risk for scab. If the weather cools down, it will take several weeks for symptoms to appear, but the scab fungus won't "die off" in infected leaves unless those leaves themselves are killed by frost. If we get cool/cold temperatures that essential halt growth, another spray in early April will be needed, since the residues will wear off with rain. Just keep in mind that a sudden return to warm weather could quickly push trees into bloom, and you don't want copper residues around at that time, since they can damage fruit.

   "Dormant" or "delayed-dormant" sprays of liquid lime-sulfur or copper-based fungicides are recommended on grapes, raspberries, blueberries, as well as other bush- and cane-berry plants, to knock back various canker and twig blight pathogens that overwinter in bark crevices and bud scales. This reduces disease pressure considerably, making it much easier to manage these diseases during the growing season. Once green tissue has emerged, however, there is a risk of phytotoxicity. See UW-Extension bulletin A3899, Midwest Small Fruit and Grape Spray Guide, for more information.

2. **Pruning and the risk of disease.** I know some apple and stone fruit growers who never finish pruning "on time," and so this year is nothing new to them in terms of pruning. But it is a risky practice, especially for spreading the bacteria that cause fire blight (apple and pear) and bacterial canker (stone fruits). Likewise, many fungal canker pathogens are active in the spring and can infect through pruning wounds. If you are still pruning, try to do it in dry weather and better yet, when rain is not forecast for at least a few days. Disinfect tools by immersing in 10% household bleach for 30 seconds between cuts and avoid cutting directly into oozy, weepy branches.

3. **Frost-damaged tissue and disease.** It varies among crops, but frost damage to leaves does not usually lead to disease. Notable exceptions are that frost-injured blueberry shoots are more susceptible to the mummyberry fungus, and frosted strawberry leaves are prone to Botrytis, which then later can rot fruit. Most fruit growers' greatest concern about frost is when it happens during bloom. In addition to crop loss, this can also lead to disease problems. Sweet cherry is especially susceptible to bacterial canker, and frost during bloom allows the pathogen to flourish. Unfortunately, copper sprays are generally not effective, even if applied prior to the frost event. Infection of tart cherry by the European brown rot fungus during bloom can kill flowers and also lead to branch cankers, a bad situation made worse by frost. Frost injured apple and pear blossoms are especially prone to fire blight.