Disease and Plant Health Concerns on Cold-Injured Blueberries in Florida

Summary: Botrytis poses an increased risk on damaged buds, bloom, and fruit. Consider management inputs. Stem blight will likely be severe post harvest. Root rot not likely an immediate concern, despite extra water.

Growers employ all available options to protect their blueberry crops from extended sub-freezing temperatures. Damage is difficult to assess, and it takes days or weeks to see the full effect on harvestable fruit and plant survival. This tremendous and unavoidable plant stress can increase the chances of some plant diseases, adding additional insult to injury. This is a brief summary of potential disease impacts that can occur post freeze-protection, and some mitigating options to consider.

The most immediate threat to the crop that remains is botrytis blossom blight and gray mold caused by *Botrytis cinerea*. The pathogen is not active during the sub-freezing periods but has a lower-than-usual temperature optimum for infection in the 60 to 70 F range. Damaged blueberry buds and floral tissues (Image 1) are more susceptible to infection after low temperature injury. Gray felty sporulation can often be seen growing on attached, brown petals (corollas) in days following freeze damage (Image 2). These spores can multiply and spread to other flower clusters and eventually onto green fruit. Infections lay dormant until berries begin to ripen then cause gray mold in the field, but also in post-harvest storage.

Fungicides may help prevent widespread and severe blossom blight. Where floral buds and green fruit survived, consider fungicide applications to target blossom blight that include captan. Captan helps manage disease when used alone or as a tank mix partner for products with resistance potential. The fungicide fenhexamid (Elevate) and the pre-mix with captan (CaptEvate) are excellent choices to consider where freeze protection was required. Target applications as soon after the threat of freeze expires as possible and particularly when wet humid weather in the 60's F is predicted. These apps would precede and be in addition to most grower's normal preharvest spray routine, which should be resumed after crop loss assessments can be made. It's likely that we are also going to see increased anthracnose ripe rot pressure as well. Switch and Omega are two good products to include in the rotation to help prevent ripe rot and other fruit rots. More info on anthracnose management: https://edis.ifas.ufl.edu/publication/PP337

Stem blight poses another disease threat post freeze injury. Increases in stem blight have been noted throughout the years following cold injury, partially due to cane breakage

caused by heavy ice loads building on plants during freeze protection (Image 3). Similar to hurricane damage, plants that have fallen over due to ice load and/or wind should be repositioned and supported upright as soon as possible (Image 4). If roots are exposed, they should be covered with soil/bark to prevent desiccation and additional stress.

Damaged buds and canes can be colonized by the stem blight pathogens through spring and summer. Infections can move into the crowns of some plants, or access the crown directly through breakage, killing them later in the year or even in the following seasons. Pruning out damaged canes has been shown to reduce stem blight severity in research conducted in North Carolina. Consider applying a fungicide immediately following pruning events to help protect pruning wounds from becoming infected. This would apply to hedging after crop loss as well as normal post-harvest timings (see https://edis.ifas.ufl.edu/publication/PP347 for more info). When plants succumb to stem blight, remove as much of the dead plant as possible from the field prior to replanting.

Also, some thoughts on root rot diseases: for growers that have applied Ridomil, Orondis or another mefenoxam fungicide in the last few weeks (typically recommended prior to bloom), roots should have been protected from the limited phytophthora infection threat during the periods of extended soil saturation associated with freeze protection. Neither Phytophthora nor Ralstonia are likely to infect new plants when temperatures are below 50F, but plants already suffering from root rot may be less resilient to the stresses and damage they have just sustained. I would expect plant losses to be more severe in parts of the field where these diseases were known to be active. If mefenoxam had not been used in the past few weeks, an application could still be made as a banded app to beds or through drip irrigation. Check the labels of products prior to use for PHI and other important instructions. The Ridomil Gold SL label that I have, has a 0 day pre harvest interval. Phyte drenches are probably not needed during this time for bacterial root rot (Ralstonia). As far as foliar sprays of phytes go, plants need healthy leaves and active growth to absorb these products for effective phytophthora root rot management, where phyte apps were planned, and where healthy leaves remain (evergreen production) these apps can still be made, and take the usual precautions to prevent further stress.

Significant acreages of blueberries have suffered total or near total crop losses in certain parts of Florida due to the extreme cold. Farms with varieties that had developed past the physiological stage of tight pink bloom (Flower bud stage 4 in https://edis.ifas.ufl.edu/publication/HS380) with only small amounts of less developed bloom remaining after the freeze event should consider taking action that includes righting lodged plants where needed and hedging (remove by pruning) freeze damaged and broken canes of affected plants. This should be done to help preserve the potential future

production of these plants not killed outright by the inclement weather. Some signs of crop loss are immediate and obvious involving blighted tissues and falling fruit. Damaged fruit may also remain on the bush but can show internal discoloration. Much of this damaged fruit will not ripen, or may ripen early and suffer severe fruit quality issues. Growers are encouraged to carefully assess and document damage across the farm prior to taking action.

Growers may be tempted to wait and see if some of the small amount of remaining fruit could be salvaged from this crop cycle. However, for plants that incurred severe freeze injury, this could be a mistake that could result in unintended consequences of increased disease severity and additional plant losses. Once these blooms and fruit have been killed and only a small amount of less developed bloom remains, focus should be on preserving plant health for next season's potential production. Any small amount of fruit that is allowed to remain and develop will put additional carbohydrate stress on the plants and would probably have been of poor quality. Also, in this situation from an economic perspective, consider if berries will be produced in sufficient quantity or quality to offset additional input costs required to protect any remaining crop from fruit rot disease through harvest.

Growers deciding if and when to hedge a crop should be aware that pruning too early may result in the development of new floral buds which would not be economically viable, may delay the plant's recovery from the freeze damage, and could require a second pruning to remove unwanted reproductive growth. Consider consulting with UF IFAS Extension and Horticultural Sciences faculty for additional input in this regard.

References:

https://content.ces.ncsu.edu/blueberry-freeze-damage-and-protection-measures

Phil Brannen, UGA blog article on response to freeze injury in blueberry from 2017 with stem blight reference. https://site.caes.uga.edu/blueberry/2017/03/blueberry-cold-damage-information-and-action-items/

Infection of Cold-Injured Blueberry Stems by Botryosphaeria dothidea. W. O. Cline, Department of Plant Pathology, North Carolina State University, Raleigh 27695-7616. Plant Dis. 78:1010. Accepted for publication 20 June 1994. Copyright 1994 The American Phytopathological Society. DOI: 10.1094/PD-78-1010A.