Irrigation For Frost Protection of Strawberries

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Frost Protection 101

- Frost injury can cause significant damage to a strawberry crop as the plants often bloom before the last frost free date.
- Strawberry fields are colder at ground level than what the weather forecast
- Frost can kill the blossoms and the unopened flower buds.

Why Frost Kills

- Frost occurs when temps around the plant drops below 0 degrees.
- Plant sap is not pure water so strawberries have a lower freezing point than 0 degrees.
- When the temps drop below the critical level, crystals form and damage the cells.

Symptoms of Frost Injury

- Frost usually kills or damages the biggest and earliest blooms.
- Blossoms become black rather than yellow when killed by frost.
- Edges or tips of leaves become black and then dry out.
- If killed after pollination, berries are seedy and misshapen.

Damaged Blossoms

Frost Damage

Implications on Yield

- Since the king blooms are the first blooms and the first to open, they produce the biggest berries.
- They are the most sensitive to frost and determine the early berry yield.
- If 5-7% of these blooms are lost, the total crop will be reduced by 10-15%.

Why does Irrigation Work

- When water cools or freezes, the temperature around the water rises as latent heat is released.
- The water changing to ice on the surface of the plant adds heat to the plant.
- Conversely, when the ice melts, the heat moves from the plant to the water.

Why does Irrigation Work

- As long as the thin layer of water is present on the bloom or on the ice, the blossom is protected.
- It is not the layer of ice that provided the protection…it's the water constantly freezing that keeps the temperature above the critical point!

Irrigation Tips

- Literature talks about the dew point temperature and wet bulb temperature.
- Growers typically irrigate when frost is predicted.
- Determine the rate of temperature drop once the sun goes down.
- Need to know the difference between your home thermometer and field thermometer.

Irrigation Tips

- Difference in temperature depending on elevation.
- Should have irrigation up and running by the time the temperature hits 0.5 degrees.
- Typical system is solid set pipes and sprinklers 80’ x 80’.
- Use 5/32” nozzles.
- Not going to get the entire field covered by irrigation.

Irrigation Tips

- Growers determine the rate of drop in temperature.
- Monitor the temperature every half hour, then you can “guessimate” the time of freeze up.
- Stop irrigating when the ice begins to melt. Normally when sun warms up the plant.

Negative Side Effects

- Increase potential for diseases such as angular leaf spot, fruit rot and root rots.
- Makes field wet and spraying difficult.