



Adapting growing strategy with high-pressure misting

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Nowadays beyond MJ-Tech



Cool down the greenhouse

- Crop
- Ventilation
- Screening
- Coating
- Roof sprinklers
- High pressure fogging





Adiabatic cooling



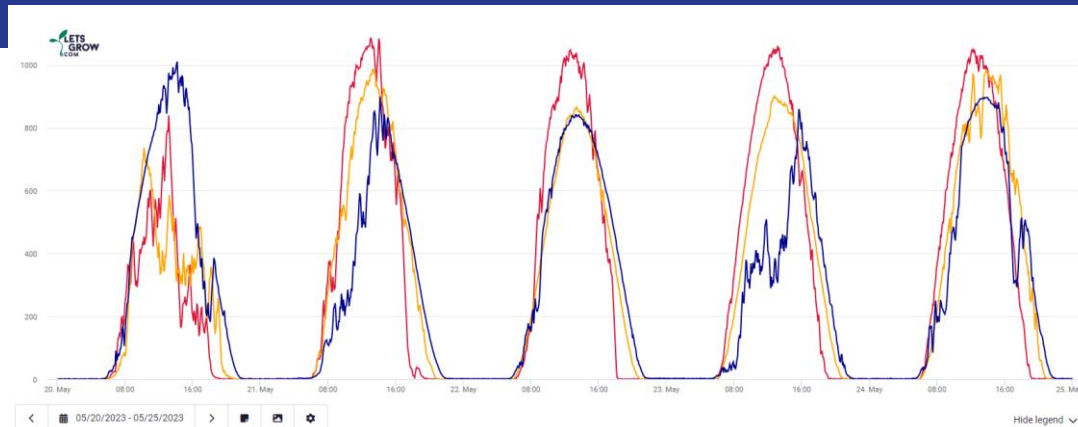
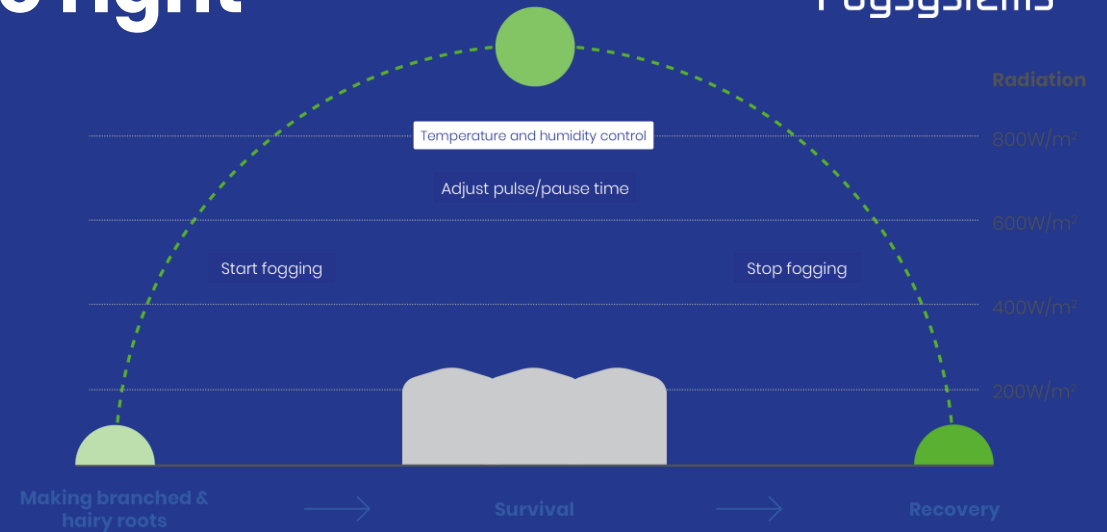
Common mistakes!

- Pulse length
- Interval length
- Moment of misting -> too early = tip burn
- Changing weather conditions
- *Start on temperature*
- *Starting on RH/HD/VPD*



Using high pressure fogging at the right moment of the day/year

- Start / stop fogging based on radiation levels
 - Based on greenhouse setup, season and location
 - Measure PAR levels in greenhouse
- Single screen / no screen
- Plant type / plant date
- Use fogging after planting fresh everbearers in warm & dry conditions
- Steer on pulse and pause lengths during different growing seasons/cycles



CO₂: the invisible gold

Porthos in the making: New construction steps setting the stage for first Dutch large-scale North Sea carbon transport and storage project

- CO₂ prices are increasing
- Photosynthesis process
- CO₂ Loss at various ventilation Levels
 - Low ventilation: 10% open, CO₂ loss is relatively low -> 800 ppm
 - Moderate ventilation: 20-30% open, more air exchange -> 600-800 ppm
 - High ventilation: >50% open, CO₂ loss is at its peak -> atmospheric levels 400 ppm
- Increasing CO₂ levels from 400ppm to 800ppm can enhance the photosynthesis rate by 30%-50% in strawberries, providing optimal light and temperature conditions



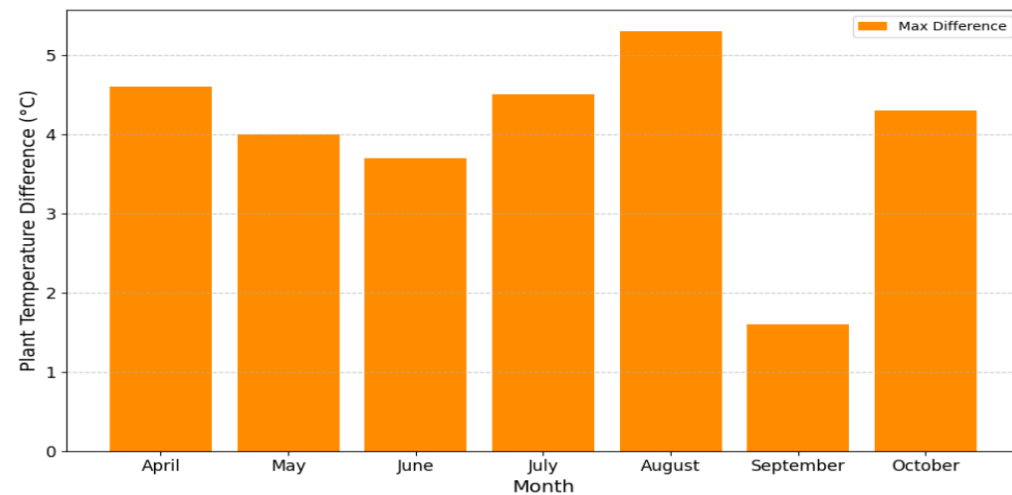
Misting trial / CO₂ control

- Side by side trial
- High-tech greenhouse
- 500 cc / hour / m²
- Goals of the trial
 - Optimizing misting settings
 - Reducing the plant temperature
 - Less ventilation to keep the CO₂ in the greenhouse for photosynthesis
- Use climate computer to make the right decision between venting or fogging
- Connection with LetsGrow

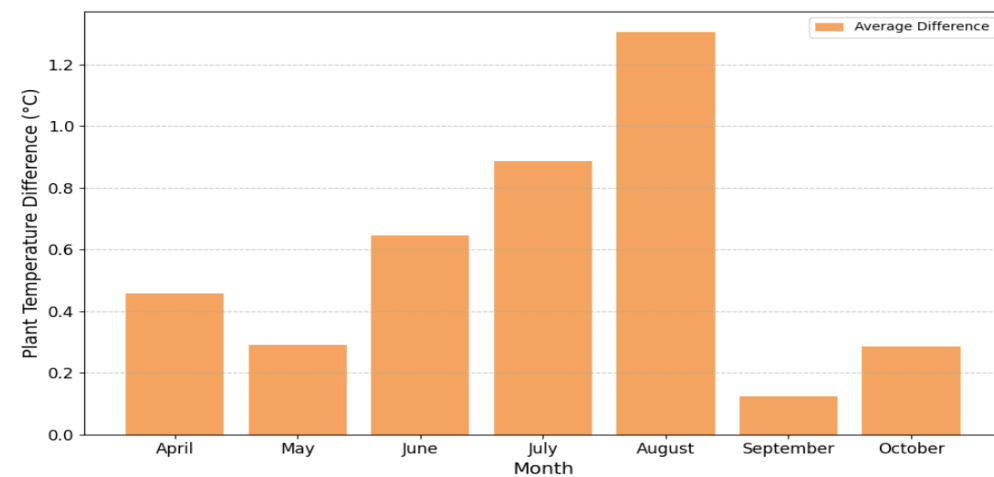


Reduction in plant temperature

- IR infrared camera
- Reduction in plant temperature per month
- Plant able to cool down due to climate circumstances



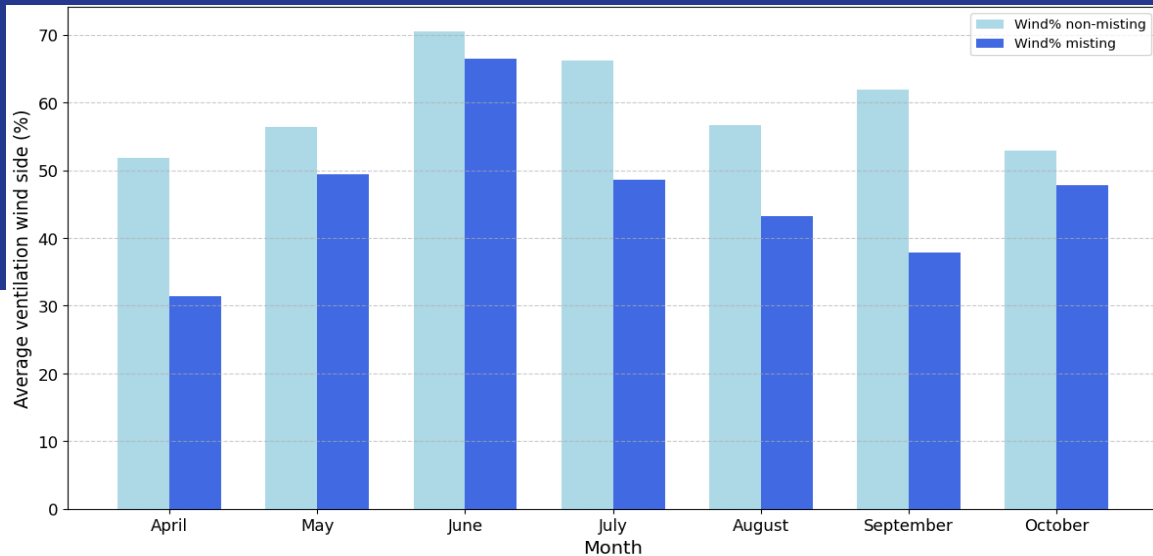
Maximum plant temperature difference (°C)



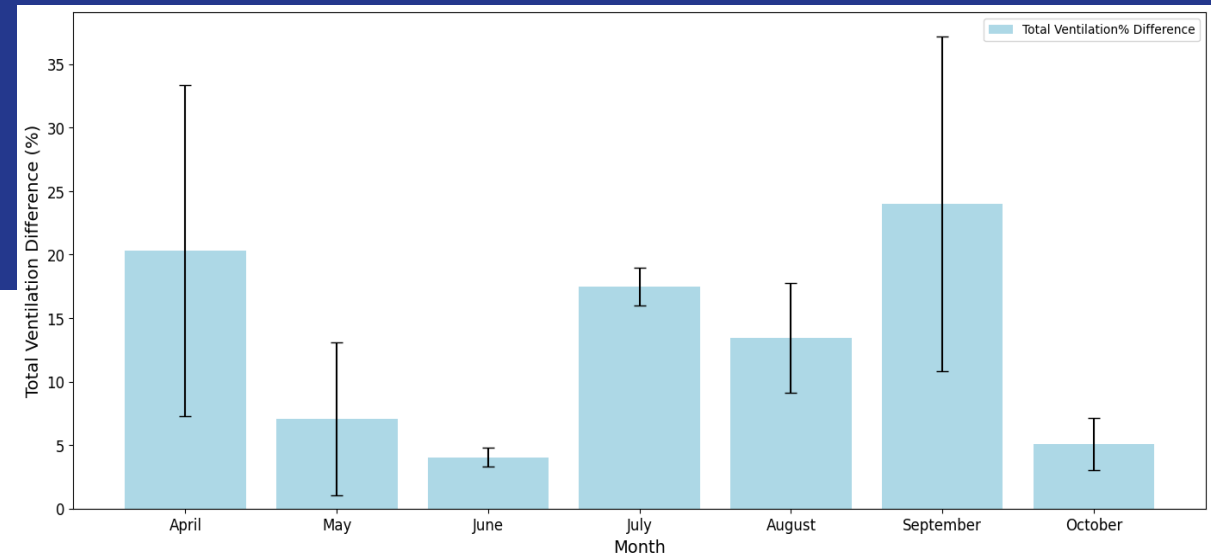
Average plant temperature difference (°C)

Reduction ventilation rate

- Average ventilation rate per month
- Difference per month
- Optimized the ventilation setpoint in the misting zone



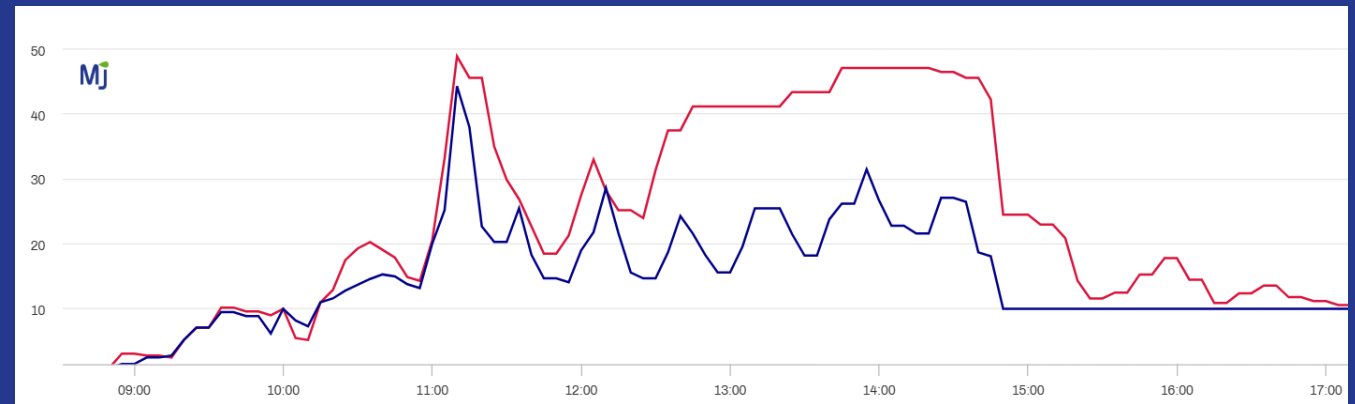
Average ventilation wind side (%)



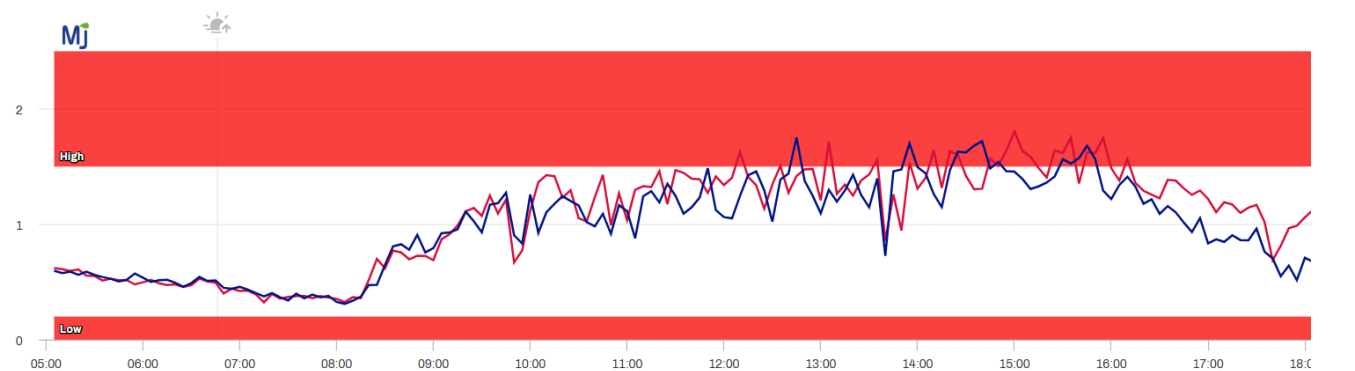
Total ventilation difference (%)

Example on daily base

- End of April
- Ventilation rate in the misting zone 40–50% lower
- Increase of 100–200 ppm CO₂
- Managed to keep the VPD below 1,5 kPa



Ventilation % wind side

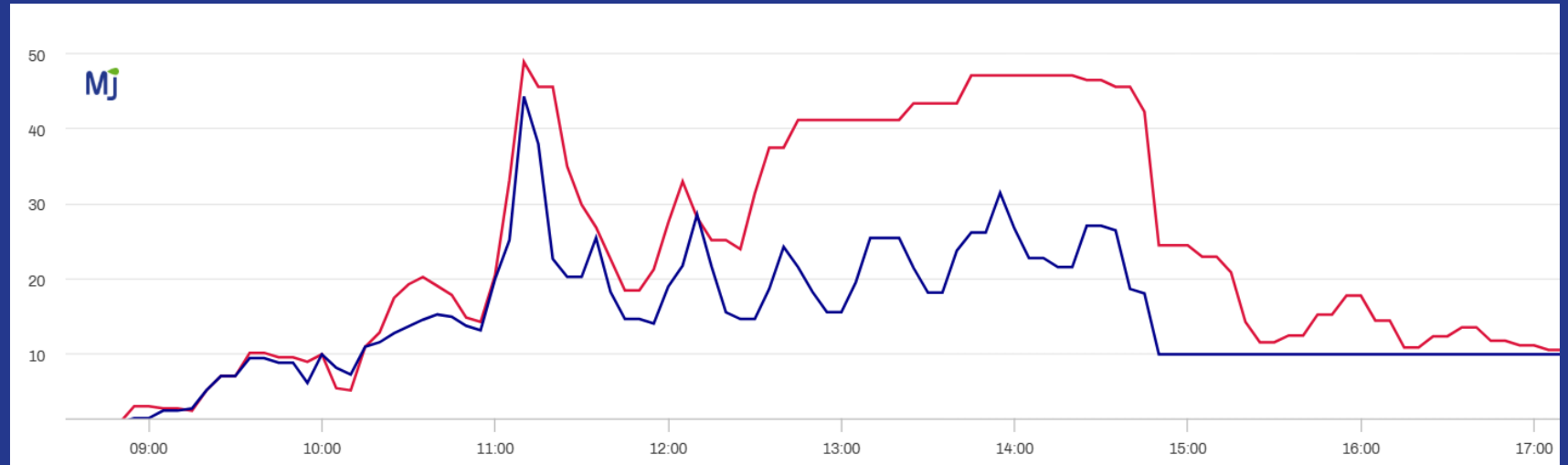


VPD levels in kPa

* blue line is misting zone

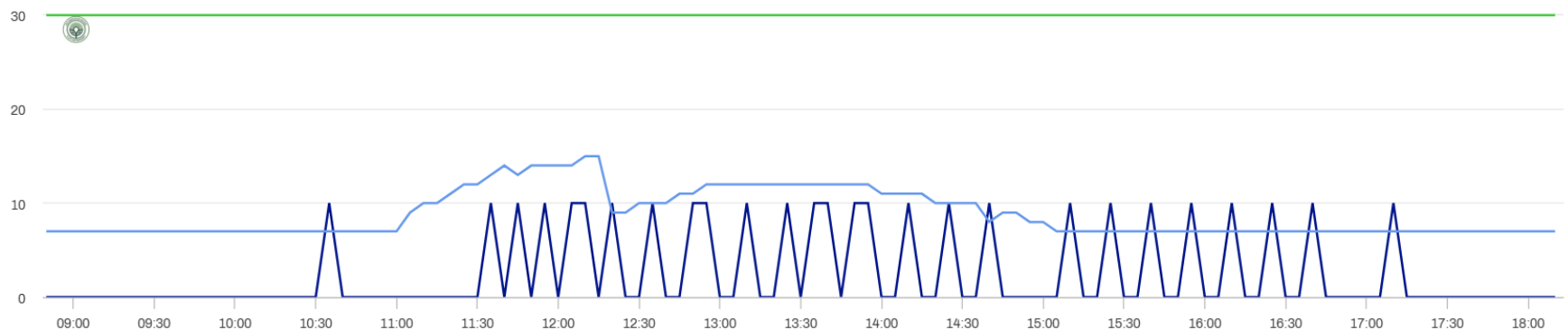
Impact misting on climate and ventilation

- End of April
- Day dynamics
- Misting strategy
 - Pulse
 - Pause
 - W/m²



Ventilation % wind side

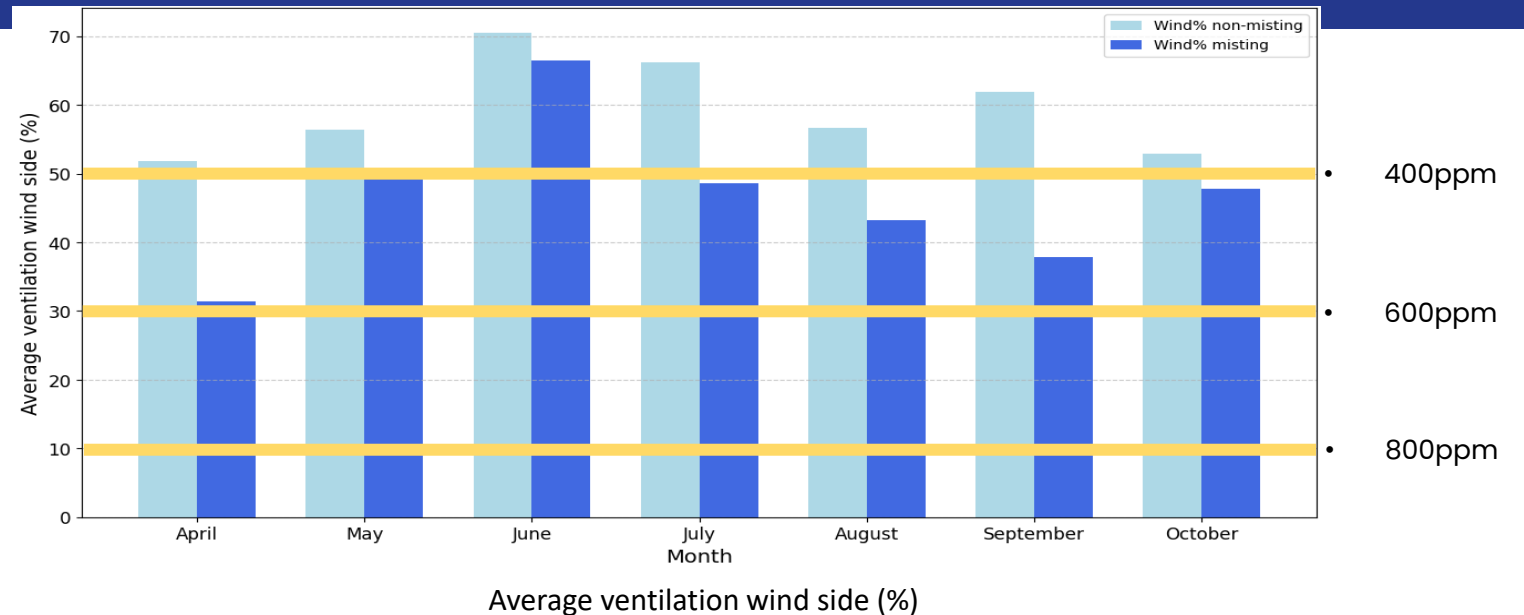
* blue line is misting zone



Pulse / Pause misting

Achievements

- Pre-summer and summer settings
 - Pre-summer focus on ventilation (short pulses / long intervals)
 - Summer focus on cooling (long pulses / short intervals)
- Maintaining higher levels of CO₂ in the misting zone
- Maintaining a lower plant temperature in the misting zone



Benefits of High Pressure Fogging for climate control

- Lower greenhouse and crop temperature will benefit fruit size and quality
- Keep the stomata of the plant opened for transpiration to prevent water stress
- Less ventilation = better CO₂ management for assimilate production
- Desired climate for effective IPM management
- Creating an enjoyable atmosphere for the workers in the greenhouse





Thanks for your attention

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