



Next generation growing Blackberry II

Challenges and opportunities



Worldwide Expertise for Food & Flowers

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Aim project

- ❖ Futureproof blackberry greenhouse cultivation
- ❖ Conditions
 - Market
 - Knowledge
 - Energy
- ❖ Learning goals:
 - Implement NGG → towards fossil-free
 - Insights in light stress, water stress & photosynthesis
 - Cultivation concept with smaller DIF and high humidity

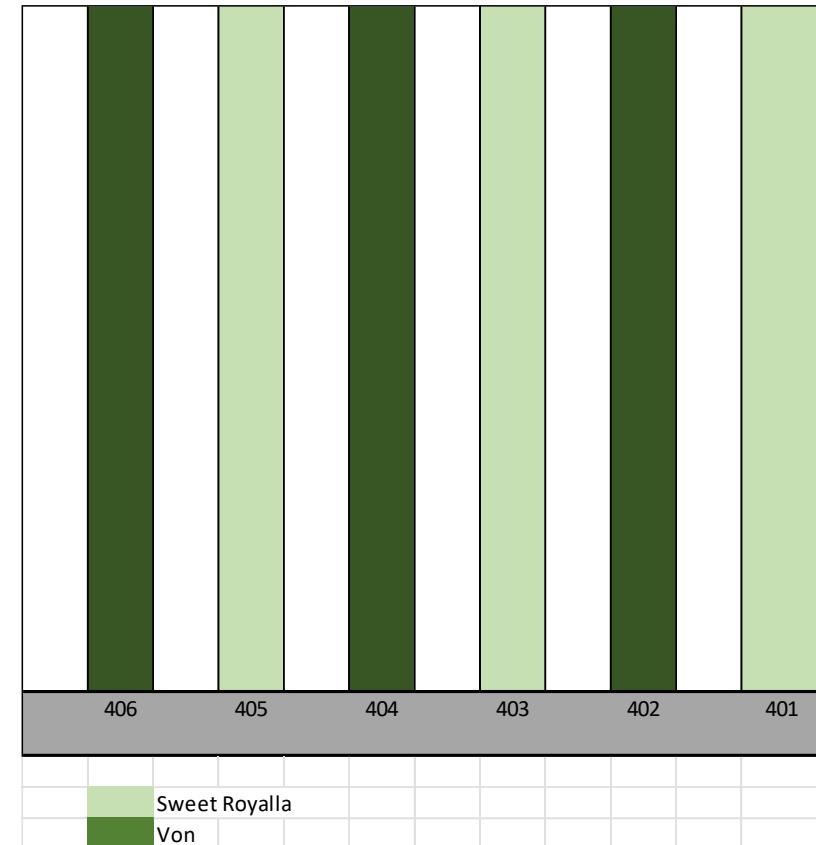


Ministerie van Landbouw, Visserij,
Voedselzekerheid en Natuur



About the trial

- ❖ Two plantings: autumn and spring cultivation
- ❖ Plantdate autumn: 5 July 2024
- ❖ Focus on flavourful varieties:
 - Sweet Royalla
 - Von
- ❖ Plant density:
 - 1 pot per 0,6m² or 1 pot per 0,4m²
- ❖ Targets:
 - Year production 10 kg/m²
 - Max. 5 m³ gas/m²
 - Minimize CO₂ inputs



Cultivation targets

❖ Cultivation

- Optimising climate
 - RTR strategy
 - High pressure fogging system
- Year production of 10kg/m²

❖ Energy

- Max. 5 m³ gas per m² per year:
 - Lowering peak usage
 - No minimum pipe temp.
 - Screening against outgoing radiation
 - Active dehumidification

❖ Plant physiological

- Insights in photosynthesis, light stress & water stress
- Effect of smaller DIF



What have we learned?

- ❖ RTR vs crop development
- ❖ Optimising production
- ❖ Light stress
- ❖ Isolation and dehumidification
- ❖ Reducing energy usage



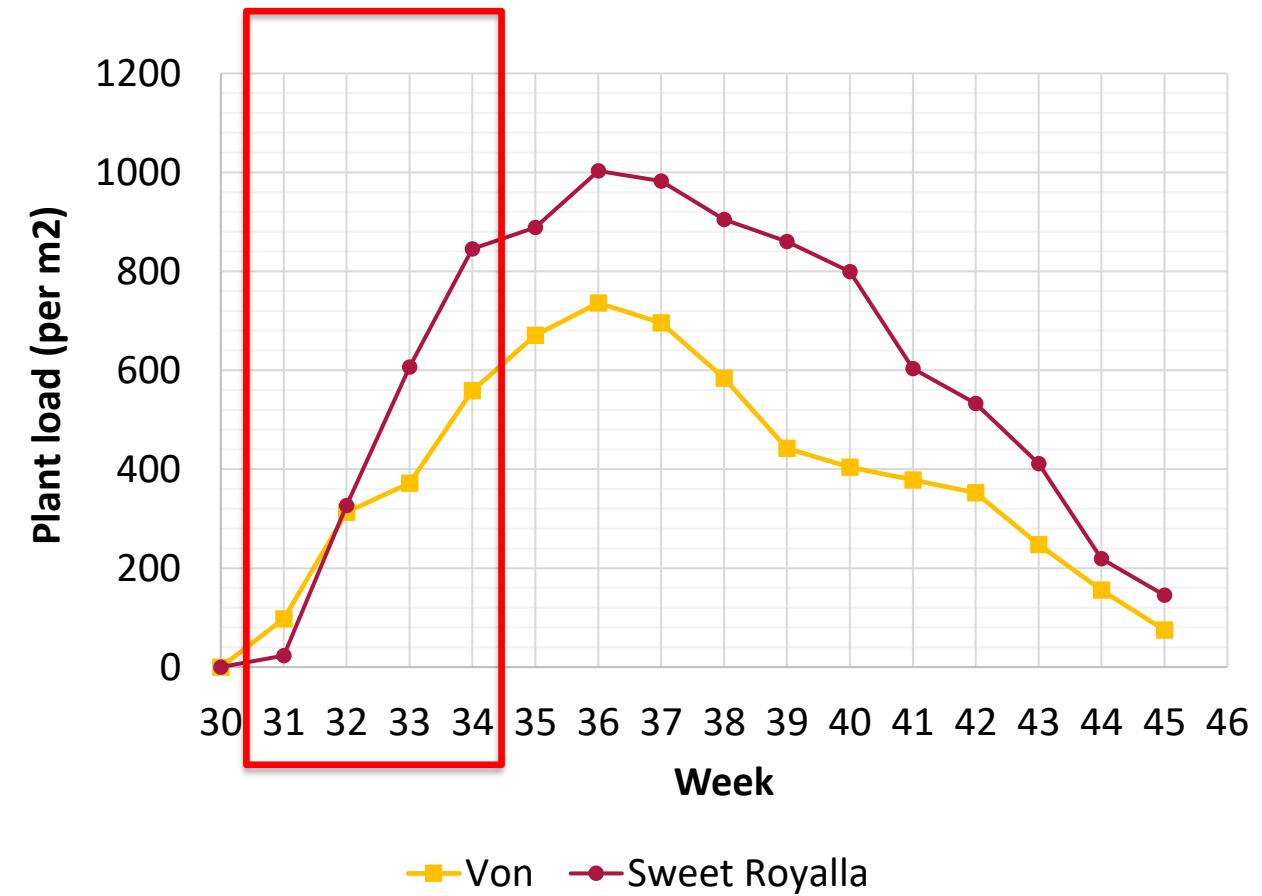
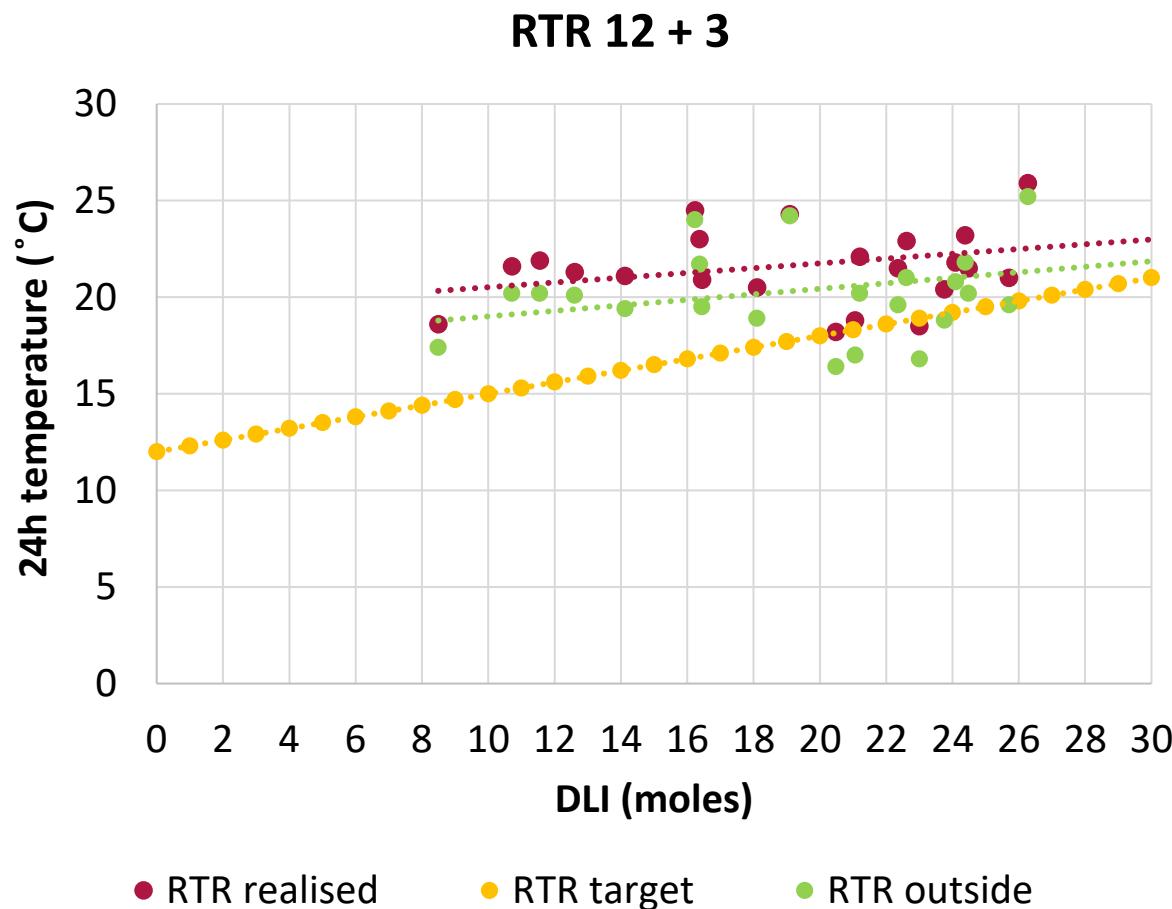
Ratio of temperature and radiation - RTR

- ❖ Using 'free' energy to build up temperature
- ❖ Allows to plan a cultivation based on GDH
- ❖ Should match with crop development



	Bud break			Lateral outgrowth			Flower bud development			Production				
Week	27	28	29	30	31	32	33	34	35	36	-	42	-	48
RTR	12+3			12+4,5			12+3			RTR 14+3				
GDH														
week	2.645	2.582	2.582	3.210	3.199	3.115	2.428	2.315	2.219	2.476		2.070		1.767

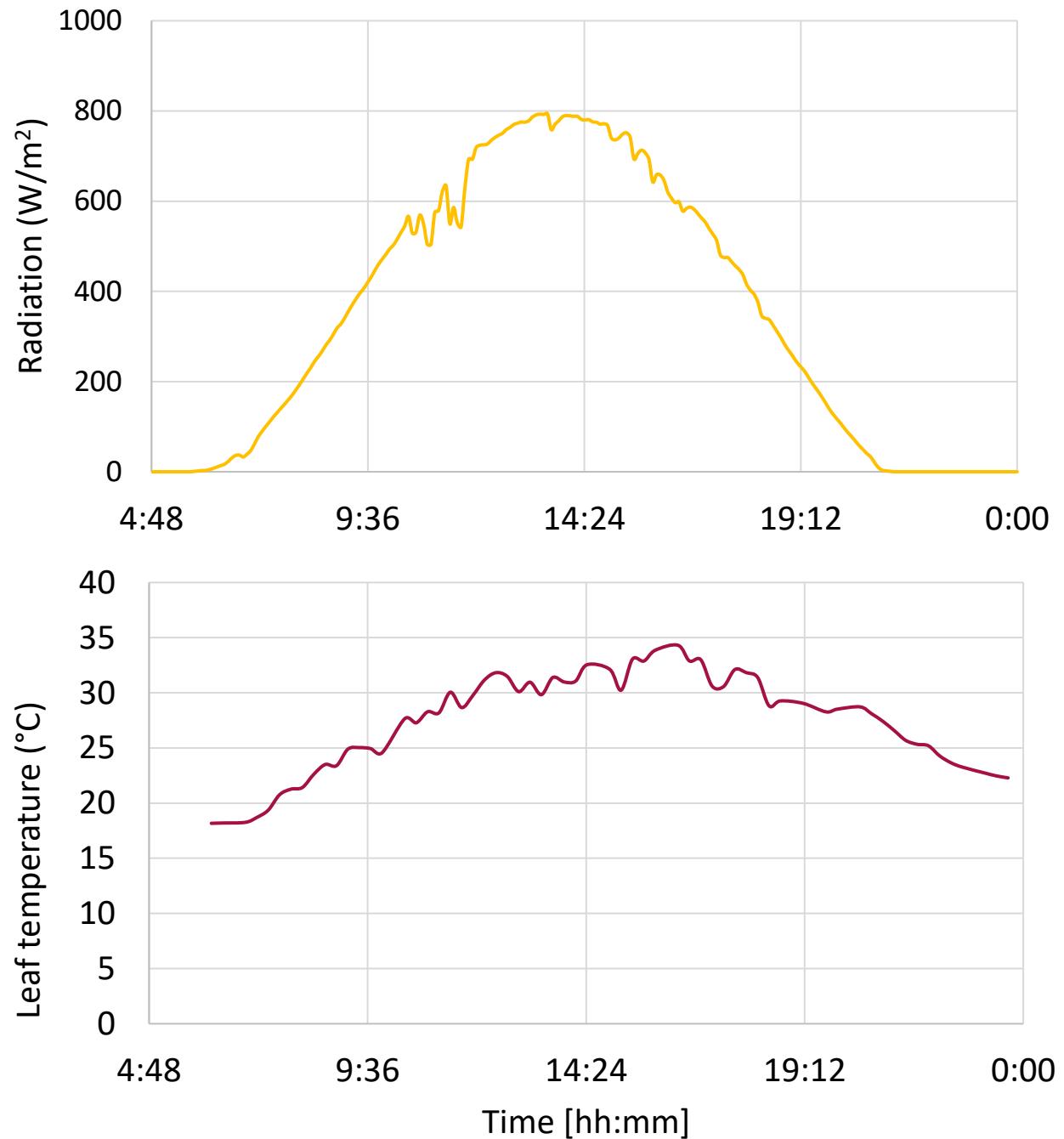
Climate management vs plant development



Cool down as much as possible during plant load build up

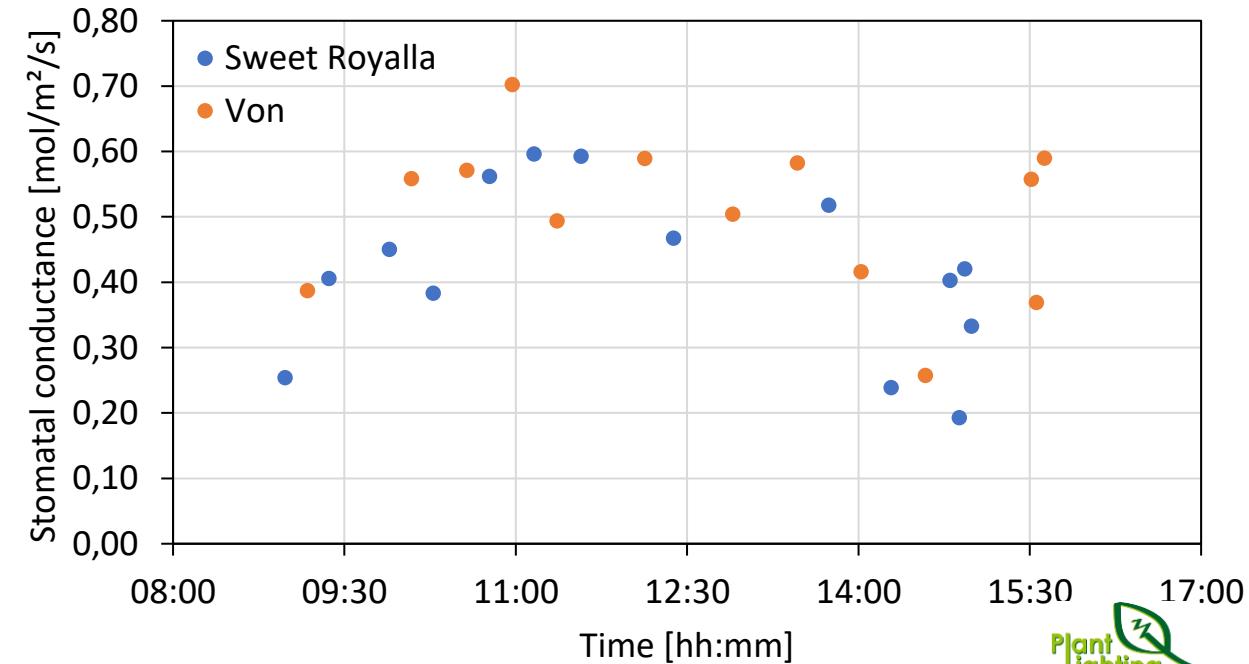
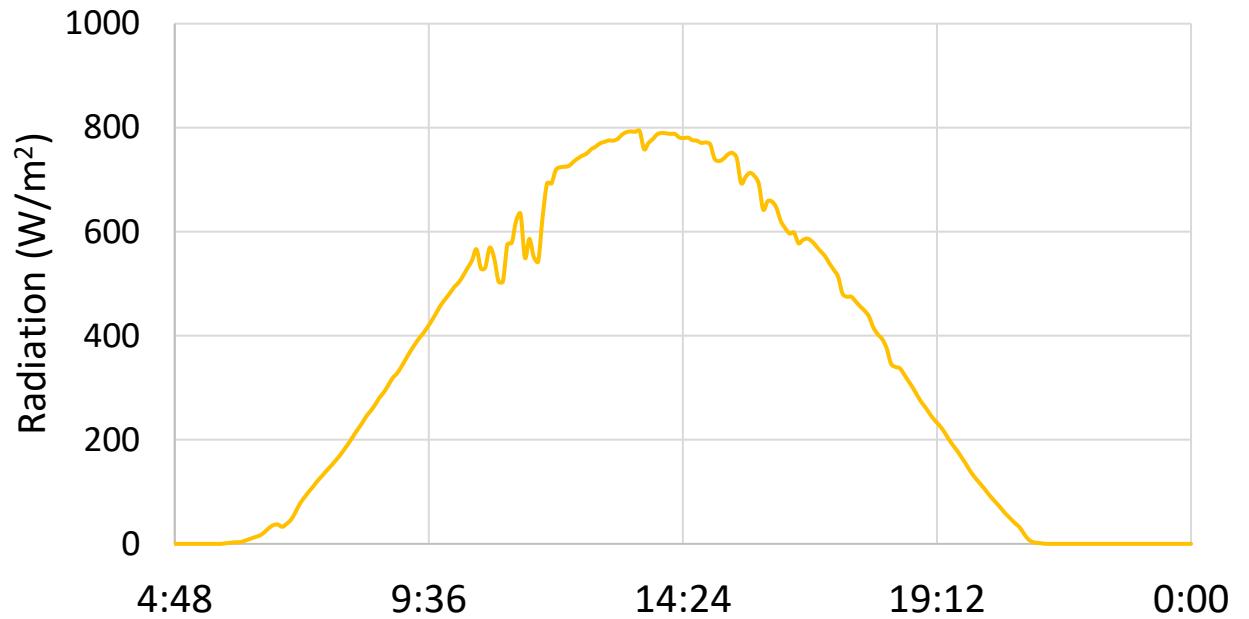
Maximizing light capture

- ✓ Leaf temperature increases with increasing radiation
- ✓ No spike → plant still evaporating and cooling



Maximizing light capture

- Leaf temperature increases with increasing radiation
- No spike → plant still evaporating and cooling
- Measurements show no closing of stomata
- Less screening needed → more potential production
- Not during ripening of fruits!
- Conducted with a high pressure fogging system!

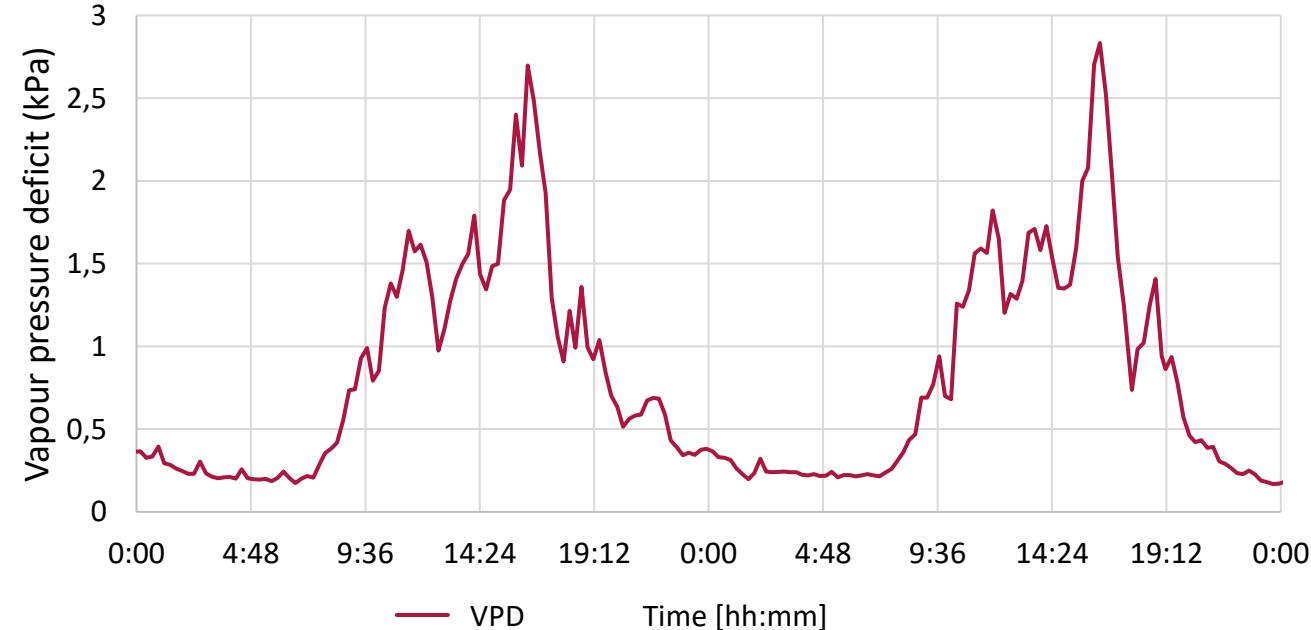
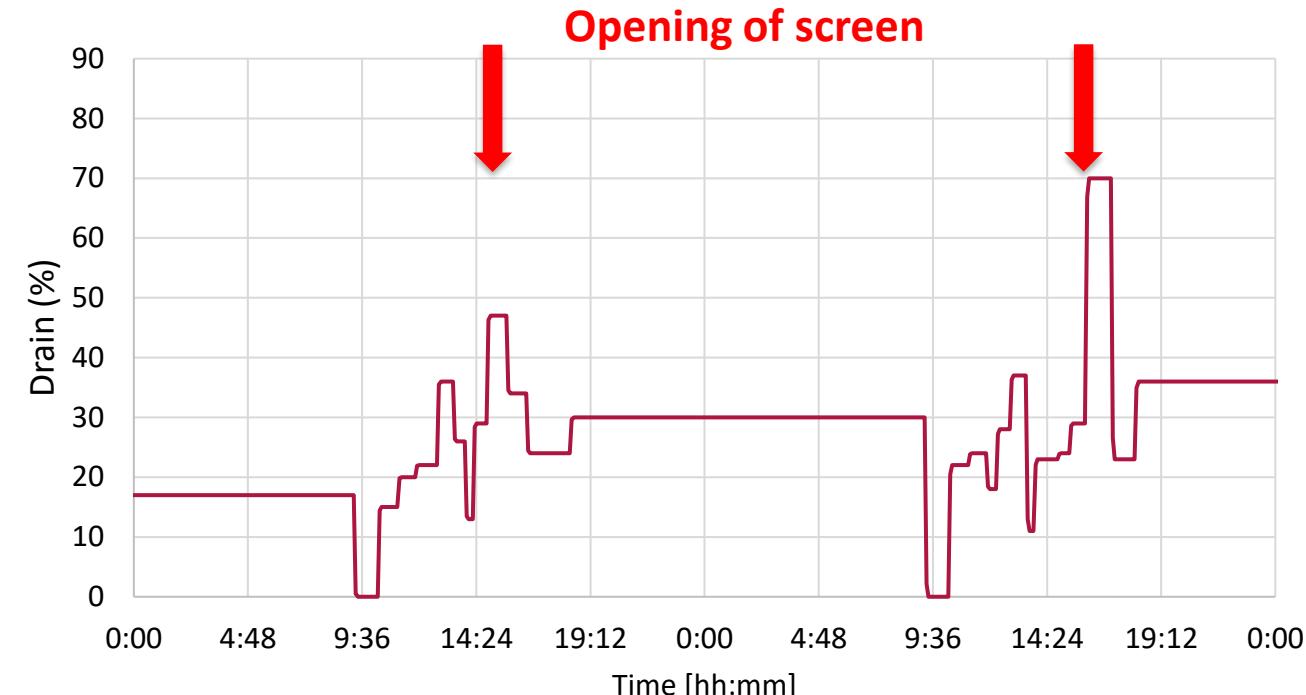


Avoid abrupt climate changes

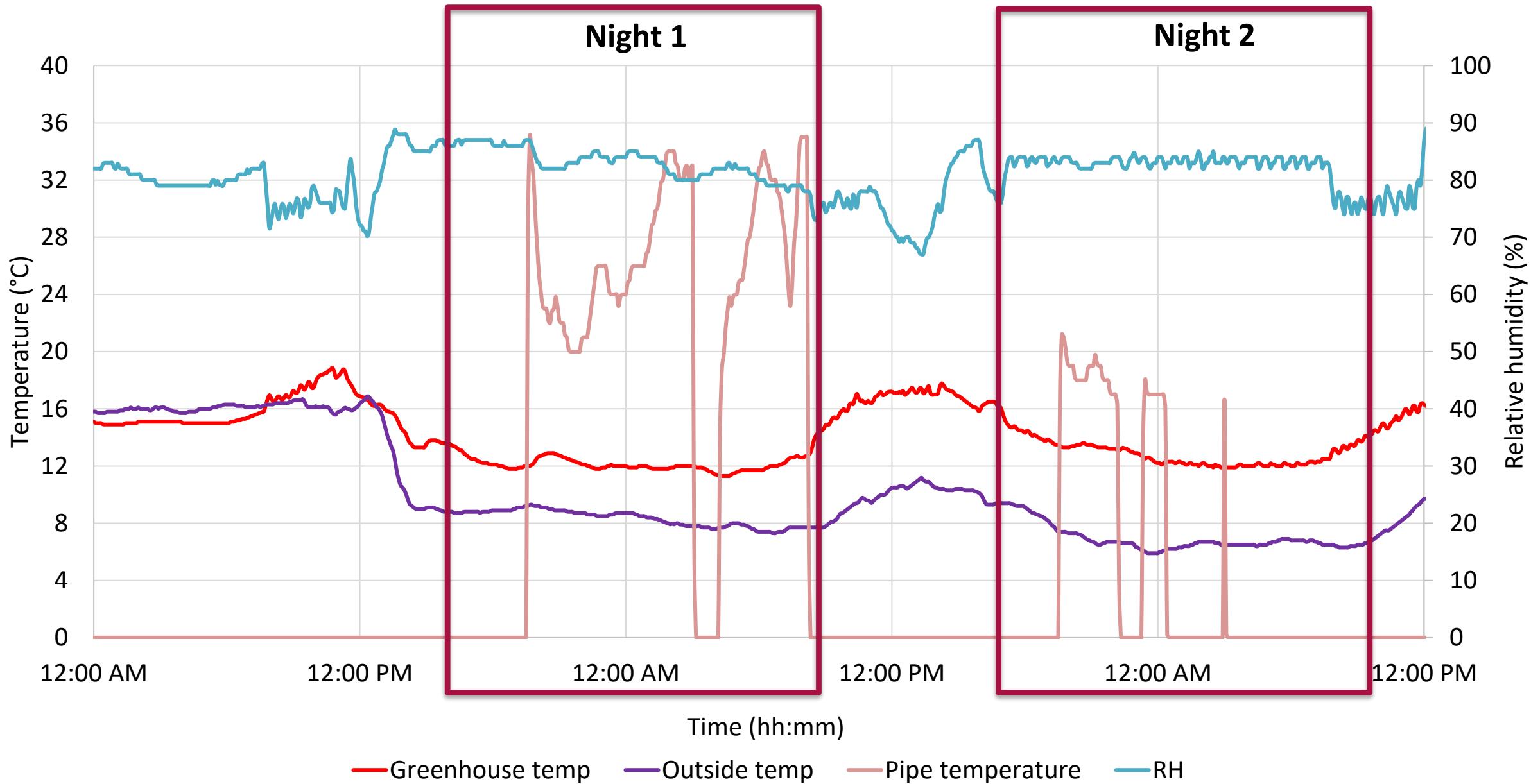
- ❖ VPD ↑ after opening of screens
- ❖ Stomata closure → no/reduced water uptake → drain% ↑

Actions:

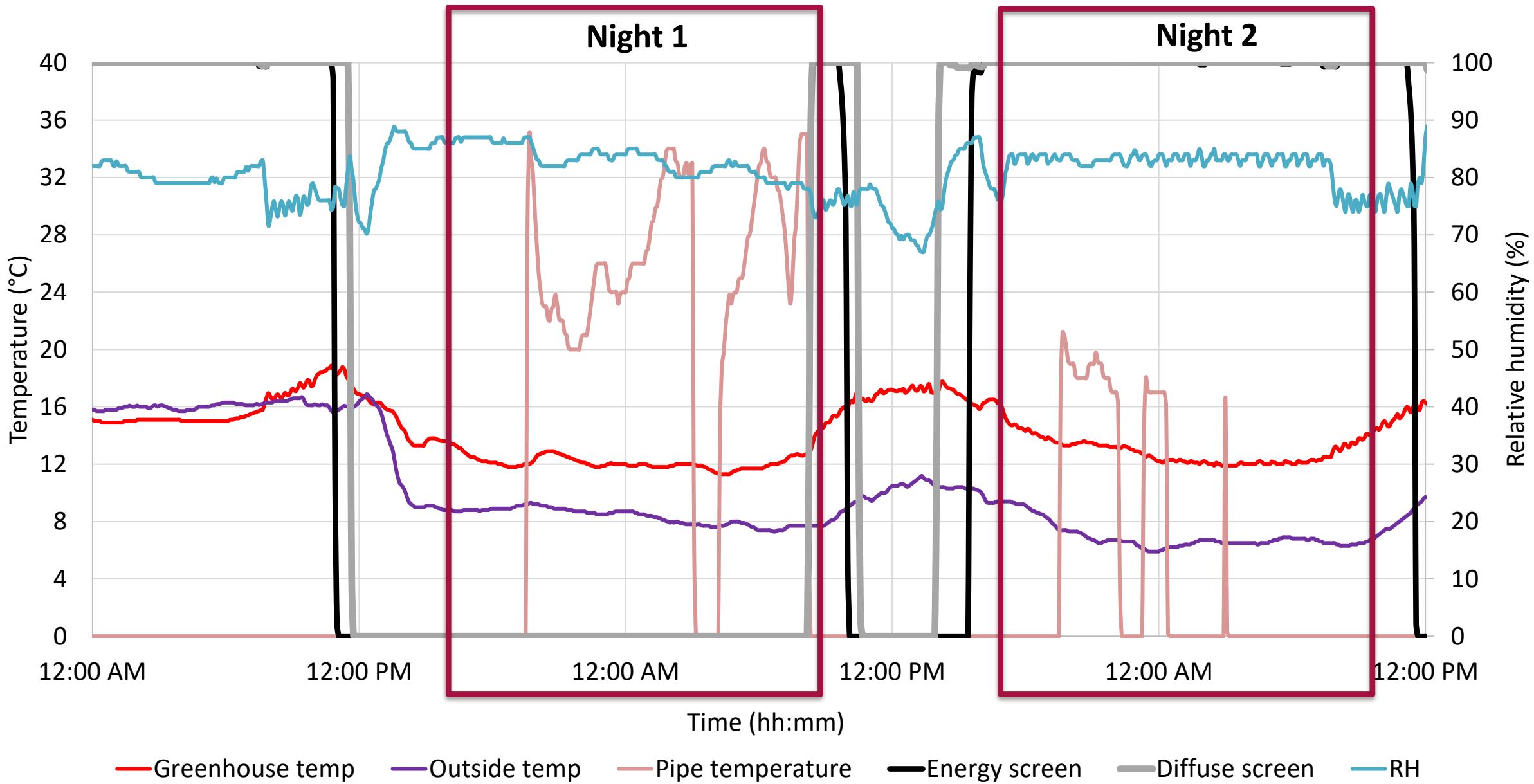
- ❖ Screening influence based on greenhouse temperature



Two screens - isolation



Two screens – isolation

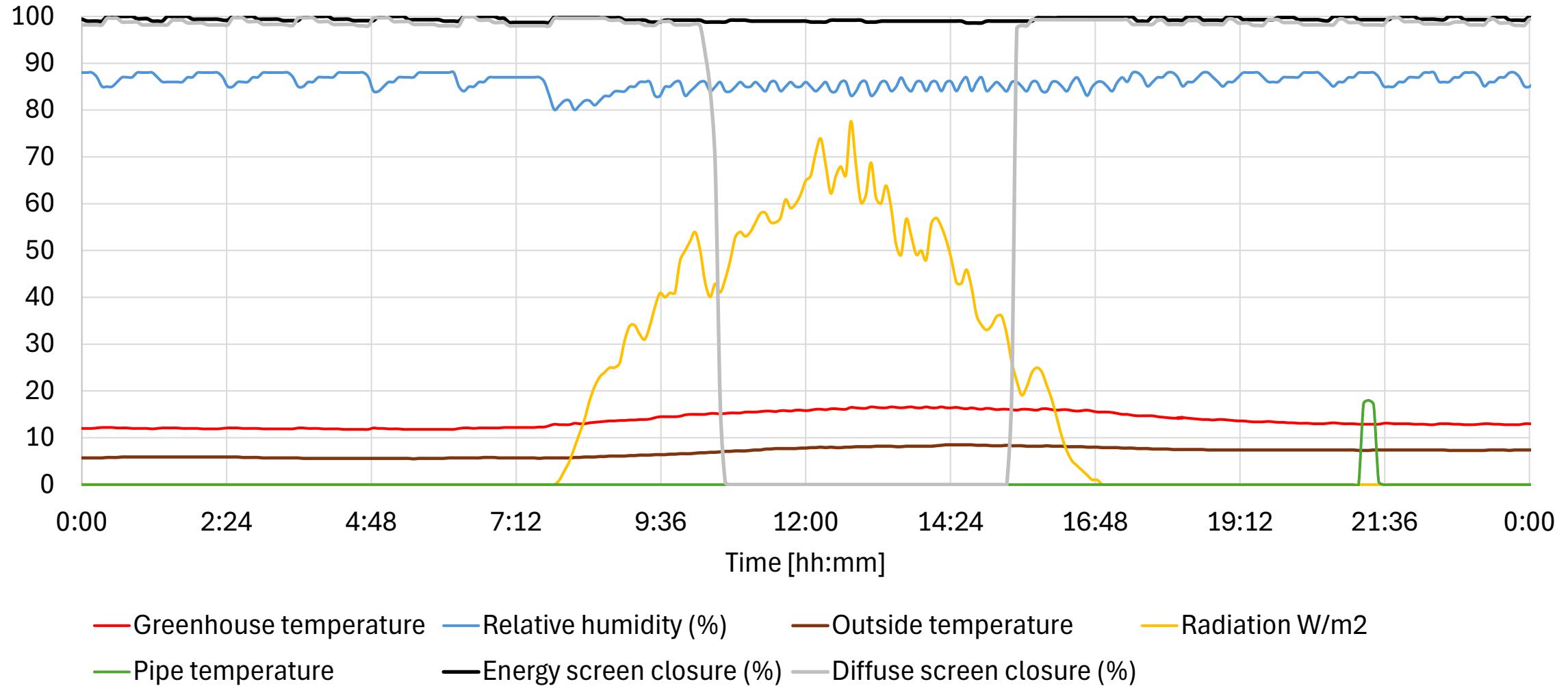


Active dehumidification

- ❖ **Night time**
 - ❖ Avoid dew point
 - ❖ Still allow high humidity
 - ❖ Before sunrise, lower RH setpoint to use latent heat and reduce heat from pipes
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- ❖ **Day time**
 - ❖ Maintain evaporation → Maintain flow of nutrients
 - ❖ VPD > 0,2



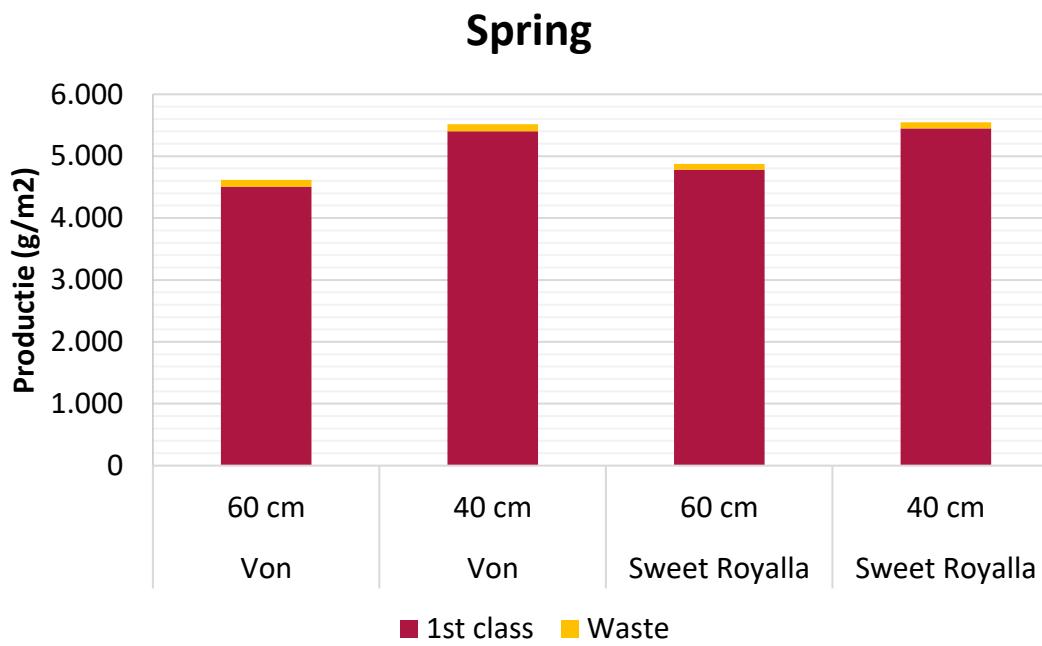
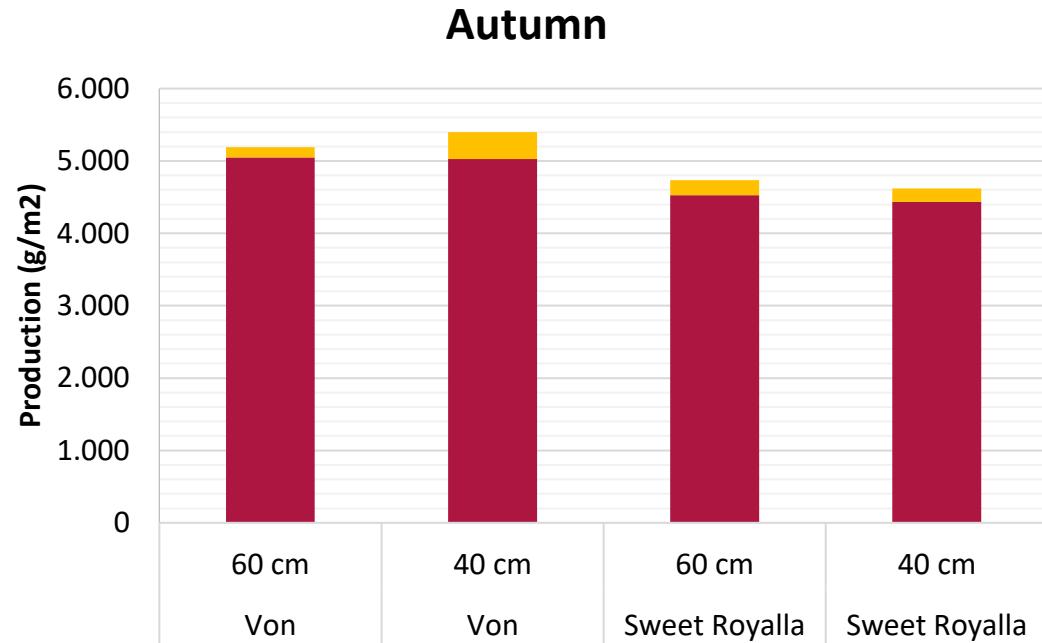
Example: active dehumidification



End results

- ❖ Production 10 kg/m² ✓
 - Autumn: lower plant density
 - Spring: production increase at high density

- ❖ Gas usage 3.5 m³/m² ✓



Conclusions



❖ Climate control:

- Avoid abrupt climate changes to prevent stomata closure
- Maintaining active climate difficult during dark days, however necessary for quality!

❖ Crop perspective

- Maintain right RTR strategy for development phase
- Increase production → reduce screening

❖ Energy saving:

- RTR good method to plan cultivation of blackberry
- Two screens highly improve isolation
- Dehumidification reduces need for venting + more control

Many opportunities for a sustainable blackberry future!



Thank you for your attention!

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