



How plant growth is impacted by humidity control; using data to make the right decisions

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Speaker @ Growing stronger
mini-conference for the greenhouse sector New Zealand



Worldwide Expertise for Food & Flowers

Welcome



Who am I:

Trainer / Lecturer

- Delphy Academy
- HAS Green Academy
- Rijk Zwaan
- DLV Tomato Consultant

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Introduction company Delphy

(Delphy is part of Peterson Solutions since 2025)

Consultancy, training, research, digital services & international projects

Plant related sectors

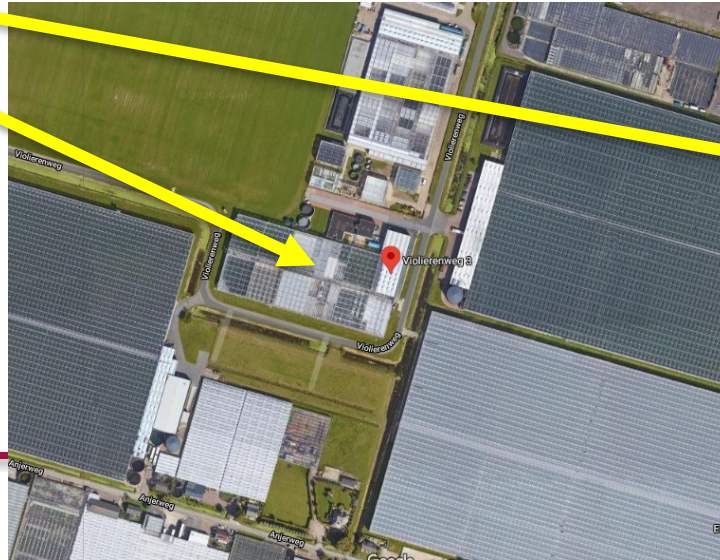
Research + Implementation

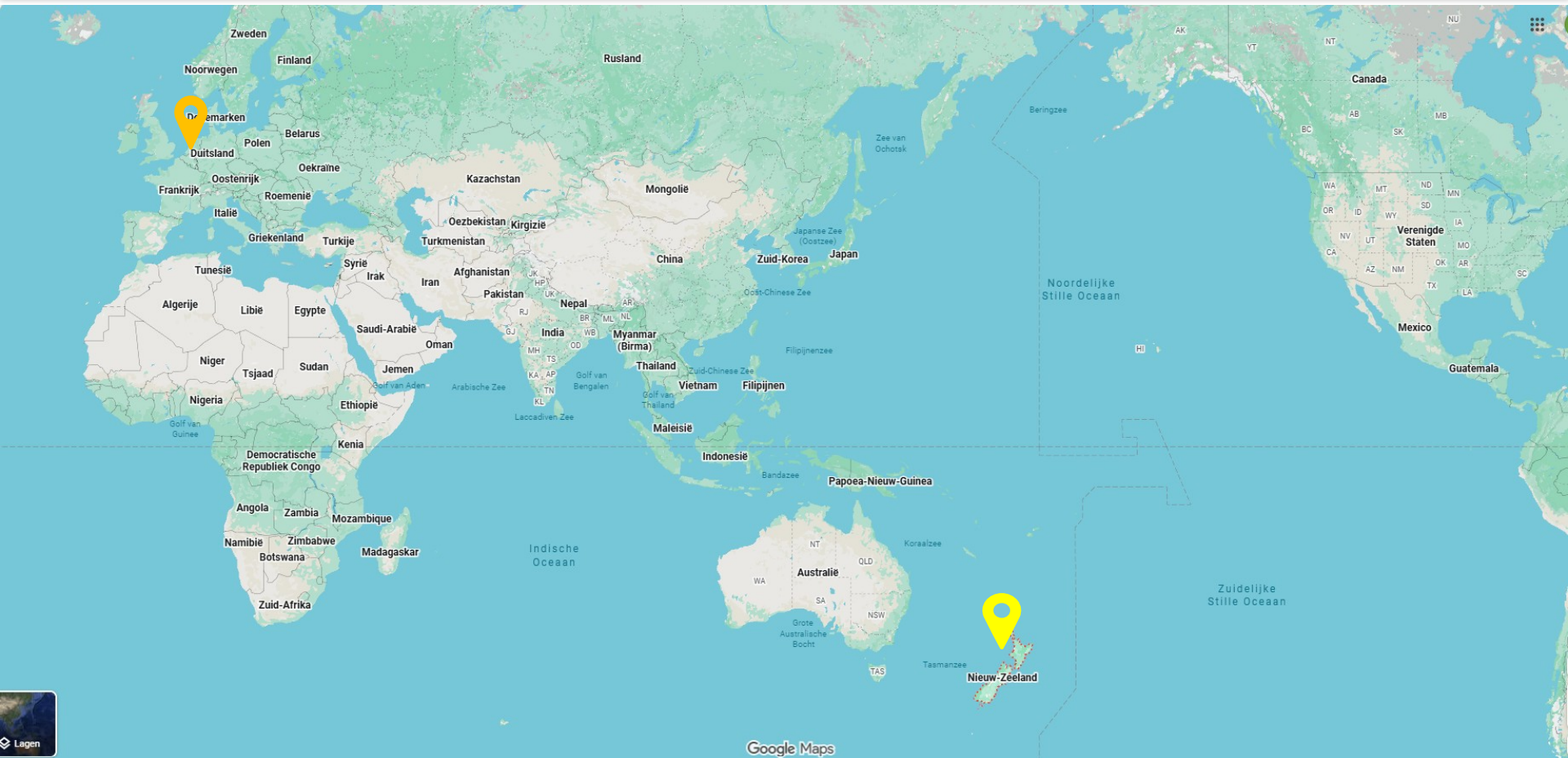
Independent

240 employees



Delphy Improvement Centre (left) and Delphy ISFC (right)





Title:

How **plant growth** is impacted by **humidity control**; using **data** to make the right **decisions**

4 themes:

Plant growth

Humidity Control

Data

Decisions

Plant growth

- ✦ Yield
- ✦ Quality
- ✦ Profit



@participants Delphy training

What does a plant need to grow?

Sugars(assimilates) produced by photosynthesis



Photosynthesis = plant proces nr 1

Input: Light + CO₂ + Water in Green Leaves

Output: Sugars and Oxygen



Depending on the right decisions



AI generated images

Investment of the sugars
= respiration (plantproces nr 2)



Maintenance
Respiration

Growth



RTR strategy → relation temperature to radiation

What about humidity?

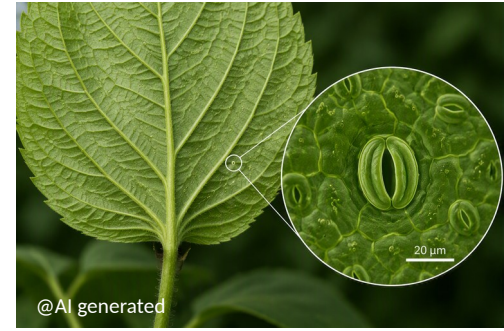
- ✦ Does it influence growth?
- ✦ How?

Transpiration (proces nr 3)



Transpiration: How does it work?

- Water *vapour* going out of the plant
- Where?
 - ➔ in the stomata (when open)
- Inside leaf **100% RH**
Outside lower ➔ law of physics ➔ movement will start
- Effect/result ➔ **cooling** of the plant
➔ **nutrient** transport



Challenge in dark period





Photos participants Delphy training

Humidity control and data

- ✦ 4 units
- ✦ What are the risks
- ✦ What is the right level → decisions

Humidity risks

→ *probably depends on season and location*

spring/summer → humidity too low

autumn/winter → humidity too high

Let's focus on **humidity too high**

Problems when humidity is too high

- ✦ Too high → risk fungi
- ✦ Too high → low uptake of nutrients → deficiency, pale colour, blotchiness
- ✦ Too high → vegetative action → balance, pollination
- ✦ Too high → weak tissue



High humidity: Dewpoint

- ✦ Dewpoint is at 100% RH → saturated air
- ✦ Condensation on *coldest* parts (*can be the plant!*)
- ✦ Risky situation when there is an uneven climate
 - warm en cold spots!
 - Cold heads → clear sky → irradiation
(= longwave radiation leaving the plant)



Participant Delphy training

Units humidity

- ✦ Relative humidity %
- ✦ Absolute humidity gr/m^3
- ✦ Humidity deficit gr/m^3
- ✦ VPD kPa



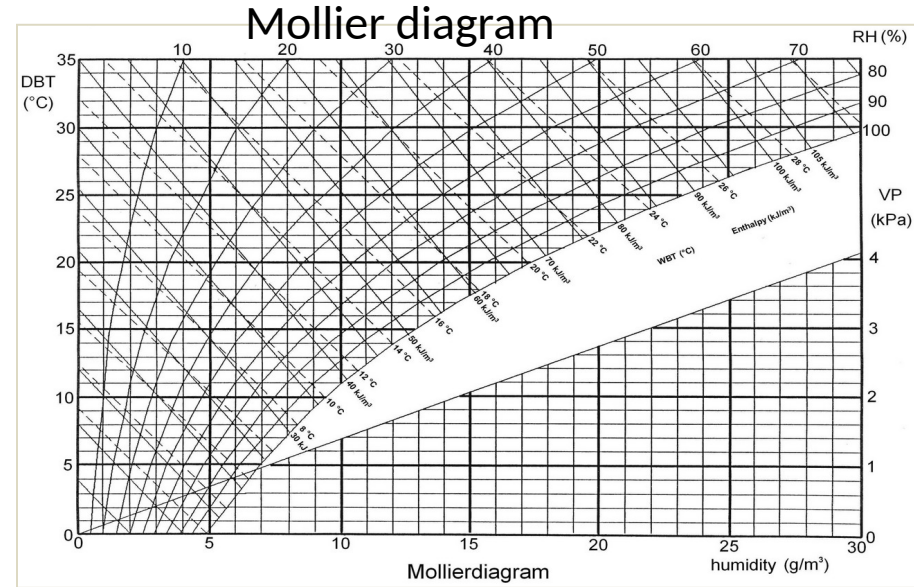
Humidity = physics

1) cold air = dry air

→ example: max water vapour content
at 15°C = 13 gram/m³
At 22°C = 19,5 gram/m³

2) RH only can give the wrong decision

→ 85% at 16°C is different than 85% at 23°C
HD = 2,0 gr/m³ HD = 3,1 gr/m³



What actions can we take to reduce the humidity?

Opening windows (ventilation)

More (pipe)temperature

Dehumidification

Air movement (fans)

➔ *What about energy (gas) use.....*



Ventilation

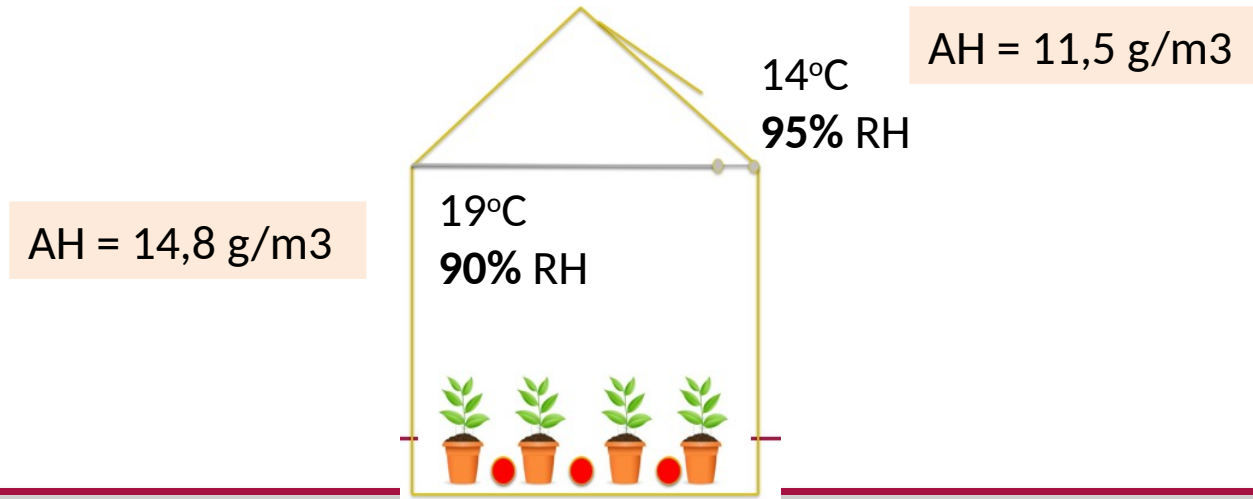
Rule of physics is: when there is a difference in concentration a movement will start → water vapour will move from inside to outside (open the vents)

- ✦ Windows open to release humidity
- ✦ Check AH humidity inside and outside air
- ✦ Possible when **AH outside is lower than AH inside**

Situation: In the greenhouse the temperature is **19°C** and the relative humidity is **90%**.
Outside the temperature is **14°C** and the relative humidity is even higher **95%**.

Questions:

- 1) What do you think of the humidity in the GH, good or not good?
- 2) Would you advise to ventilate or not based on humidity? Explain your answer



Let's go back to the title of this lecture

How **plant growth** is impacted by **humidity control**; using **data** to make the right **decisions**

The more risks you take → growing on the edge → more production but more damage when something goes wrong.

More checks necessary → more monitoring (data)

Data involved

Crop evaluation → green fingers

- 1) Light sum → Joules/cm² or PAR sum in mol/m²
- 2) Light intensity → Watt/m²*s
- 3) Air temperature; plant temperature
- 4) Humidity → HD + AH inside/outside
- 5) Dewpoint temperature
- 6) Irradiation (Energy loss by outgoing longwave radiation)
- 7) Drain%
- 8) Drain EC



?

Sticky flower



- 1) Light sum → Joules/cm² or PAR sum in mol/m²
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- 6) Irradiation (Energy loss by outgoing longwave radiation)

The End, *to be continued* (?)

For more Delphy Greenhouse Crop services:

Training by Delphy Academy: <https://delphy.nl/en/services/trainings/>

Consultancy Greenhouse Crops: <https://delphy.nl/en/services/consultancy/>

Data driven crop management: <https://delphy.nl/en/services/data-driven-crop-management/>



End of lecture

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