

# Welcome to Propagate!2025

Your team for today



Hans van Herk



Annelies Michels



Ad Kranendonk



Marcel Cloo



Yorick van Asperen



These days are all about  
Green & Sustainable Propagation





# Program for today

10:30 – 10:45	Opening
10:45 – 11:30	Tomorrow's Allies – Tom Groot
11:30 – 12:00	Powering Propagation – Lukas Sigg
12:00 – 12:30	Screen Sense – Paula Rico
12:30 – 13:30	<b>Walking lunch</b>
13:30 – 14:00	Tiny Titans – Fleur Bruinen
14:00 – 14:45	Propagation on the Other Side of the World
14:45 – 15:15	The Strategy of Scent – Jürgen Brokelman
15:15 – 15:45	<b>Coffee break</b>
15:45 – 17:15	Propagate Experience – Innovation pitches
17:15 – 18:30	<b>Closing &amp; drinks</b>
18:30 – 19:30	Guided walk to Hotel Voco The Hague (shuttle possible)
19:30 – 22:00	Walk-in dinner at Hotel Voco The Hague





# Tomorrow's Allies: Beneficials in the Propagation of the Future

Tom Groot





# Hi, I'm Tom

Integrated Pest  
Management Expert



# Koppert at a glance

- Macrobial natural enemies
- Entomopathogenic nematodes
- Beneficial microbes
- Pollinators
- Supporting products





# A good crop starts with clean plants

Starting material is clean from pests

Propagation should provide clean plants

- For grower
- Export / import requirement

How?

- Clean raw materials
- Strict hygiene in place
- Scouting and monitoring
- Effective (chemical) treatment (to finish)



# A good crop starts with clean plants

Starting material is clean from pests

Increasingly hard to guarantee cleanliness

- Fewer chemicals available
- Pesticide resistant pests





# A good crop starts with clean plants

Starting material is clean from chemical residues

Growers are under pressure to use less chemicals

- Fewer effective chemicals
- Retailers demands
- Pressure from society

Natural enemies are the sustainable alternative

- Leave no residues
- No resistance problems
- No environmental concerns



# A good crop starts with clean plants

Starting material is clean from chemical residues

Beneficial3 items		Side Effects			
Select product					
 Swirski Mite	X				
 Thripor L	X				
 Spidex	X				
Active ingredient2 items					
Select product					
 Gazelle	X				
 Tracer	X				
				GazelleX Acetamiprid	
				spray	drench
				spray	drench
 Swirski MiteX <i>Amblyseius swirskii</i>	egg			4	
	adult			4	1
	population	1	1		
	persistence			1 - 2 WEEKS	0 WEEKS
 Thripor LX <i>Orius laevigatus</i>	nymph	4	2	3	2
	adult	2	1	2	1
	persistence	6 WEEKS	1 WEEKS	< 1 WEEKS	0 WEEKS
 SpidexX <i>Phytoseiulus persimilis</i>	nymph			2	
	adult			2	1
	population	3	1		
	persistence	1 WEEKS	1 WEEKS	1 WEEKS	0 WEEKS





# A good crop starts with clean plants

Starting material is clean from chemical residues

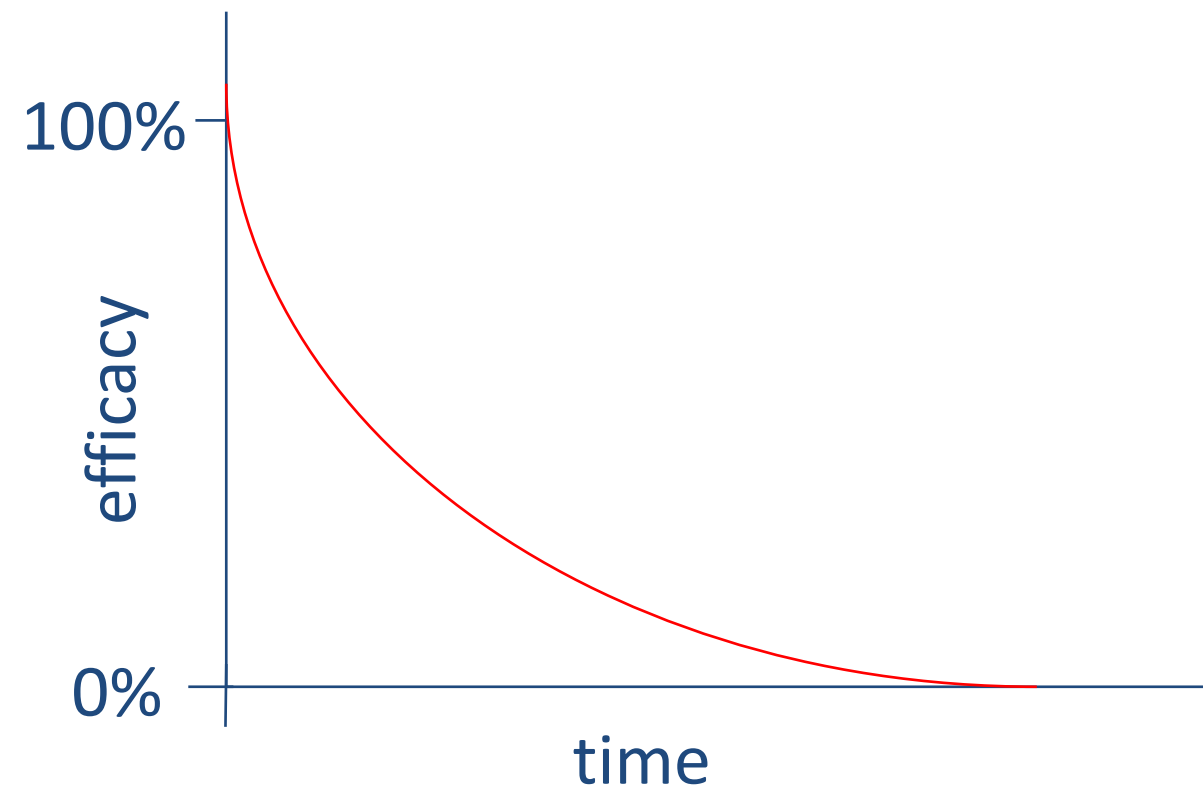
Chemical residues will delay the start of the biocontrol program

Natural enemies need time to build a population

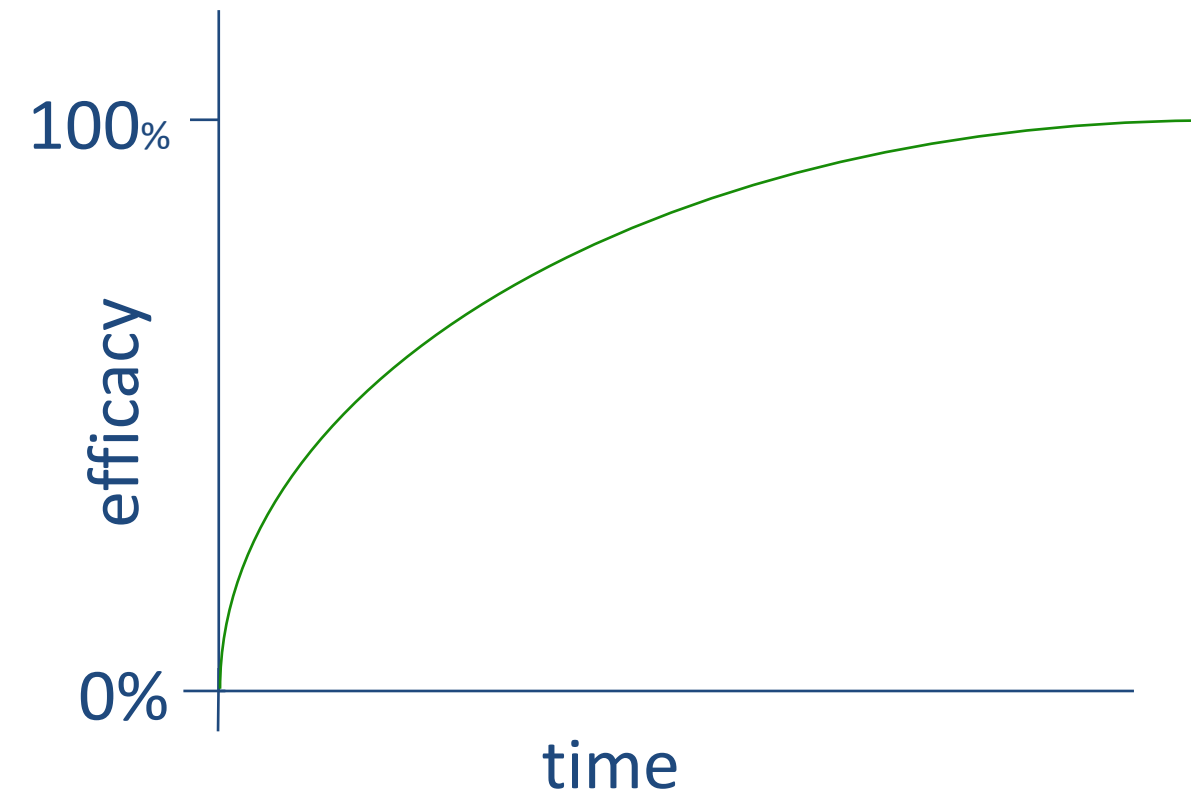


# A good crop starts with clean plants

Starting material is clean from chemical residues



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# A good crop starts with clean plants

Starting material is clean from chemical residues



Temperature	10°C	15°C	20°C	25°C	30°C
Generation time (days)	19.8	16.6	10.0	13.6	9.6
Doubling time (days)	8.5	5.6	2.7	3.1	3.2

In 14 days, 5x doubled | 1 becomes 32!

- Parasitoid is faster!
- If head start is too large, aphid population will surpass the damage threshold
- Start as soon as possible



# A good crop starts with clean plants

Starting material is clean from chemical residues

Compatible alternatives that leave no residue include

- Some “softer” chemicals
- Temperature treatments (CATT, plant sauna, ...)
- Soaps, oils, salts, ...



# A good crop starts with clean plants

Starting material is clean from pests

Starting material is clean from chemical residues

Starting material is loaded with natural enemies





# A good crop starts with clean plants

Starting material is loaded with natural enemies

Start with natural enemies on the mother plants

Use natural enemies to control pest during propagation

- May require additional feed to grow and multiply
- May / may not remain on the plant during transport
- Take advantage of the dense positioning
- Could be challenge for phytosanitary inspections



# A good crop starts with clean plants

Starting material is loaded with natural enemies

Example: nursery release *Nesidiocoris* for tomatoes

- Introduce 7-10 days before transplanting
- Provide high quality food

Plants are loaded with eggs!



# A good crop starts with clean plants

Starting material is loaded with natural enemies

Why does it work?


- Start as soon as possible
- Activates the plant defenses

Journal of Pest Science (2022) 95:1501–1517  
<https://doi.org/10.1007/s10340-022-01506-3>

REVIEW



## Induction of plant defenses: the added value of zoophytophagous predators

Meritxell Pérez-Hedo<sup>1</sup> · Sarra Bouagga<sup>2</sup> · Nina Xiaoning Zhang<sup>3</sup> · Rob Moerkens<sup>4</sup> · Gerben Messelink<sup>5,6</sup> · Josep A. Jaques<sup>7</sup> · Victor Flors<sup>8</sup> · George Broufas<sup>9</sup> · Alberto Urbaneja<sup>1</sup> · Maria L. Pappas<sup>9</sup> 





# A good crop starts with clean plants

Starting material is clean from pests

Starting material is clean from chemical residues

Starting material is loaded with natural enemies



# Thank you!

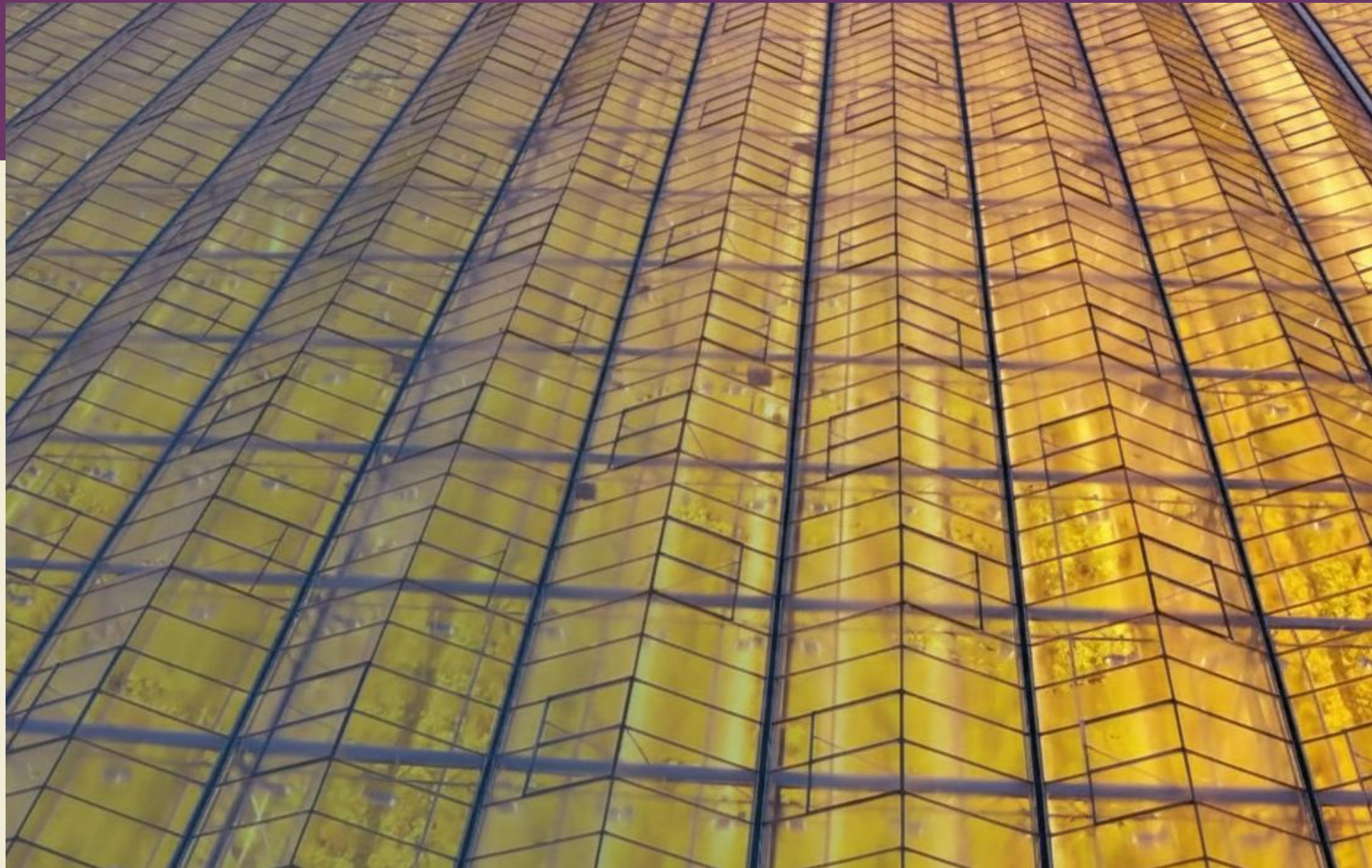
Tom Groot





# Smart Energy management for propagators

Lukas Sigg





# Hi, I'm Lukas

Founder of Nordic Energy  
Consulting



# The Greenhouse Business Or The Energy Business

*You're in both*



# Reactive vs Strategic





Relying only on your  
supplier is not enough



Be strategic and not reactive



Markets and regulations  
are changing fast

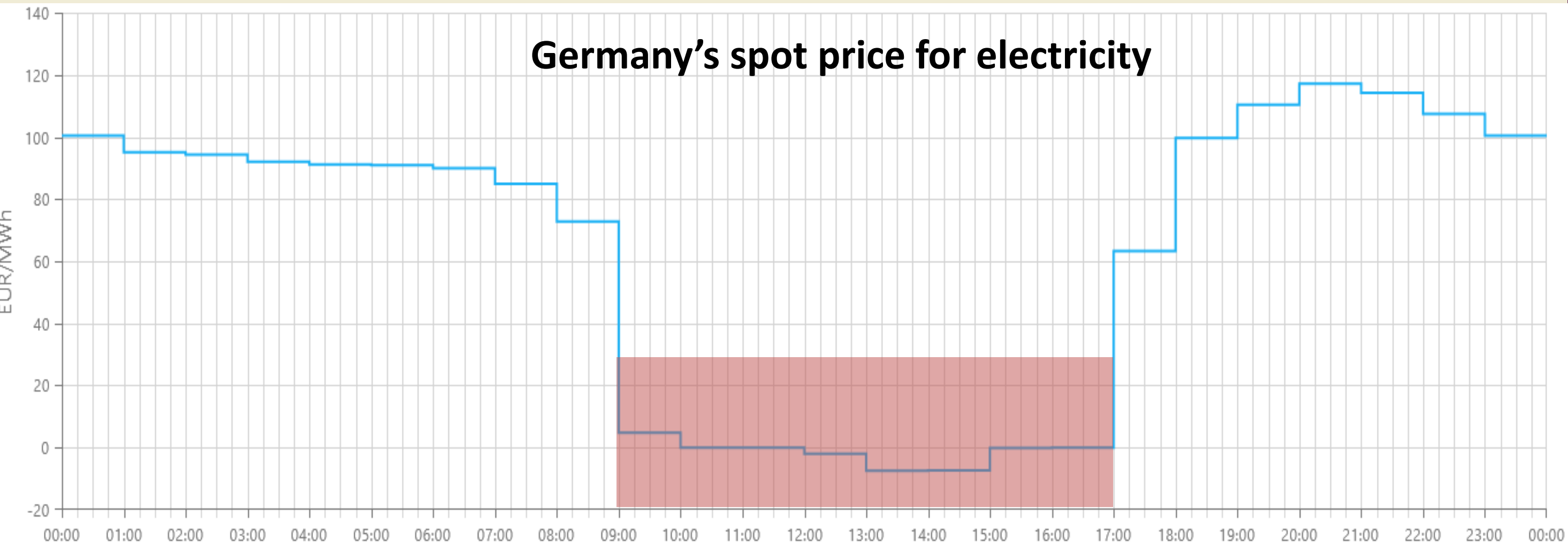


Energy is one of your  
biggest costs



# Know your local markets

Make sure you know the markets you are operational in and take advantage of them

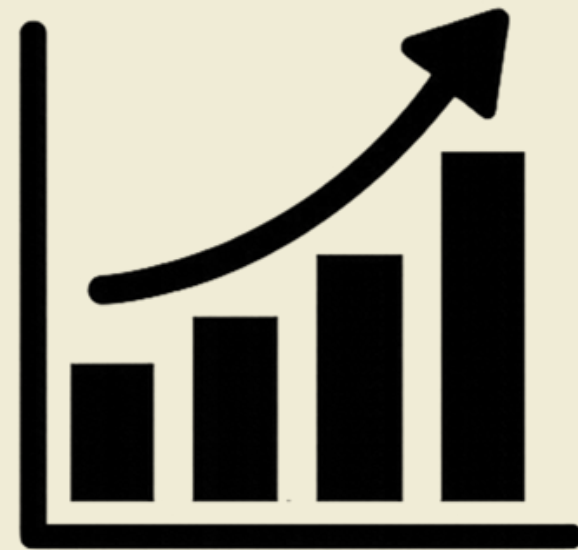


# Electrifying your heating

Electrical  
boiler



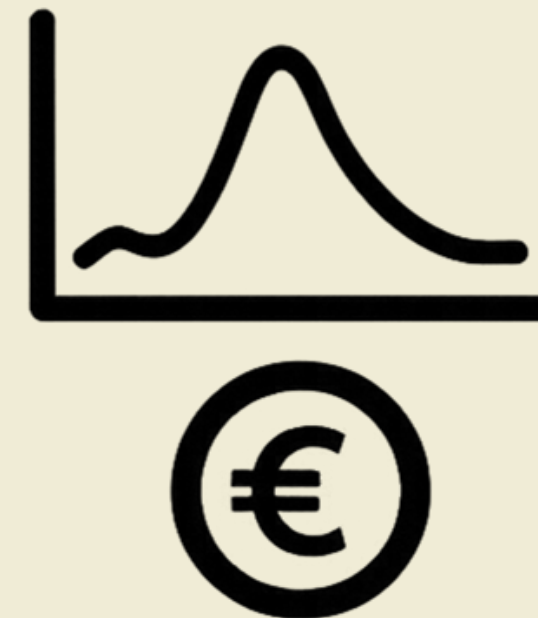
Balancing  
markets



Heat  
storage



Price  
curves



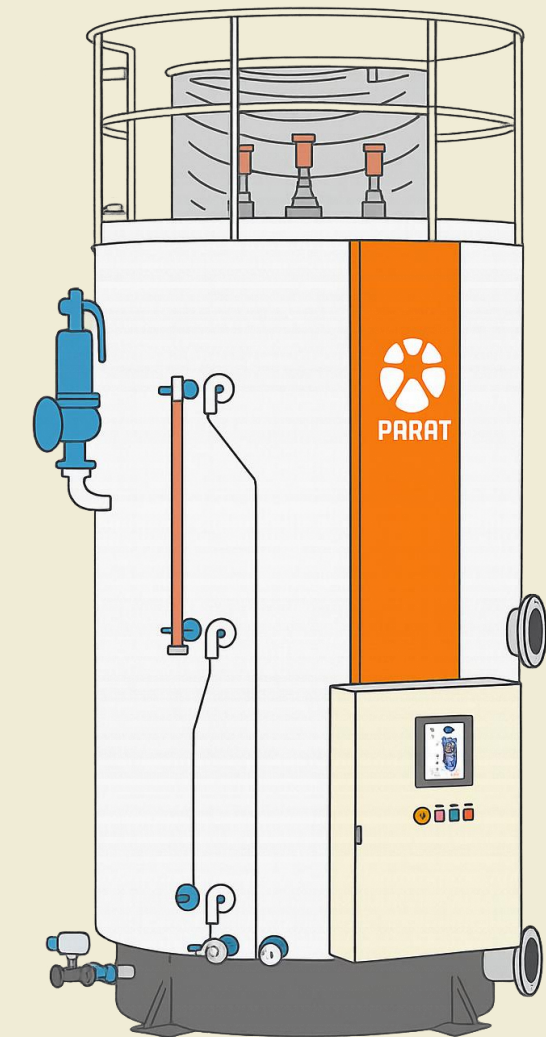


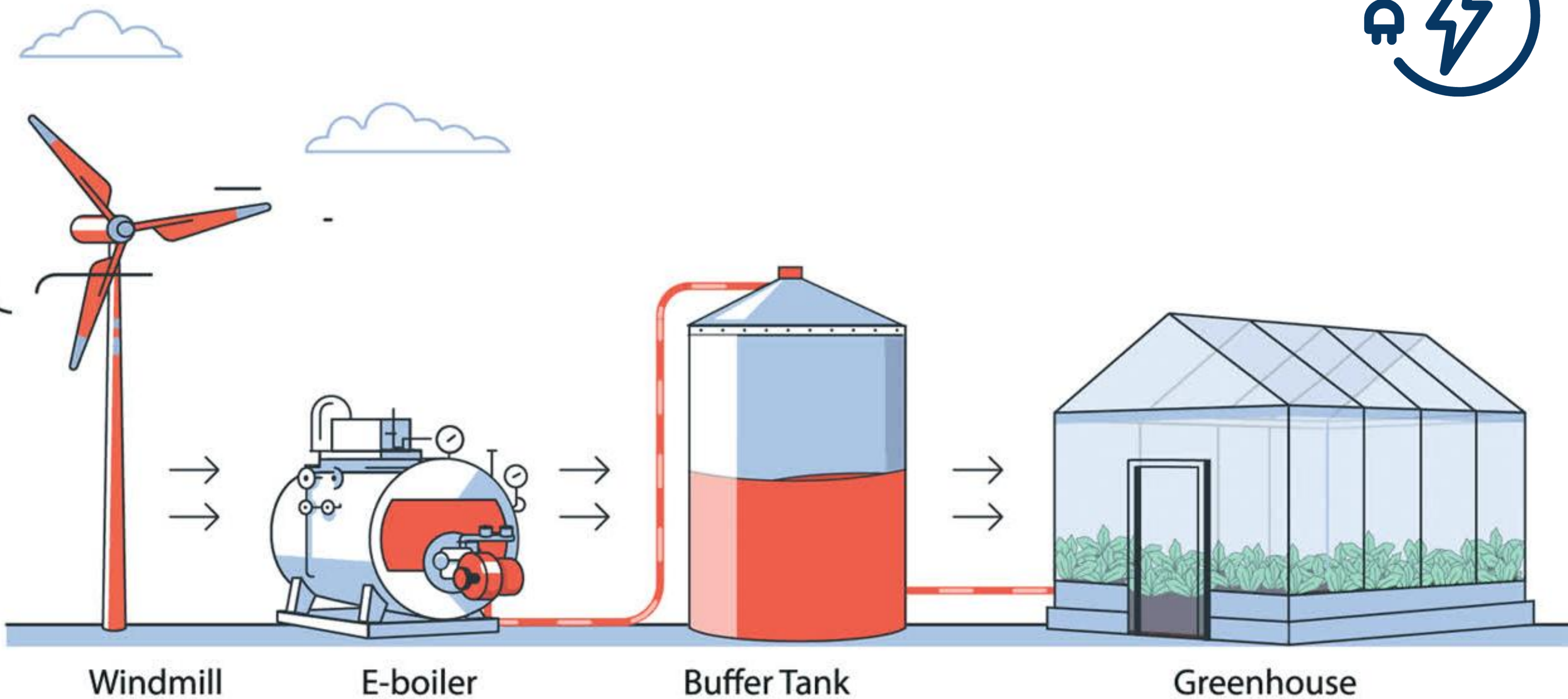
# Electrical Boilers

E-boilers come in all sizes, 100 kW to 100 MW

Turn electricity into heat

Combine with heat storage



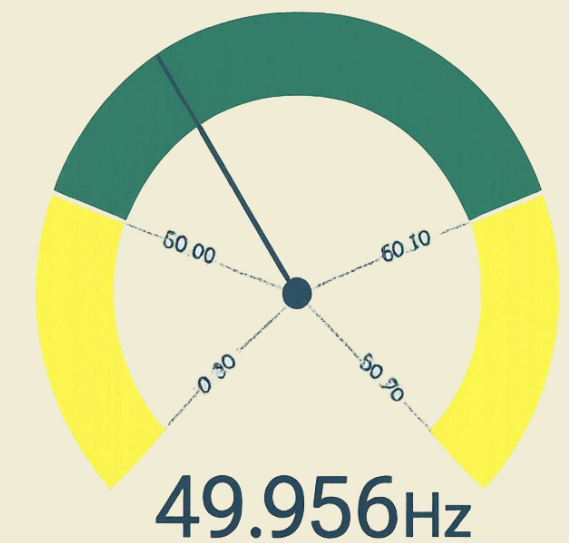
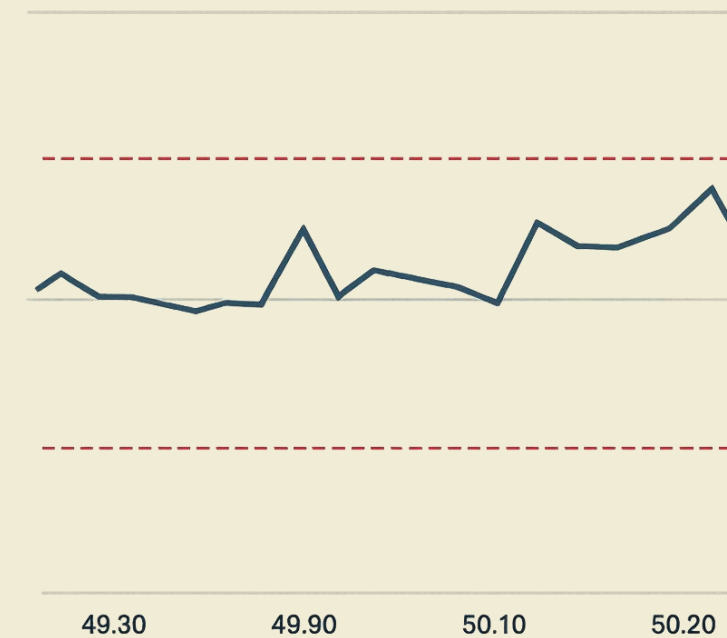


# Reserve and Balancing Markets

Turn flexibility into revenue



Electric system frequency







# Reserve and Balancing Markets

Turn flexibility into revenue

## Why do we need reserve markets

Production and consumption  
always needs to be in balance

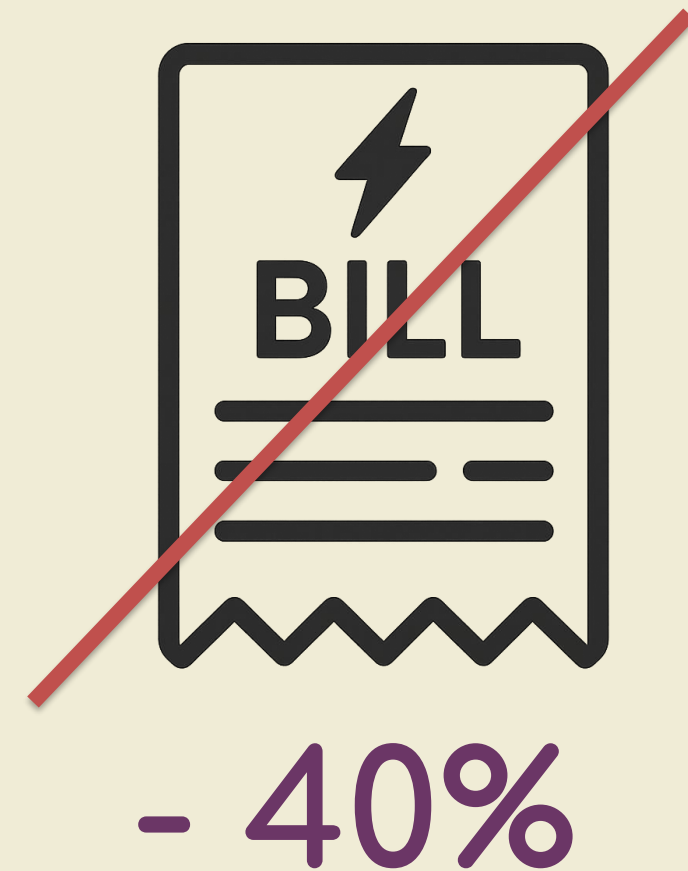
## The market needs flexible assets

Perfect for flexible electrical  
assets



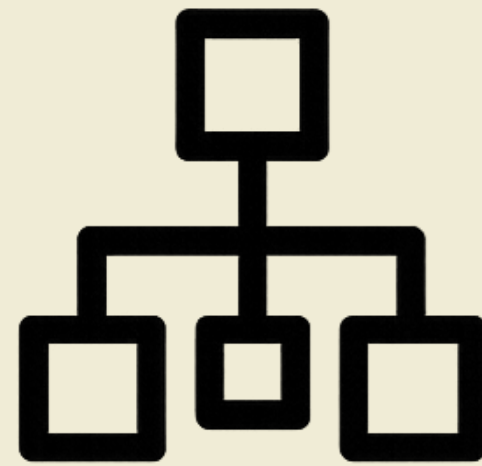
# Finland as an example in 2024

"In 2024, a Finnish greenhouse covered over 40% of its electricity costs through revenues from reserve and balancing markets."





**You**



**Aggregator**

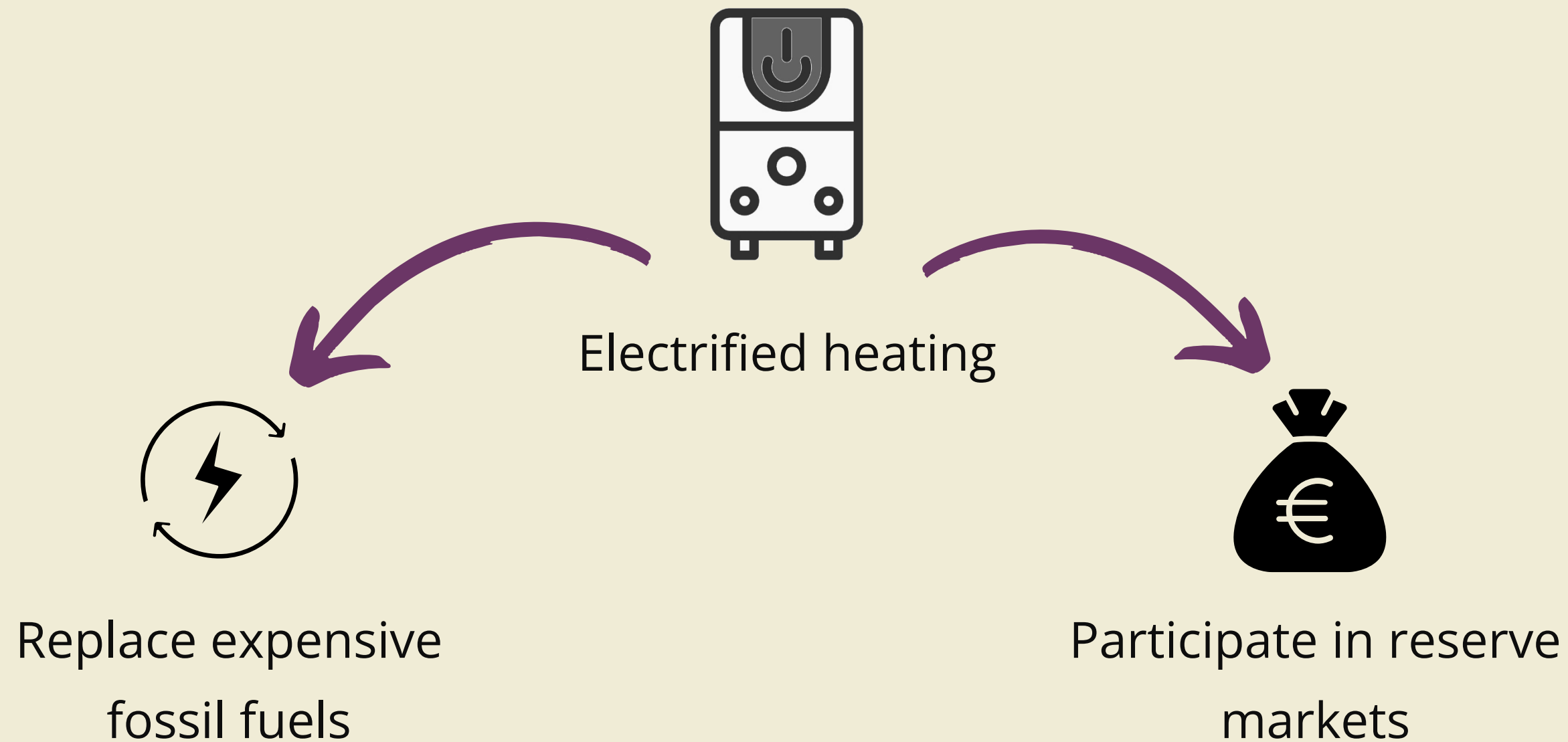


**Grid Operator**





# One Asset Two Income Streams



# Thank you!

Lukas Sigg





# Screening as a path to achieve more efficient growing

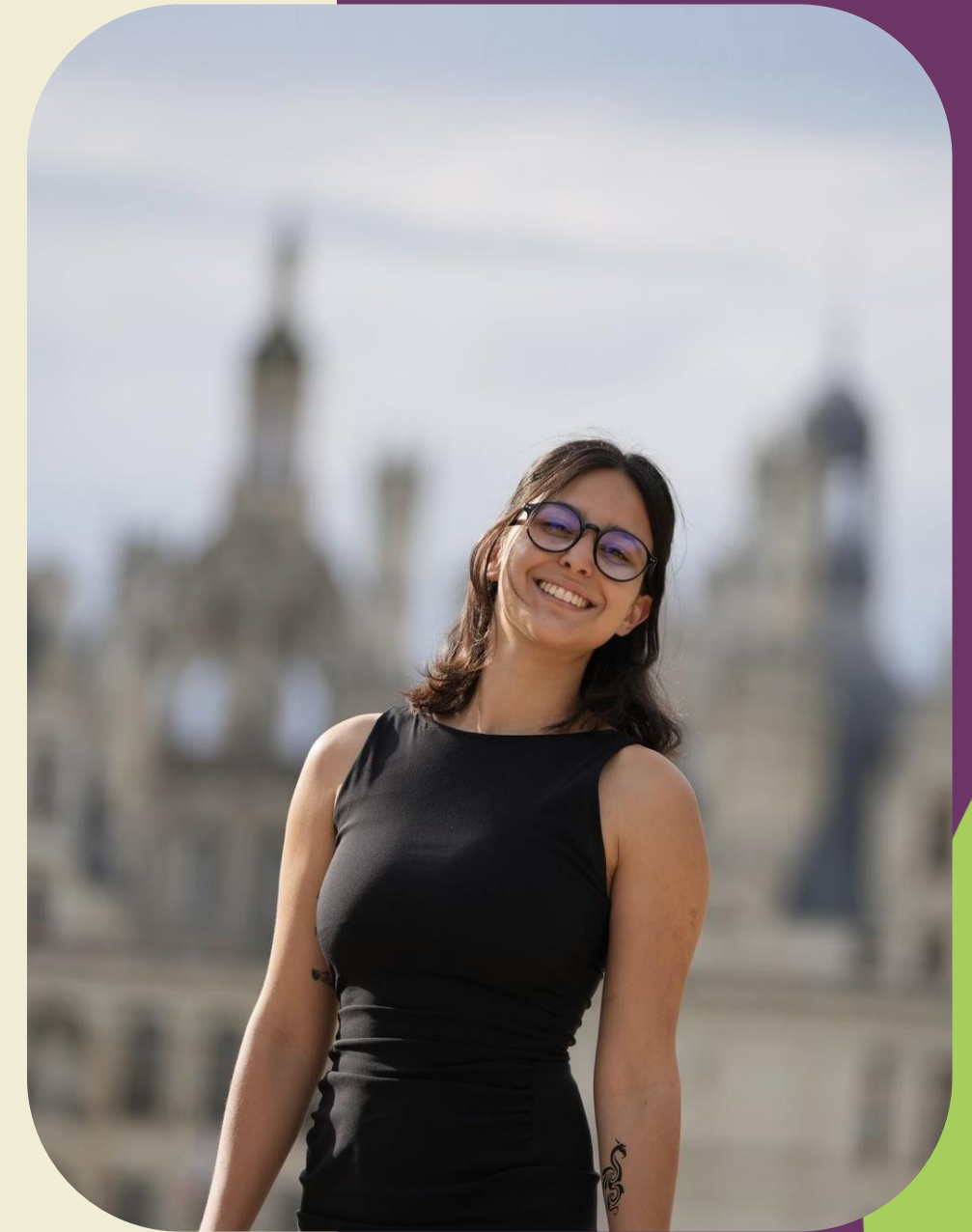
Paula Rico





# Hi, I'm Paula!

- 🌿 Horticulture and Business Management, HAS | 2026
- 🌿 Internship at Hoogendoorn + PE staff | 2025
- 🌿 High-Tech Agricultural Solutions Minor | 2024
- 🌿 Plant Empowerment Summer School | 2024
- 🌿 Internship at Nunhems & Growy | 2021
- 🌿 Plantanova



# The aim



Healthier plants



Energy saving



Lower costs > Higher profit



# The struggles



Edema



Prinzenberg, A.E. (2021)



Fungal diseases



Chang et al. (2025)



Lack of Ca



Yara, 2018





# The struggles



Lack of Ca



Yara, 2018

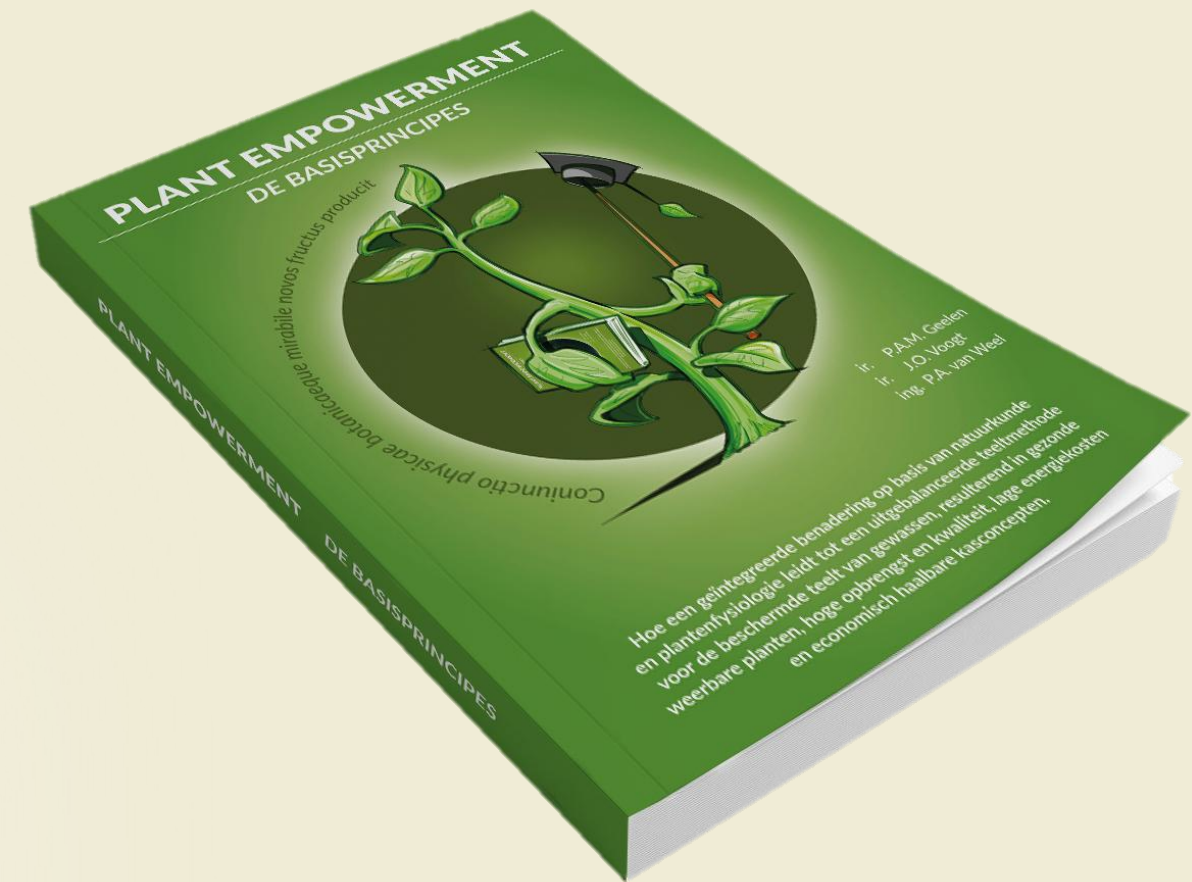
With Calcium, there is no point of return



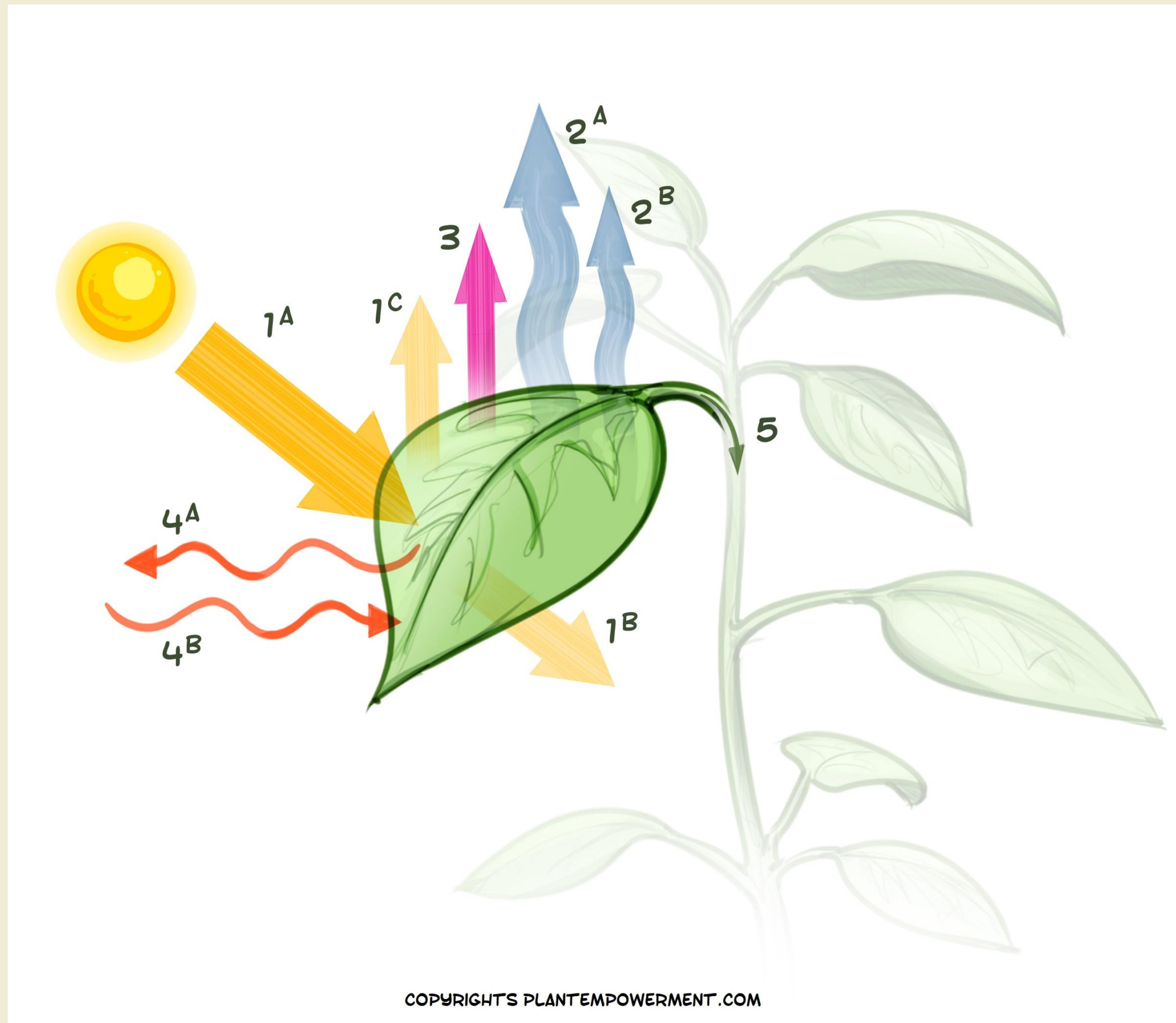
# We all want this...



Source: Plant Empowerment







Source: Plant Empowerment





# Let's talk about screens

- Reduction of light pollution
- Lower levels of sunlight
- Diffuse light
- Lower influence from outdoor conditions
- Decreased energy consumption
- Prevention of cold heads

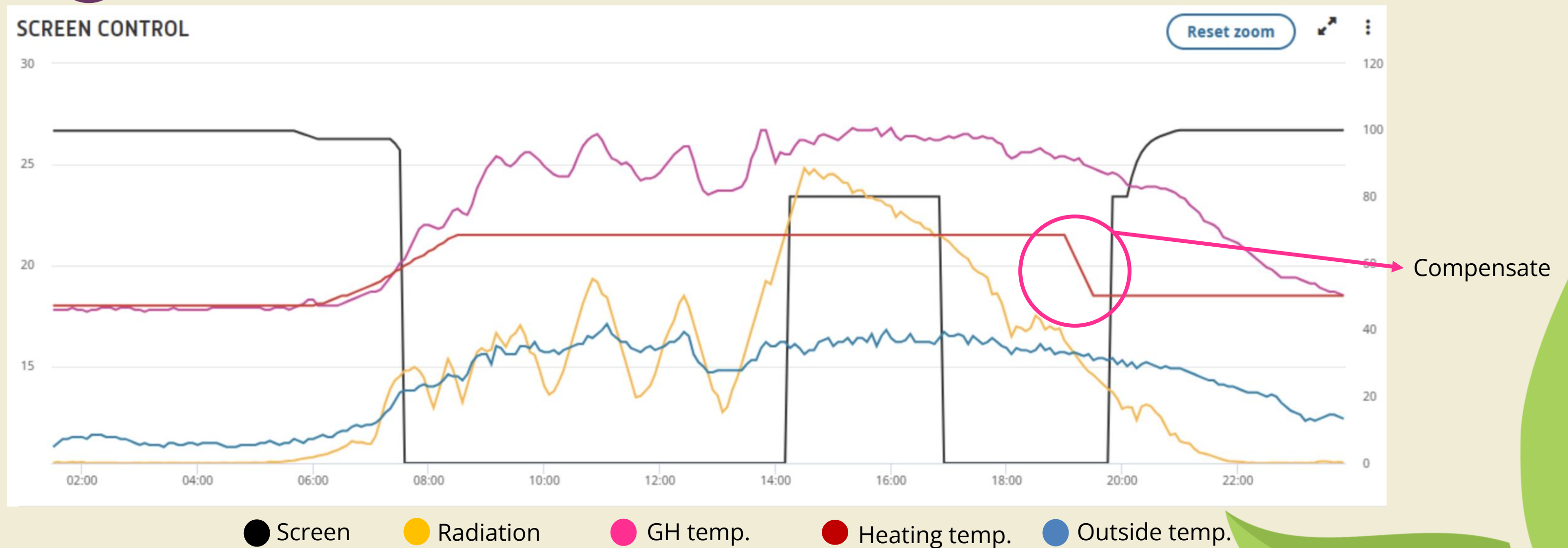


Source: Ludvig Svensson, 2019



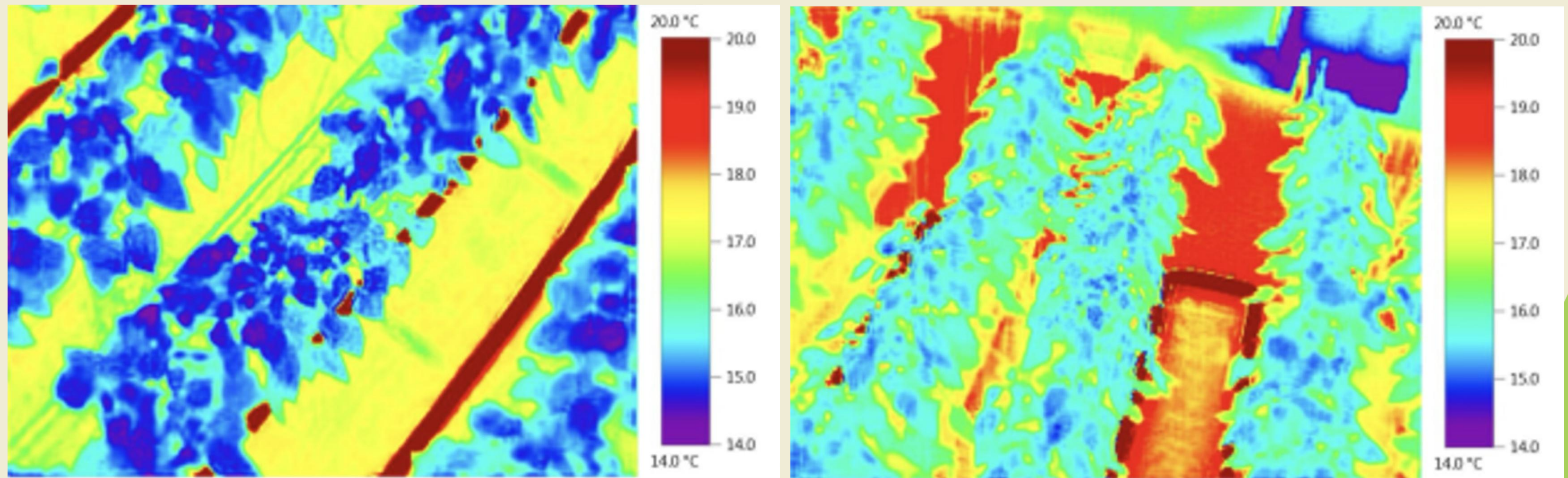
# Guidelines

## 1 Screen against condensation, mainly at sunrise & sunset





- 2 Always assume that there is *heat emission* -> more on clear than cloudy nights



Source: Feije de Zwart, 2016 ; Young peppers

Change 1.5°C without any heating costs!



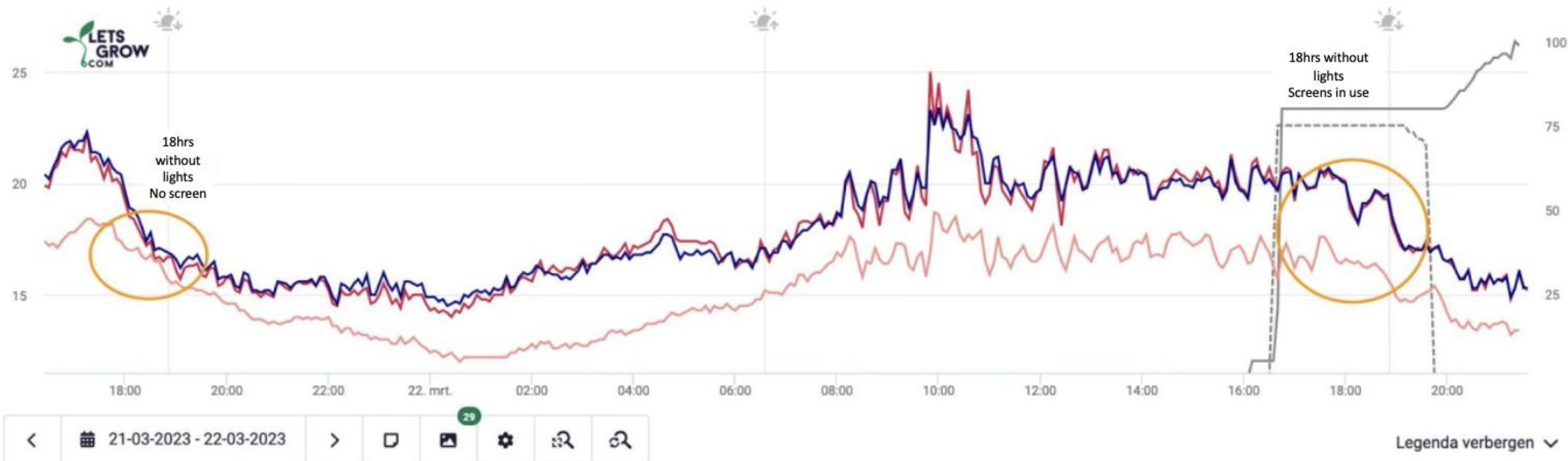




**Peter Ninhuys** • 2nd  
Teeltmanager bij Van Gog Kwekerijen C.V.  
2yr • 🌱

## ⋮ Crop dew point

? Support



● Dew point ● Crop temperature ● Head temperature ● Screens



# More Ca in the sap



Luuk van Duijn; Source: Kas Als Energiebron

## Key Insights:

Started closing the screen at the end of the day by 80% until night temperature was reached. This increased evaporation at the top of the plant.

They analyzed leaves every 2 weeks..

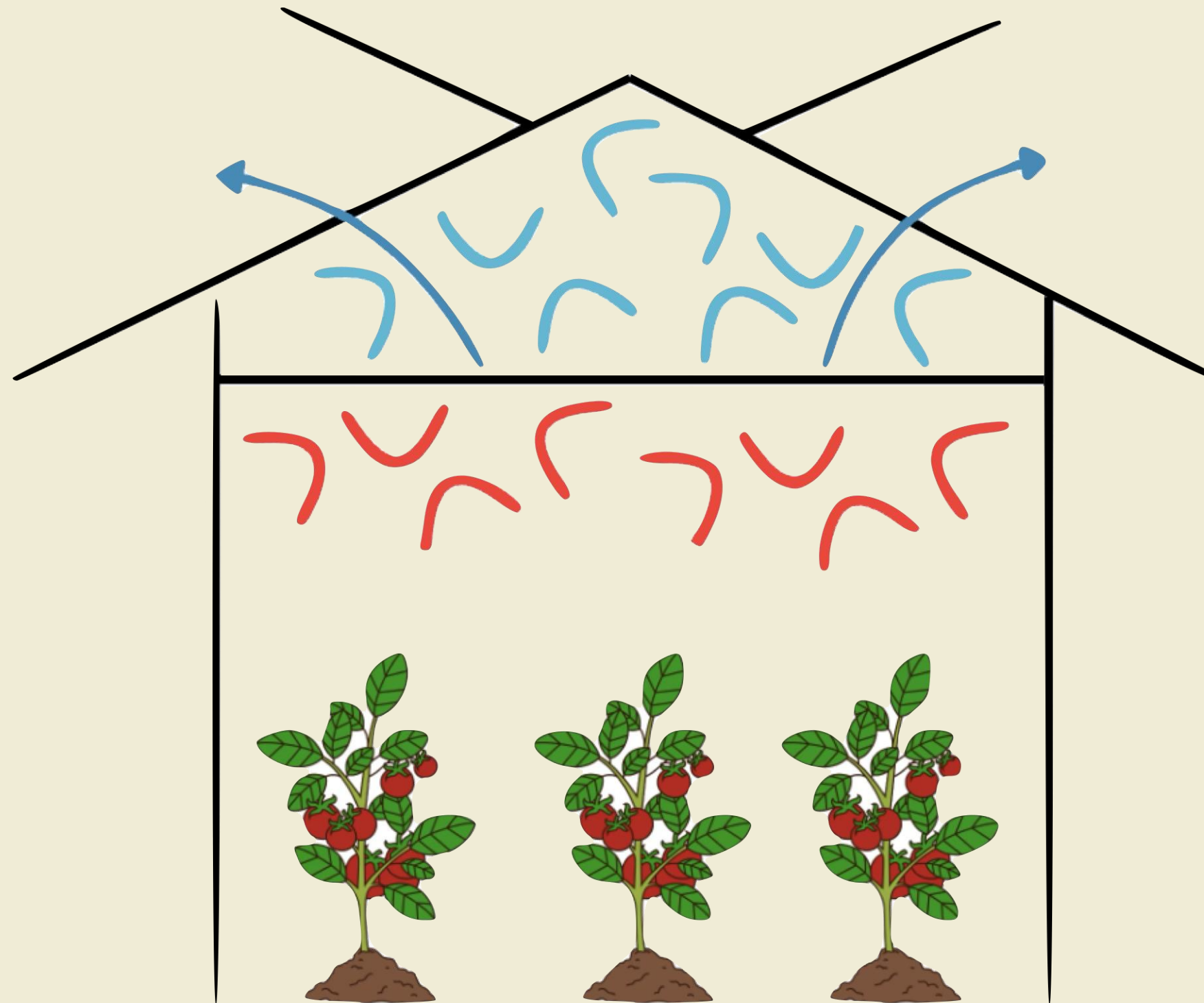
Found higher Ca levels in the sap of the young leaves

They also used 0.5 m<sup>3</sup>/m<sup>2</sup> less gas vs. last year

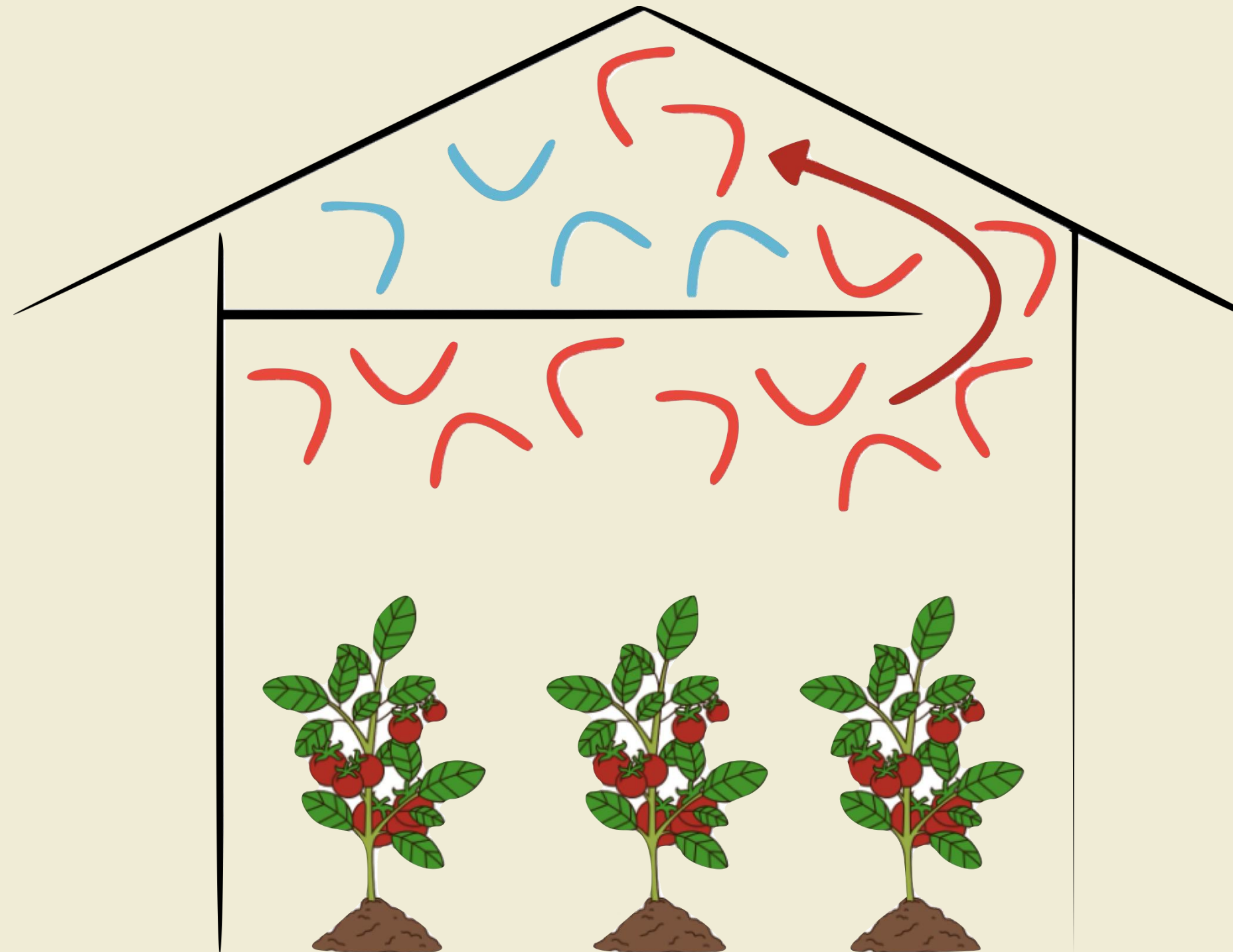




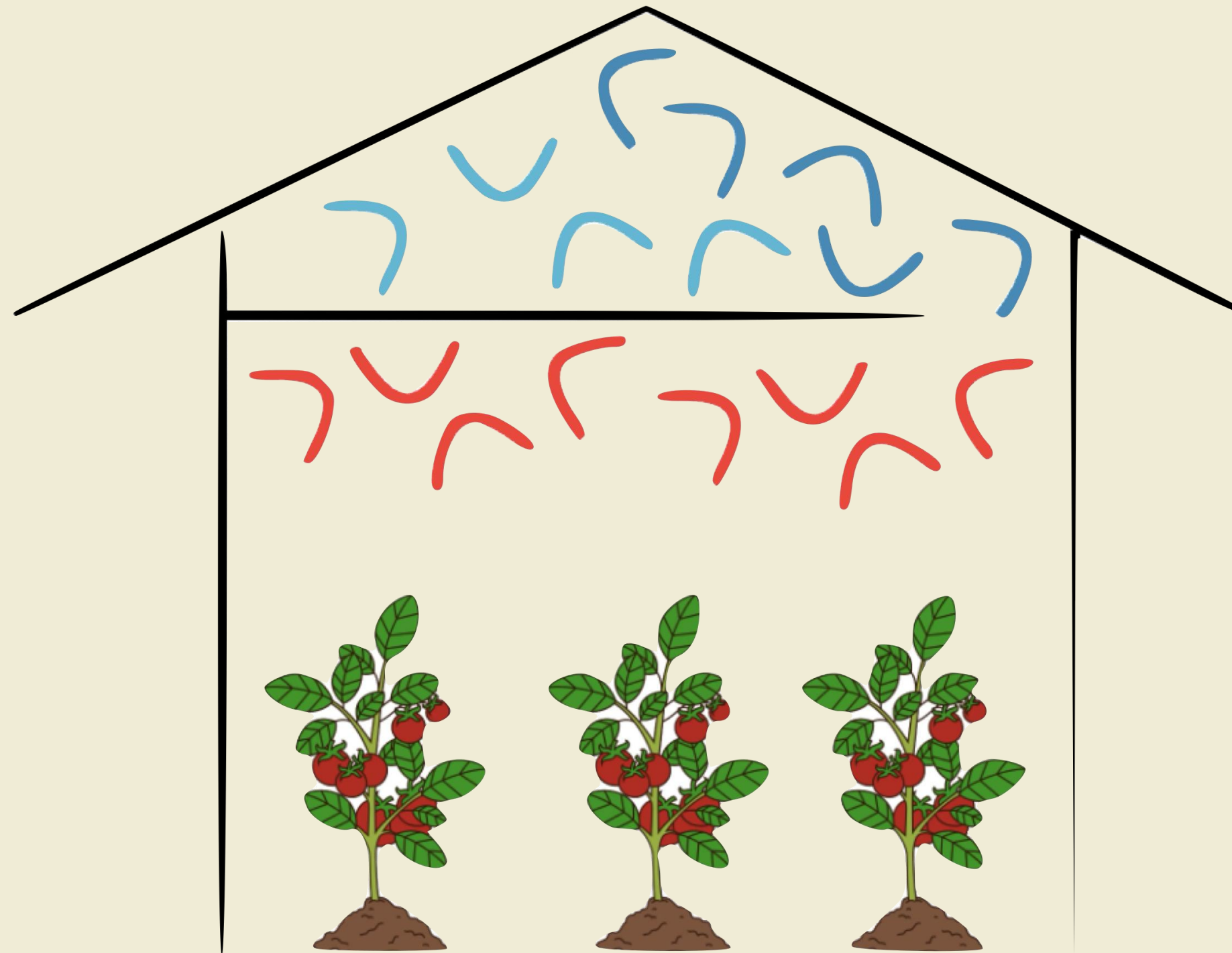
- 3 Close the screens as much as possible to avoid cold drops



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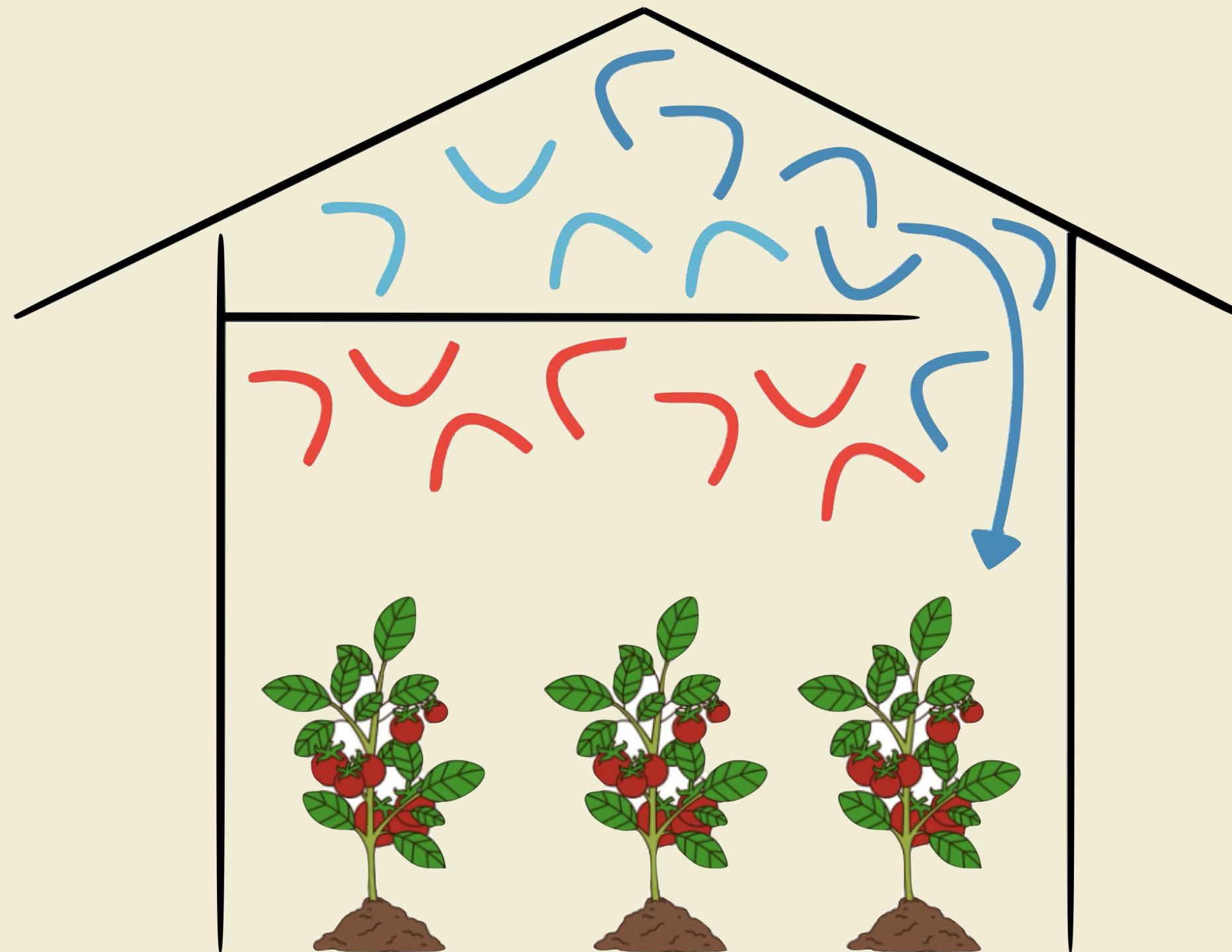


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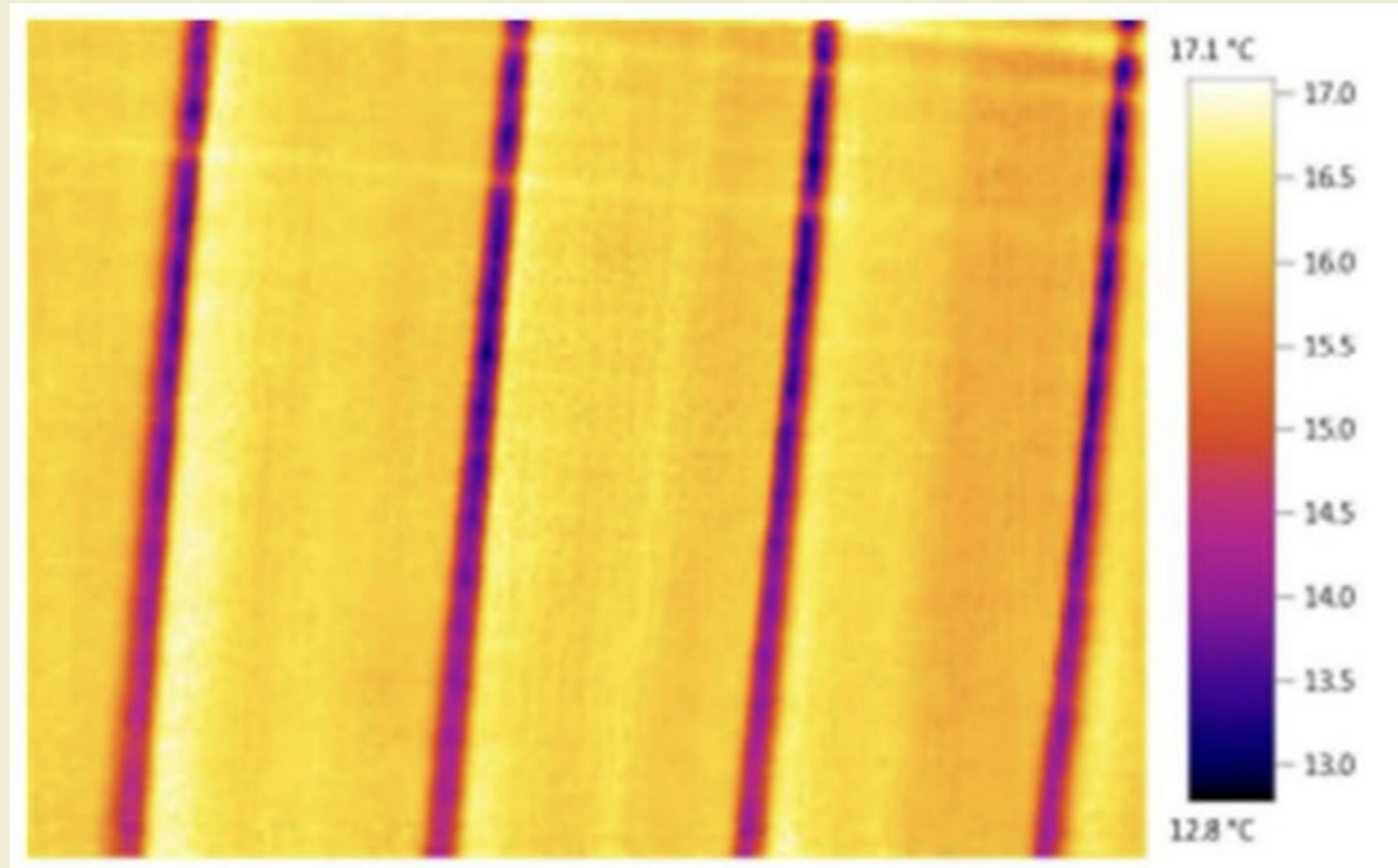




- 3 Close the screens as much as possible to avoid cold drops



## Gaps between the screens



Source: Feije de Zwart, 2016 ; screen XLS SL95 W/W



# Sunrise screening strategy

Cold season

Prevent fall of vertical cold air



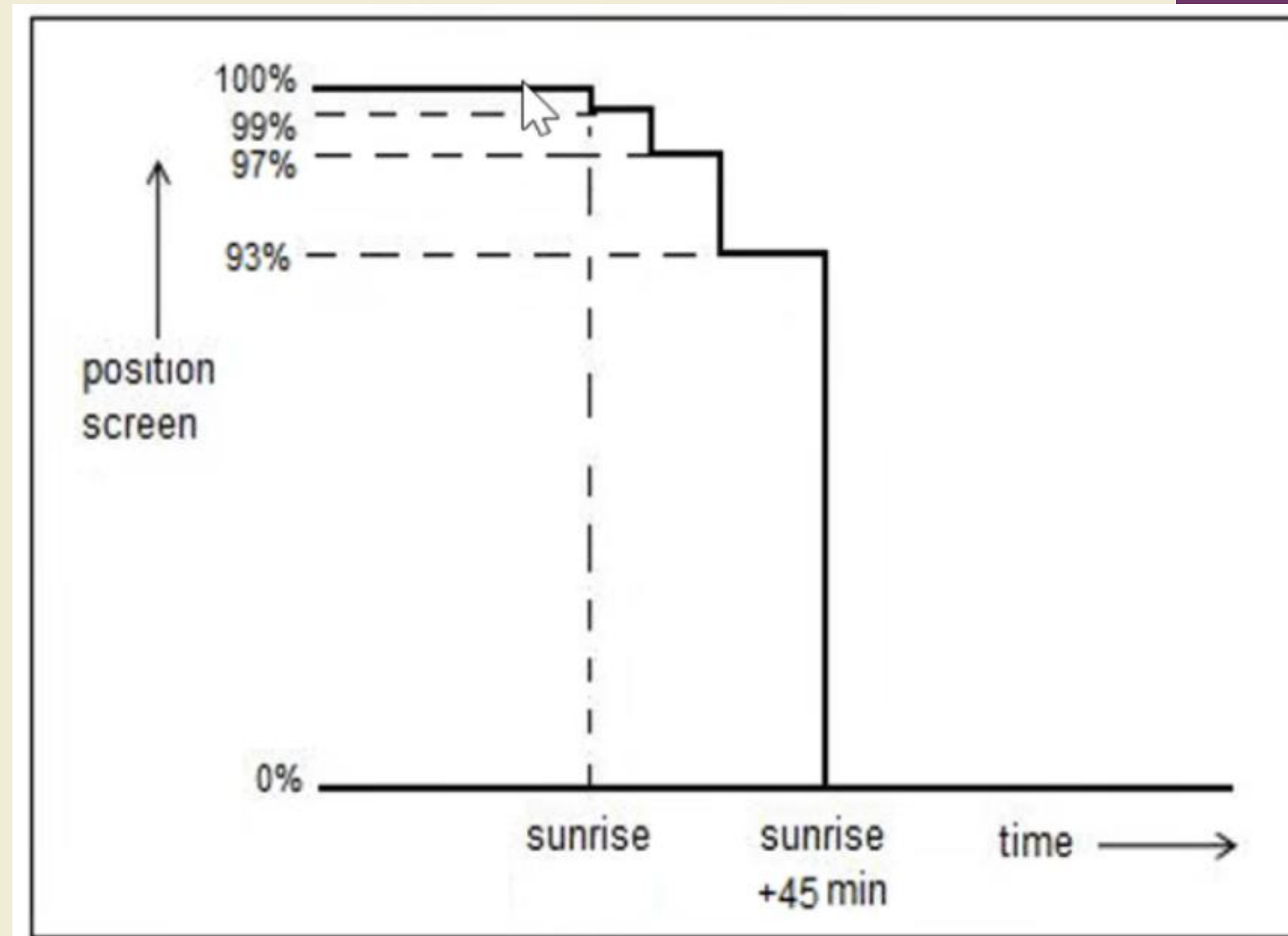
Avoid cold plants



Avoid condensation



Avoid fungi, low Ca, edema...



Source: Paul Arkensteijn,  
Svensson



# Screening strategy

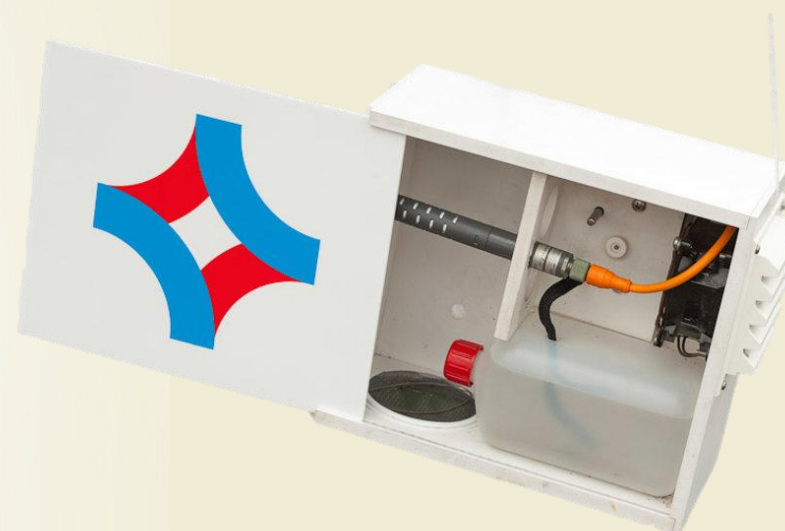
- Screen against heat emission, mainly at sunset & sunrise
- Close the screens as long as possible for an even climate and to avoid cold drops
- Initiate the day smoothly -> the colder, the more steps!







Use the tools available!



# Thank you!

Paula Rico



**Paula Rico**

Future Data Driven Growing Specialist





# Tiny Titans

Fleur Bruinen

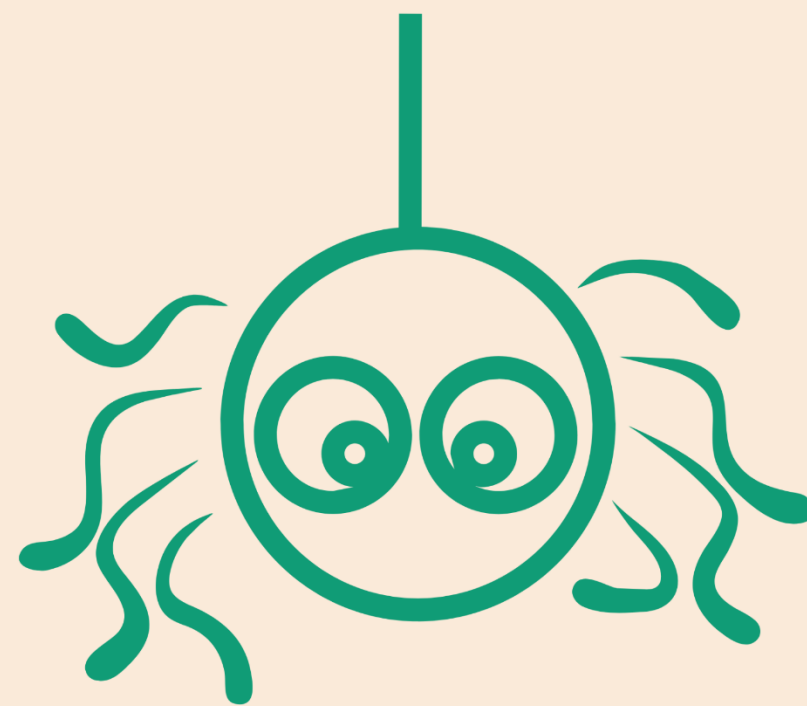




# Hi, I'm Fleur!

Co-owner of Little Spider  
B.V.





LITTLE  
SPIDER BV





# kick-off question

Who is already working with biological control agents in their greenhouse?



# Little Spider in Action

LITTLE SPIDER CATCHES AN APHID

 LITTLE  
SPIDER BV



What will you do when  
spraying is no longer an  
option?





A man with grey hair, wearing a dark blue polo shirt with a small logo, is standing in a large greenhouse. He is surrounded by rows of orchids, with large purple orchids in the foreground and green orchids in the background. He is holding a thin vertical wire with his right hand. The greenhouse has a complex metal structure with many hanging pots and plants. The lighting is bright, suggesting a sunny day.

WOS

the ladies who are going to harvest in the morning who were bothered



# Breeding the Spiders



# What do they do?





# The Spider's web



# Hunting behavior





# Releasing the Spiders





# Little Spider Control





# Chemical Pest Control





# Key Facts



The spider is native and found throughout Europe



They love humidity and warmth, but cold doesn't kill them.



The spiders are monogamous, they stay with one partner for life.



With Little Spider, the  
Future Starts Today





# Thank you!

Fleur Bruinen



Propagation  
at the other  
side of the  
world







**plantanova**

# Propagation at the other side of world







***Suagro***  
S.R.L

# The strategy of scent

Pheromone-powered pest control in Propagation



Expert in natural solutions

Together towards green and sustainable  
cultivation methods for your crop





# Hi, I'm Jürgen!

Commercial Manager at  
HortiPro



**HortiPro**.com

Plant

Soil &  
substrate

Plant  
Protection  
Products

Water &  
fertilizers



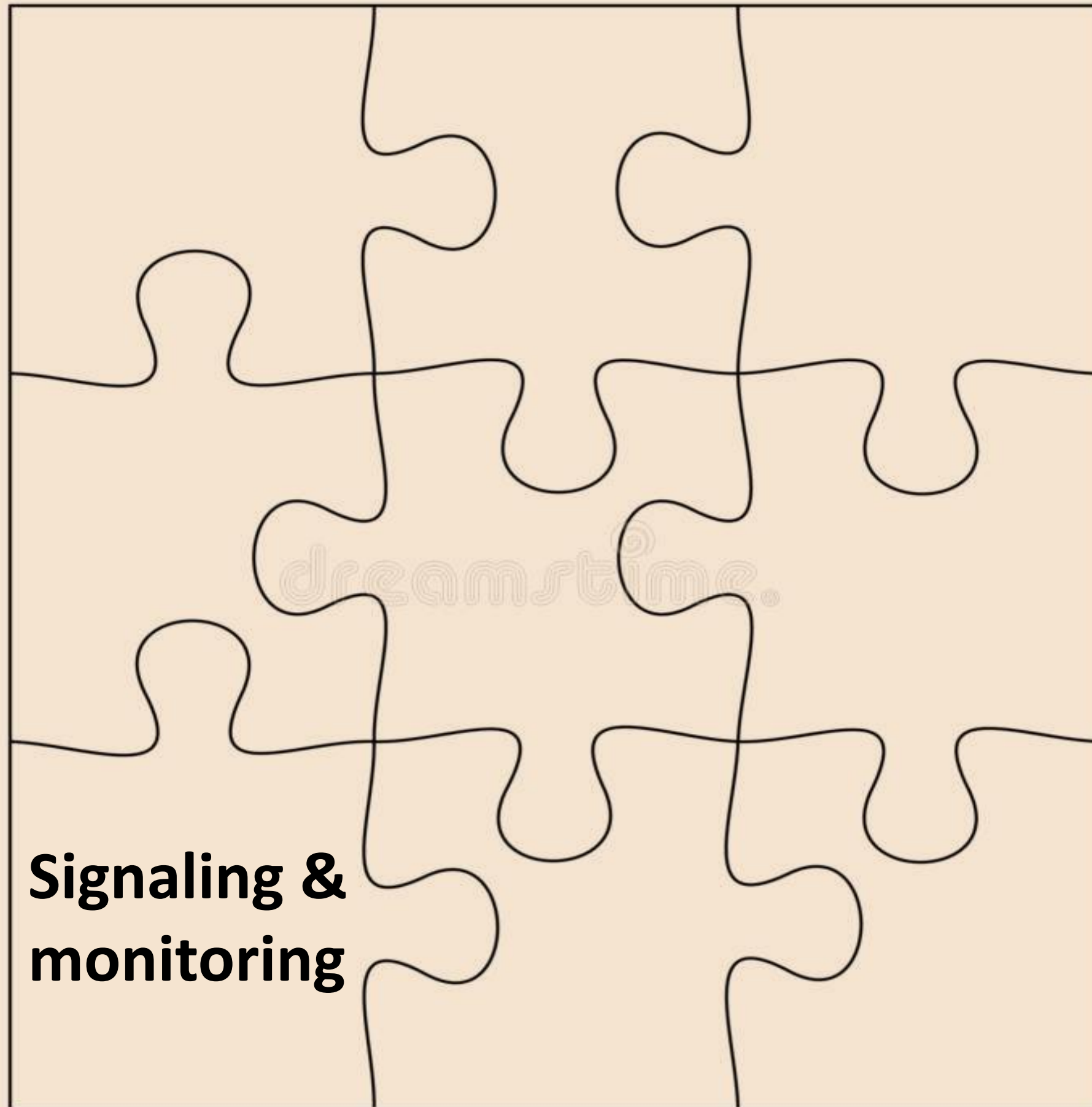
**HortiPro**.com

# Trends in crop protection:

- Social and political concerns.
- Decreasing approved active ingredients. (chemicals)
- More stringent registration requirements.
- Decreasing number of applications on labels.
- The toolbox emptier → lack of curative measures.
- Growing role for green, less environmentally harmful solutions.
- Requires different mindset (IPM → ICM)



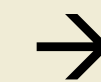




Growing puzzle remains the same size but becomes more complex



We need more puzzle pieces to complete the cultivation puzzle.



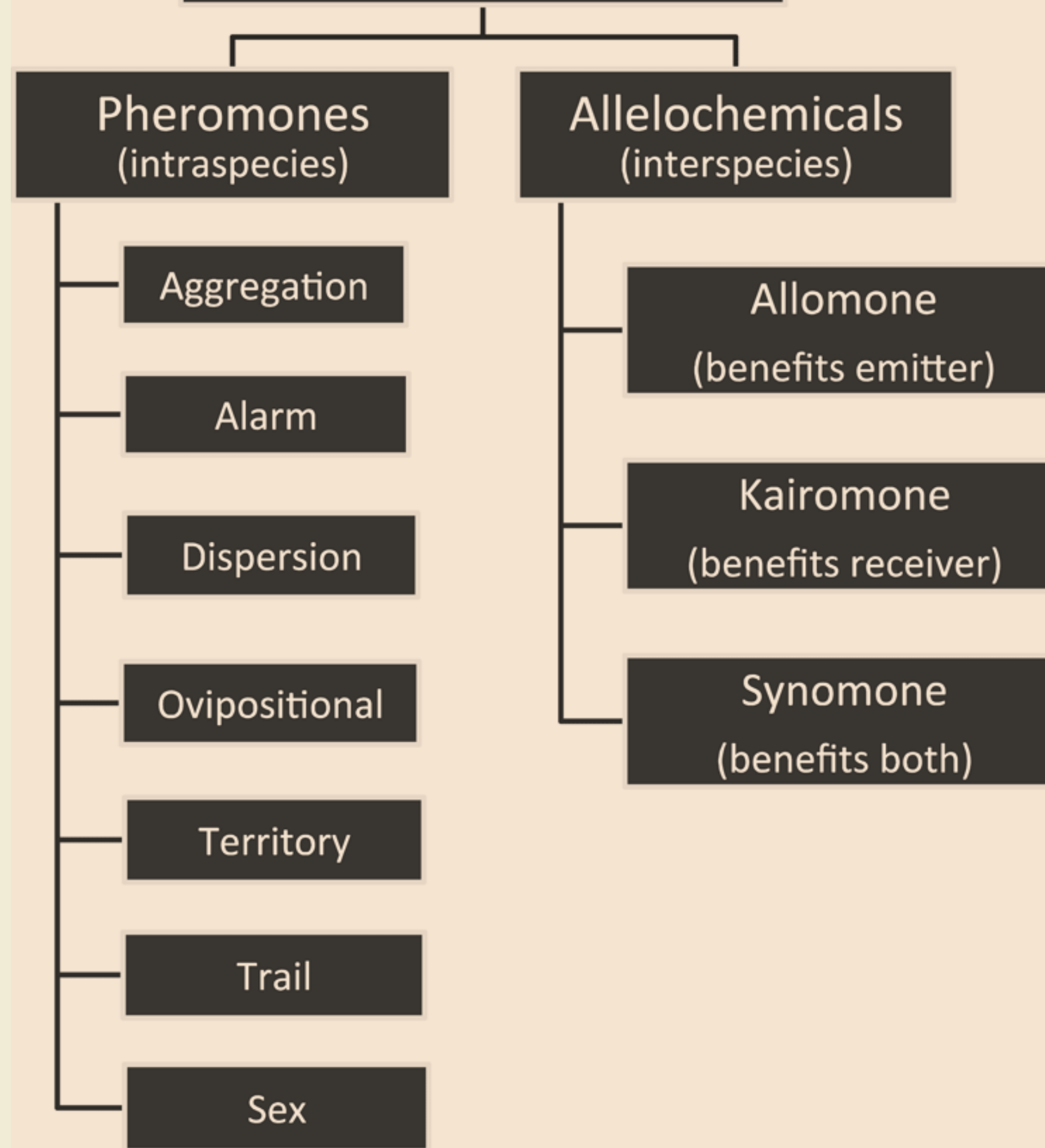
Systems approach (ICM)

**HortiPro**.com

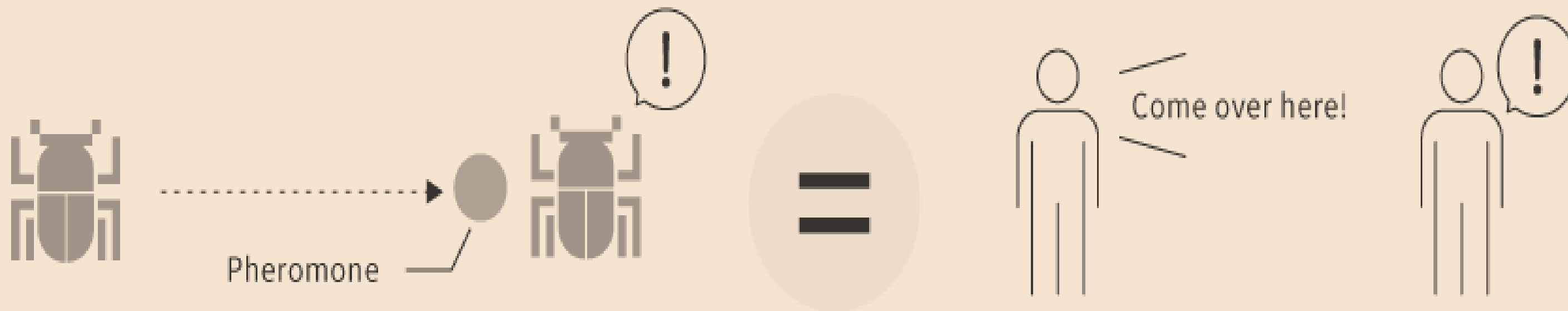


# Semiochemicals (Infochemicals)

Source: John J. Beck/ USA



**HortiPro**.com



insect communication using pheromones is the same as Human communication by language

Source: Fuij Flavor Co., LTD Japan



**HortiPro**.com



# What can we do with pheromones?

**Mating disruption: Isonet-T®; tomato leaf miner (*Tuta absoluta*)**  
Crop protection registration required.



**Signaling & monitoring:**  
Crop protection registration not needed





# Signaling and monitoring



Present situation: delta trap in combination with glue bottom or sticky plate with or without pheromone.

## Disadvantages:

- Attracts only male insects.
- Short acting pheromones.
- Do not touch with hands.





# New SemeonPro Line

New type of pheromones for different insects.

## Advantages:

- Duo pheromones; attracts male and female insects.
- Longer acting pheromones
- Do touch with hands.
- 3-7 days earlier detection
- 35-40% more insects attracted



**HortiPro**.com





# SemeonPro™ feromonen

- 10 pheromone dispensers.
- Dispensers are packed airtight.
- Resealable aluminum packaging.
- Store in the refrigerator or freezer.
- Shelf life up to 24 months.
- Operating time 6 - 8 weeks.





**HortiPro**.com

feromoon - pheromone - Pheromon - phéromone - feromona - feromônio - feromone  
 феромон - feromon - فيرومون - فرمون - feromón - פרומון - φερομόνη - ფერომონი

♀♂

### PheroThrip 2.0 10x Trips / Thrips

 + 4C°  
 - 18C°  
 07/2024

8 718564 162998

**SemeonPro**  
 PHEROMONES


HortiPro BV [www.hortipro.com](http://www.hortipro.com)

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### PheroBem™ 10x Bemisia tabaci

 + 4C°  
 - 18C°  
 07/2024

8 718564 163124

**SemeonPro**  
 PHEROMONES

HortiPro BV [www.hortipro.com](http://www.hortipro.com)

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♀♂

### PheroDes™ 10x Trialeurodes vaporariorum kas wittevlief

 + 4C°  
 - 18C°  
 09/2024

8 718564 163117

**SemeonPro**  
 PHEROMONES

HortiPro BV [www.hortipro.com](http://www.hortipro.com)

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♀♂

### PheroSuf™ 10x Sufetula diminutalis



 + 4C°  
 - 18C°  
 06/2024

8 718564 163179

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 PHEROMONES



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♀♂

### PheroDup™ 10x Duponchelia fovealis

 + 4C°  
 - 18C°  
 09/2024

8 718564 163162

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 PHEROMONES

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♀♂

### PheroCica™ 10x Empoasca vitis (druivencicade)


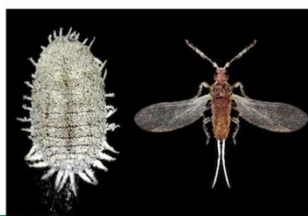
 + 4C°  
 - 18C°  
 09/2024

8 718564 163346

**SemeonPro**  
 PHEROMONES



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 феромон - feromon - فيرومون - فرمون - feromón - פרומון - φερομόνη - ფერომონი

♀♂

### PheroCitri™ 10x Planococcus citri citruswolluis

 + 4C°  
 - 18C°  
 10/2025

8 718564 163292

**SemeonPro**  
 PHEROMONES

HortiPro BV [www.hortipro.com](http://www.hortipro.com)

feromoon - pheromone - Pheromon - phéromone - feromona - feromônio - feromone  
 феромон - feromon - فيرومون - فرمون - feromón - פרומון - φερομόνη - ფერომონი




♀♂

### PheroDeixis™ 10x Chrysodeixis chalcites (Turkse mot)

 + 4C°  
 - 18C°  
 09/2024

8 718564 163155

**SemeonPro**  
 PHEROMONES


HortiPro BV [www.hortipro.com](http://www.hortipro.com)

feromoon - pheromone - Pheromon - phéromone - feromona - feromônio - feromone  
 феромон - feromon - فيرومون - فرمون - feromón - פרומון - φερομόνη - ფერომონი




♀♂

### PheroTuta™ 10x Tuta absoluta tomatenmineermot

 + 4C°  
 - 18C°  
 06/2024

8 718564 163308

**SemeonPro**  
 PHEROMONES

HortiPro BV [www.hortipro.com](http://www.hortipro.com)

feromoon - pheromone - Pheromon - phéromone - feromona - feromônio - feromone  
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♀♂

### PheroRadicum™ 10x Delia radicum (koolvlieg)


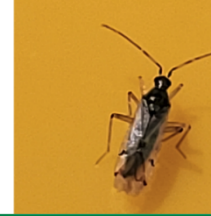
 + 4C°  
 - 18C°  
 05/2024

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♀♂

### PheroNesi™ 10x Nesidiocorus tenuis

 + 4C°  
 - 18C°  
 07/2024

8 718564 163254

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# Thank you!

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