GREEN SMILE

MOROCCO BERRY CONFERENCE 2024

Svensson
Pieter Mol

14th November 2024

Innovative Solutions: Explore the latest technologies and solutions that are transforming the berry production landscape. Discover the innovations driving the berry industry forward.

Pieter Mol

International Senior Advisor/Consultant at **Svensson**

(Since May 2016)

- 35 Years experience international Agri- & Horticulture

“I’m helping growers with a ‘tailor-made’ climate & screen advice with a clear focus on local needs & circumstances, and give advices, how to realize an optimal greenhouse climate, and plant performance”

Agenda:

- Company Svensson
- Plantempowerment
- Plant balances
- Key challenges in “Hot Climates” - Berries
- Light & Diffuse Light:
  - Effects of Diffuse screen in practice (general)
  - Yellow net vs Diffuse screen in Raspberry
  - Diffuse screen & White groundcover in Blueberry
  - Conclusion effects diffuse light
- Mediterranean info / trends
- Trends for next steps

Challenge Accepted!

About the company Svensson:

Global presence

- HQ, Kinna, Sweden
- Operations in 7 countries
- Production in Sweden & China

What we do
Climate solutions

Climate Screens
Climate screens for professional greenhouse cultivation

Interior textiles
Interior textiles for public spaces

+370
Employees

Our culture
Enduring
Dependable
Dynamic

Turnover
750 Msek
Export: ~88%

Family owned company since 1887
4th generation

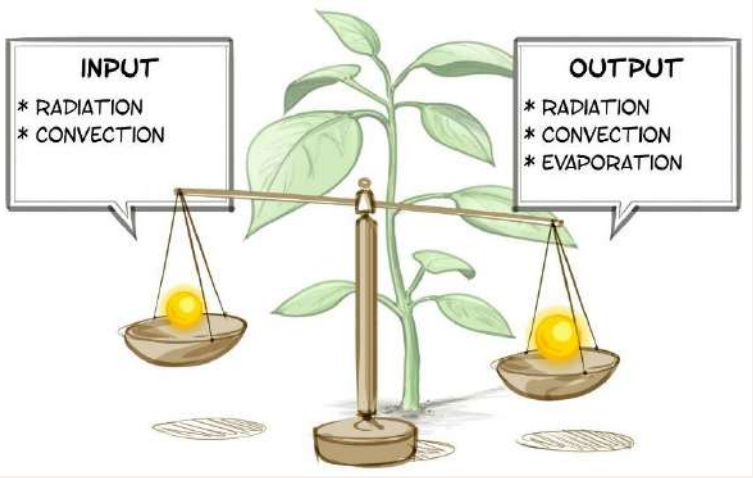
CEO: Anders Ludvigson

Plant Empowerment

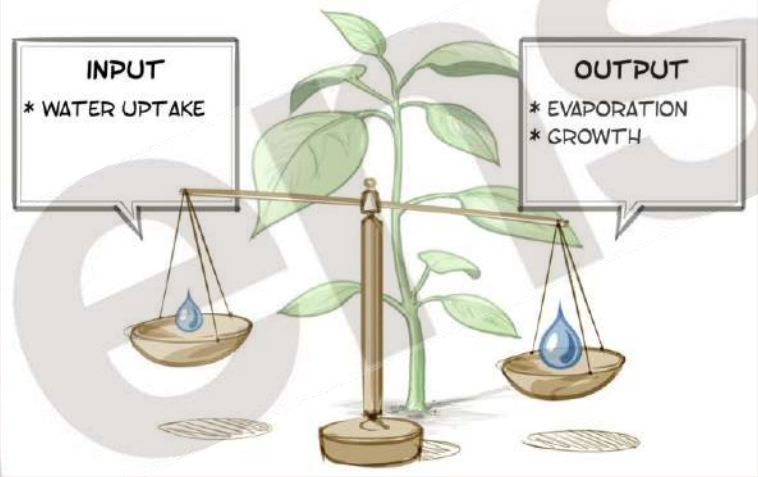
Plant Central & find the limiting factor

Plant Empowerment

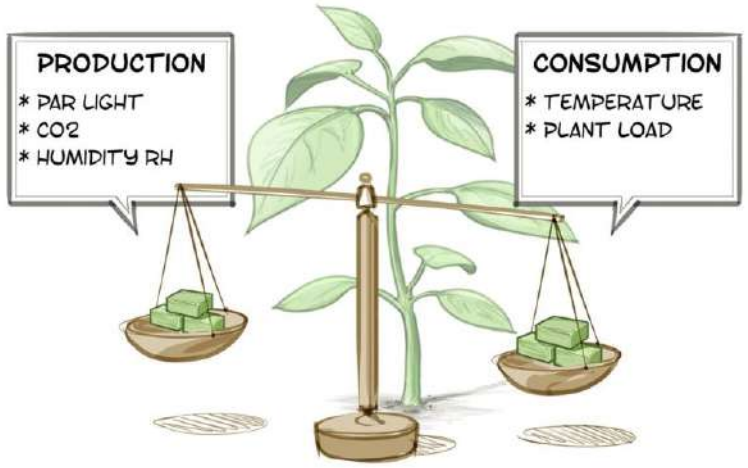
Energy



Water



Assimilates



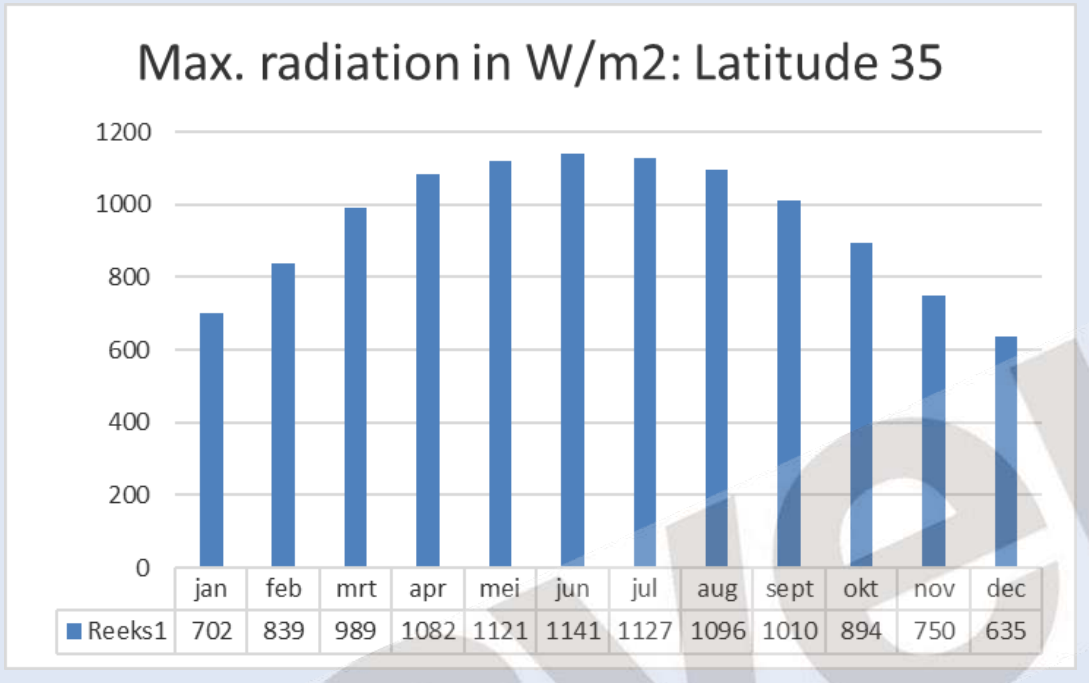
Plant balances are key

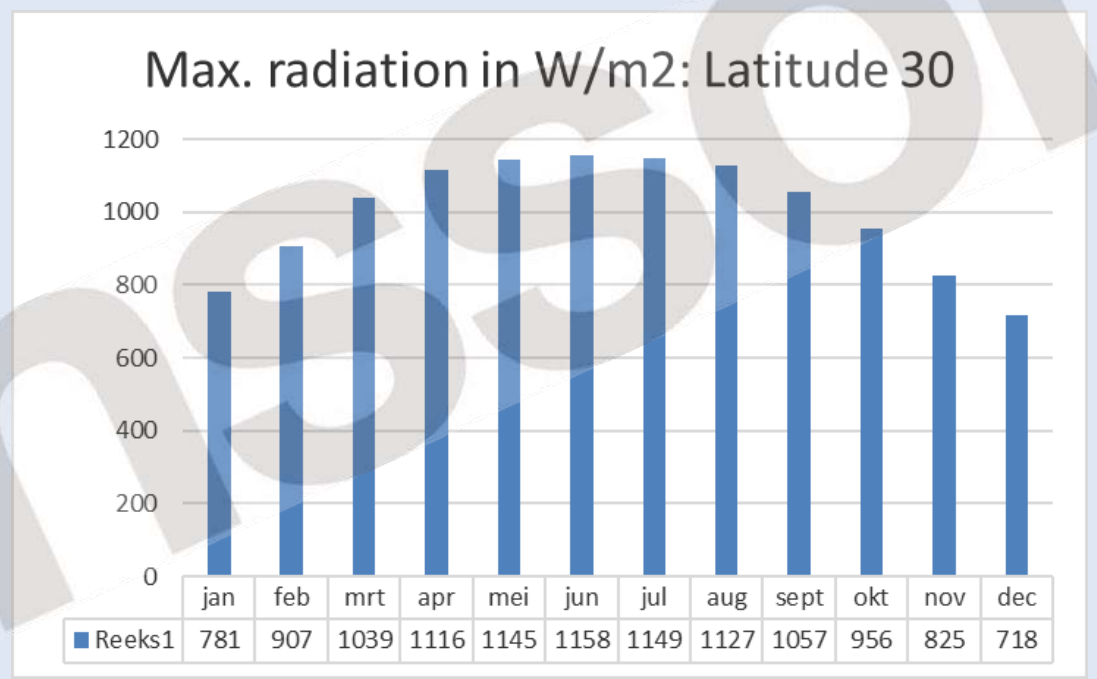
Key challenges “Hot Climates”, for Berries production:

- Increasing temperatures (up to 50 ‘Celcius)
- Heat waves from Sahara dessert (f.e. Morocco)
- Low humidity (Spring-Summer, “Hot Climates”)
- High humidity (Autumn - Winter)
- Low night temperatures (Autumn – Winter)
- Increase of Insect Pressure & Less chemical alowed
- Water availability
- Labour

- Augmentation des températures (jusqu'à 50 °C)
- Vagues de chaleur du désert du Sahara (par exemple le Maroc)
- Faible humidité (printemps-été, « climats chauds »)
- Humidité élevée (automne-hiver)
- Basses températures nocturnes (automne-hiver)
- Augmentation de la pression des insectes et diminution des produits chimiques autorisés
- Disponibilité de l'eau
- Travail / Main ‘d oeuvre

Radiation Report Larache & Agadir



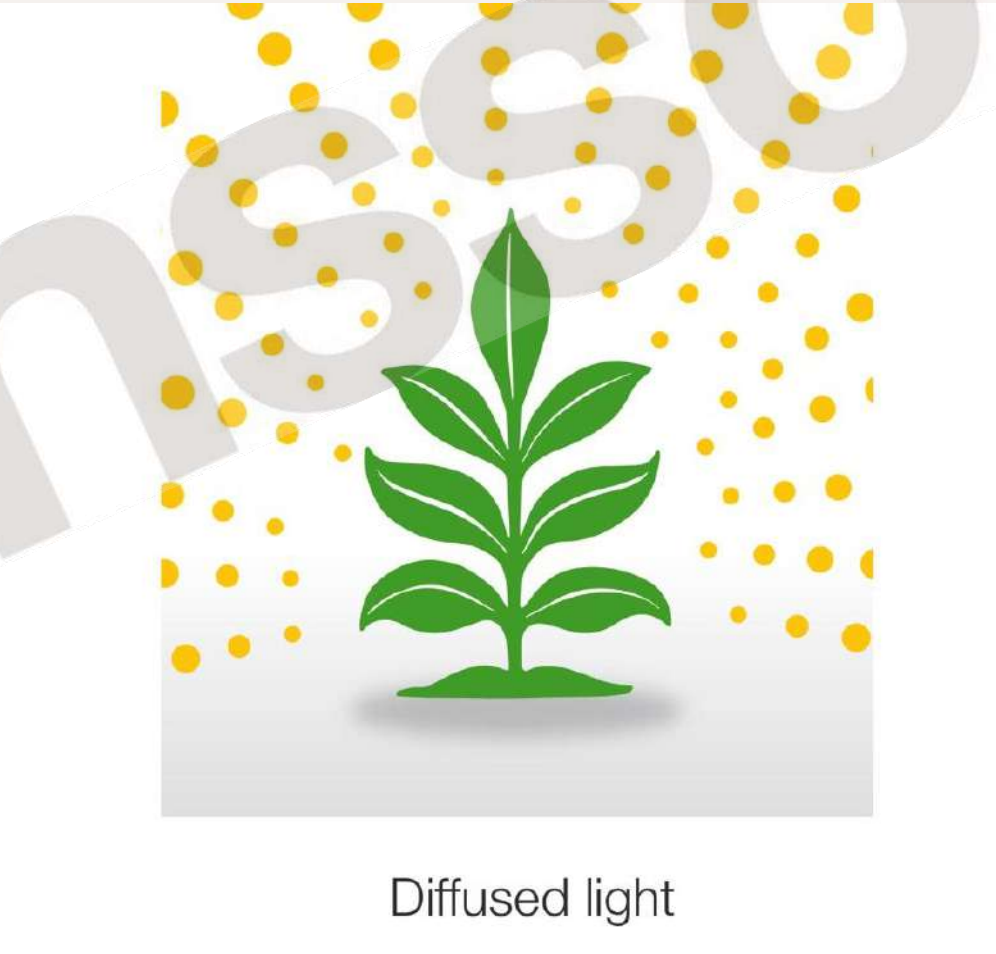


		W/m2	W/m2	W/m2	W/m2	W/m2
		800	900	1000	1100	1150
Plastic	12% Shade	704	792	880	968	1012
Screen	30% Shade	492,8	554,4	616	678	708

Diffuse light / la lumière diffuse

What is diffused light? / Qu'est-ce que la lumière diffuse?

Direct light



Diffused light

(Spain)

Shade Screens with diffuse characteristics, for:

- **High Tech Greenhouse**
- **Midium Tech Greenhouse**
- **Tradional Tech Greenhouse**
- **Macrotunnels**

Diffusing the light: How does that look like

Harmony
High grade light diffusion

Une bonne diffusion de la lumière augmente la production!

Explication : meilleure répartition de la lumière sur toute la plante.

Light diffusion leads to a higher production!

Reason: better spread of the light over the whole plant

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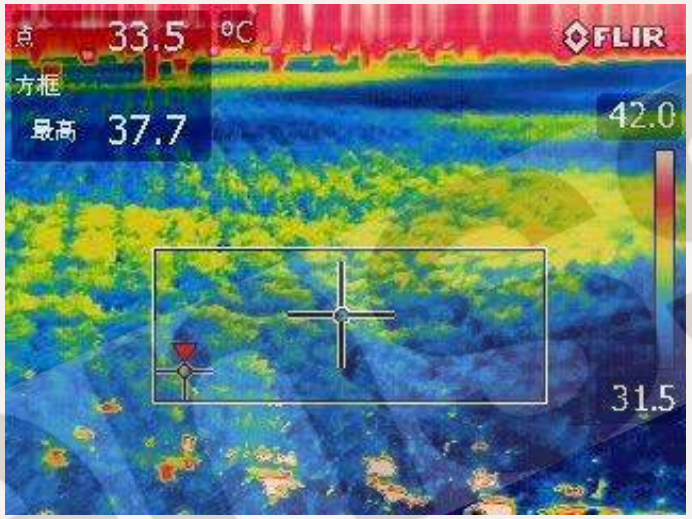
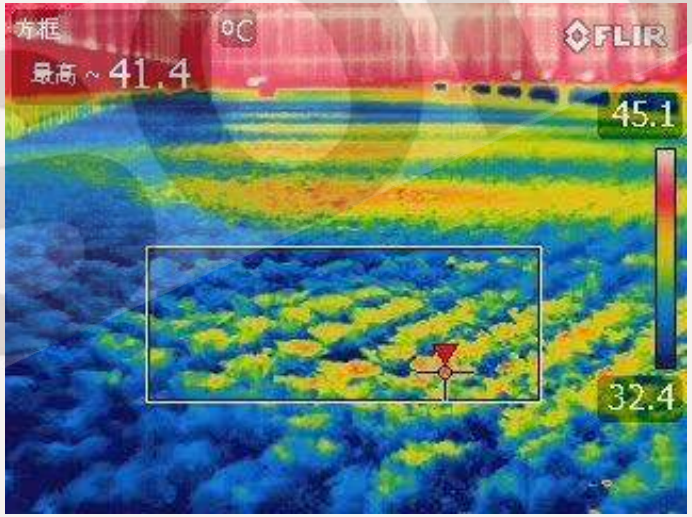
HARMONY Lower plant temperature, more even light spreading

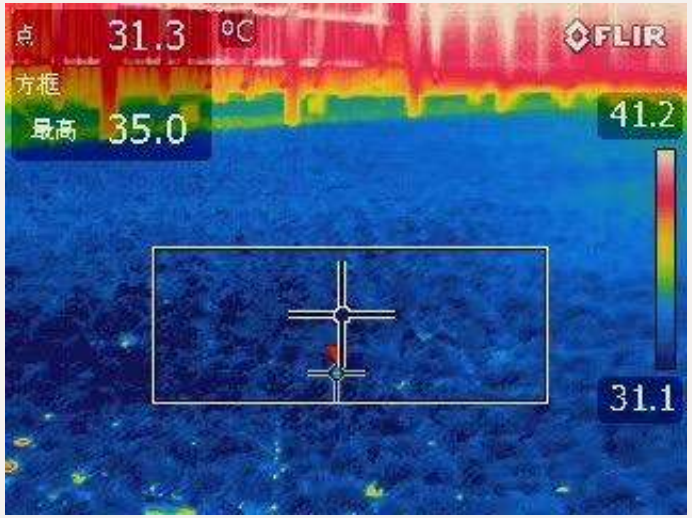
HARMONY 5747 FR in open and closed position - diffuse plastic or glass is not enough

Effect with only diffuse glass

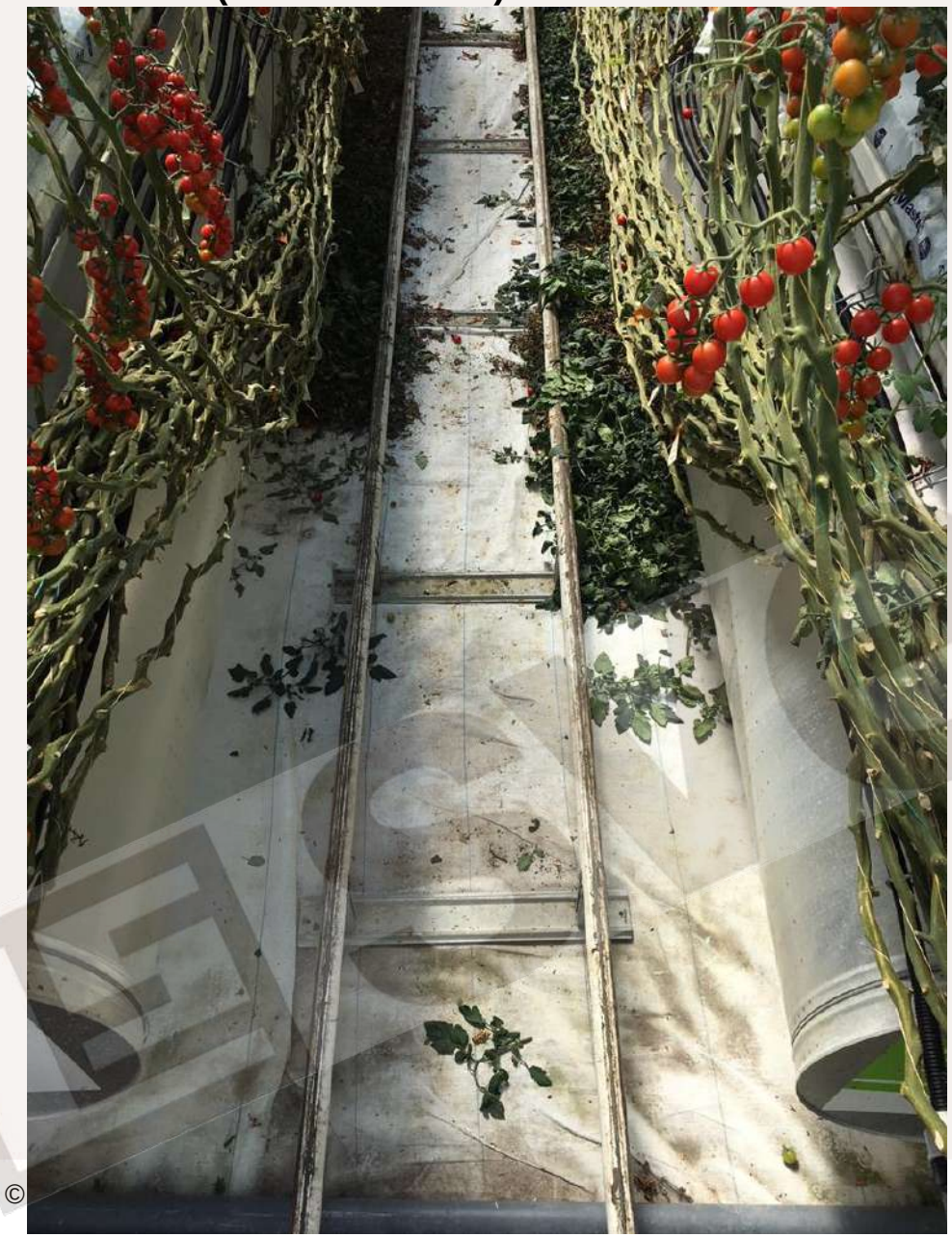




Effect with diffuse glass & Harmony screen



With diffuse Glass, without a screen (JDR 24-07-2019)



With Diffuse glass and a screen: (HARMONY O 2315 FR)

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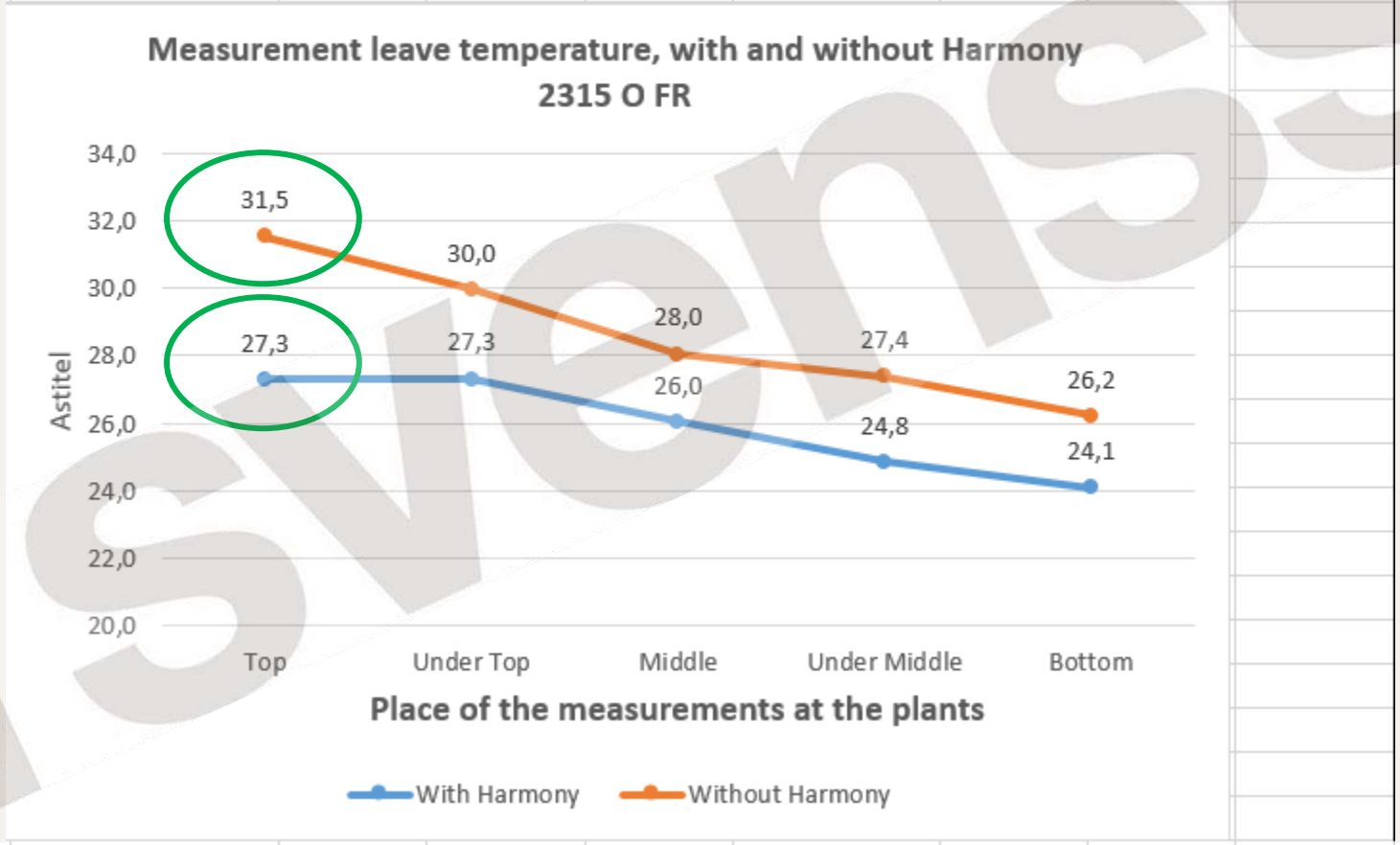
Les différences possibles sans écran et avec un écran HARMONY O 2315 FR (JDR (France) 03-09-2019)

	Top	Under Top	Middle	Under Middle	Bottom		
With Harmony	27,3	27,3	26,0	24,8	24,1		**3,2**
Without Harmony	31,5	30,0	28,0	27,4	26,2		**5,3**



Difference in plant-head temperature is 4,2 degrees

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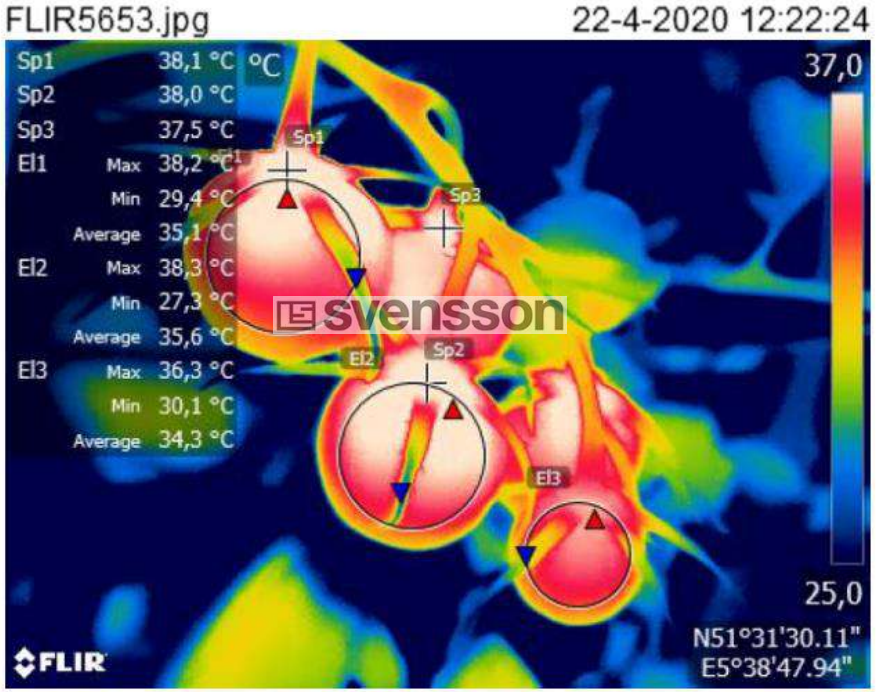
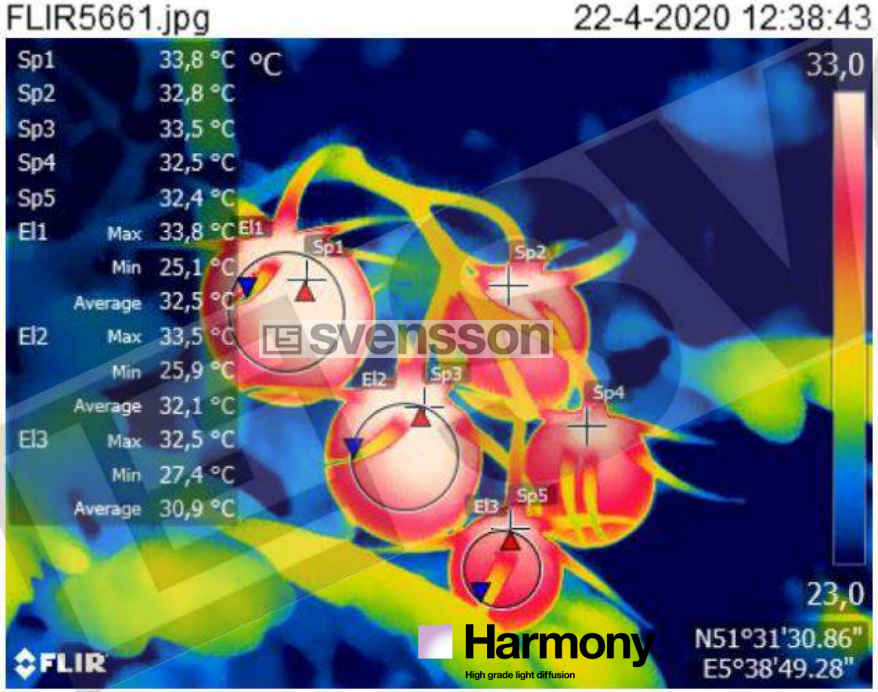


Without screen:
(sans ecran)

Avg. 35 ˚C.



With Harmony screen:
(avec ecran Harmony)

Avg. 31,8 ˚C.

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Comparison:

Harmony Screen & Black Net (multispan GH)

Mexico

Comparison Harmony Screens / Nets

Screen Svensson Harmony 3015 O E

Mesh Rashel Black

(Disuniformity was detected at the opening of the black mesh)

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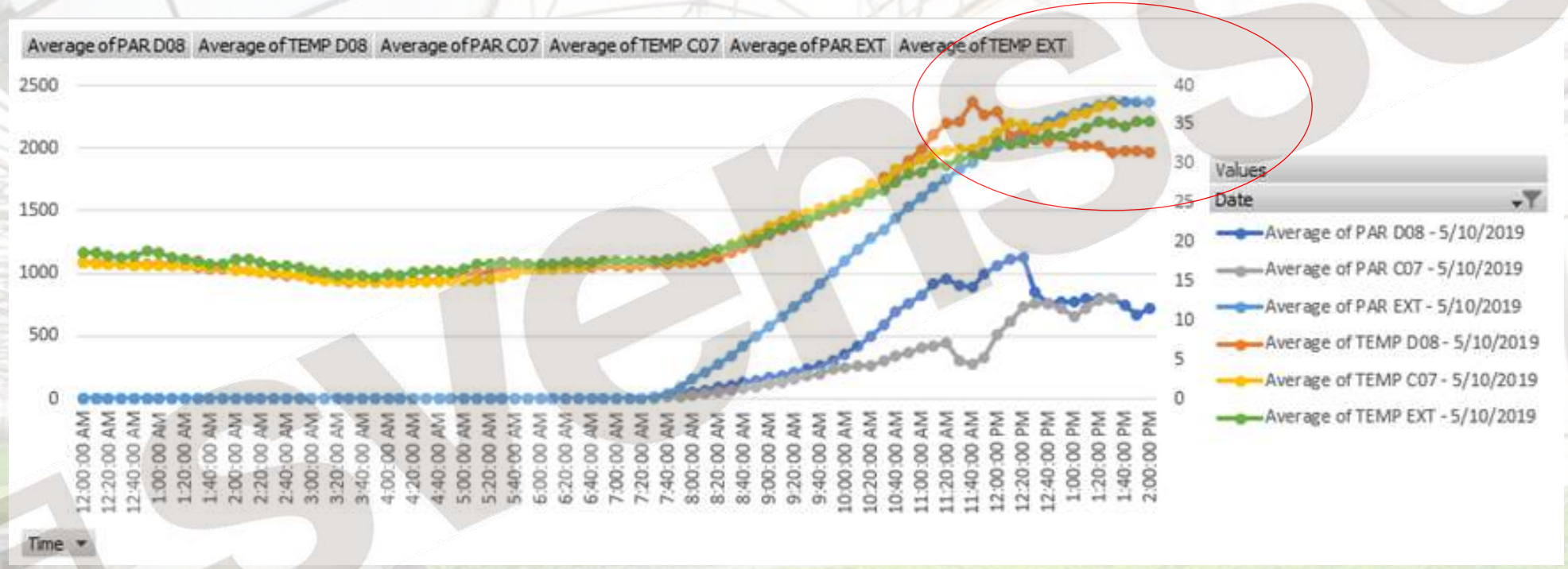
Comparison Screens/Nets

D08 = Harmony 3015 O E

C07 = Black Net



- Green line: Air-temperature outside
- Yellow (Black Net): Air-temperature even higher comparing outside temperature
- Orange (Harmony): Air-temperature lower comparing black net and comparing outside

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Comparison Screens/Nets

D08 = Harmony 3015 O E

C07 = Black Net

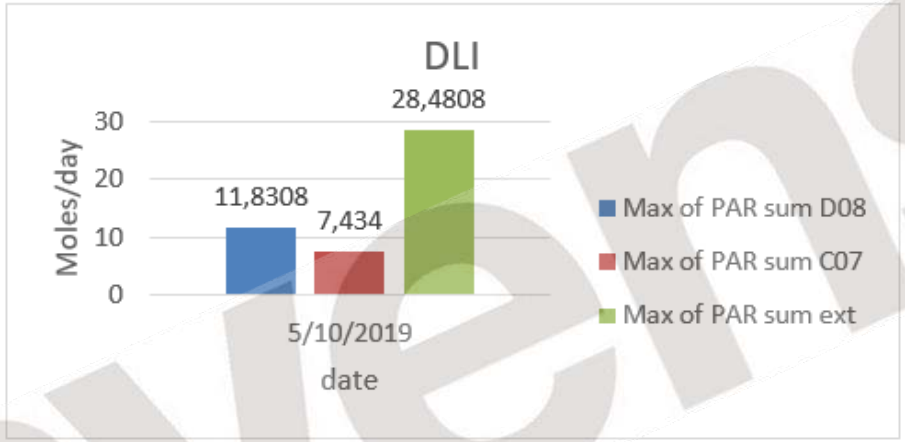
Greenhouse	Time	Temperature at leaves level	Time	Temperature at leaves level
D08	12:30	31,5 °C	13:30	28°C
C07	12:30	32 °C	13:30	32,5°C

During monitoring of leaf temperature, 3.5 ° C of reduction was detected, from 12:30 to 13:30 in D08.
Whereas in C07 there was no temperature reduction effect detected in the leaf.

Comparison Screens/Nets

D08 = Harmony 3015 O E

C07 = Black Net



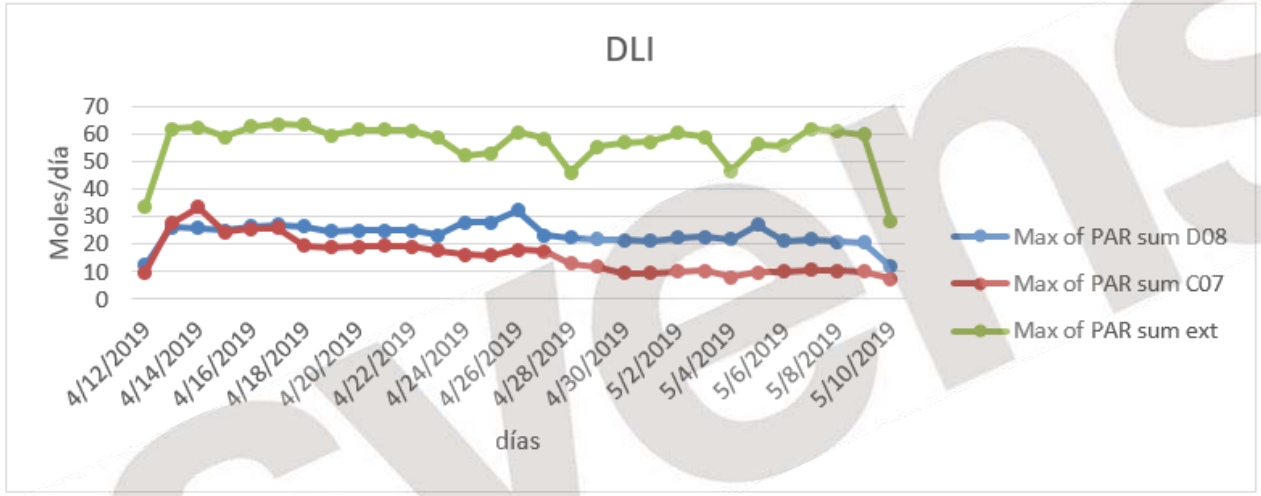
The following graph shows the daily light integral PAR (moles /day), from 05-10-2019 from 12:00 AM to 02:00 PM. There is a difference of about 4 moles until that time of day.

Comparison Screens/Nets

D08 = Harmony 3015 O E

C07 = Black Net

Next, I present the total amount of light (moles / daily) from 04-12-2019 to 05-10-2019.



You can see how during this month it was possible to increase around 5-10 moles / day in the D08, even having a substantial effect on climate.

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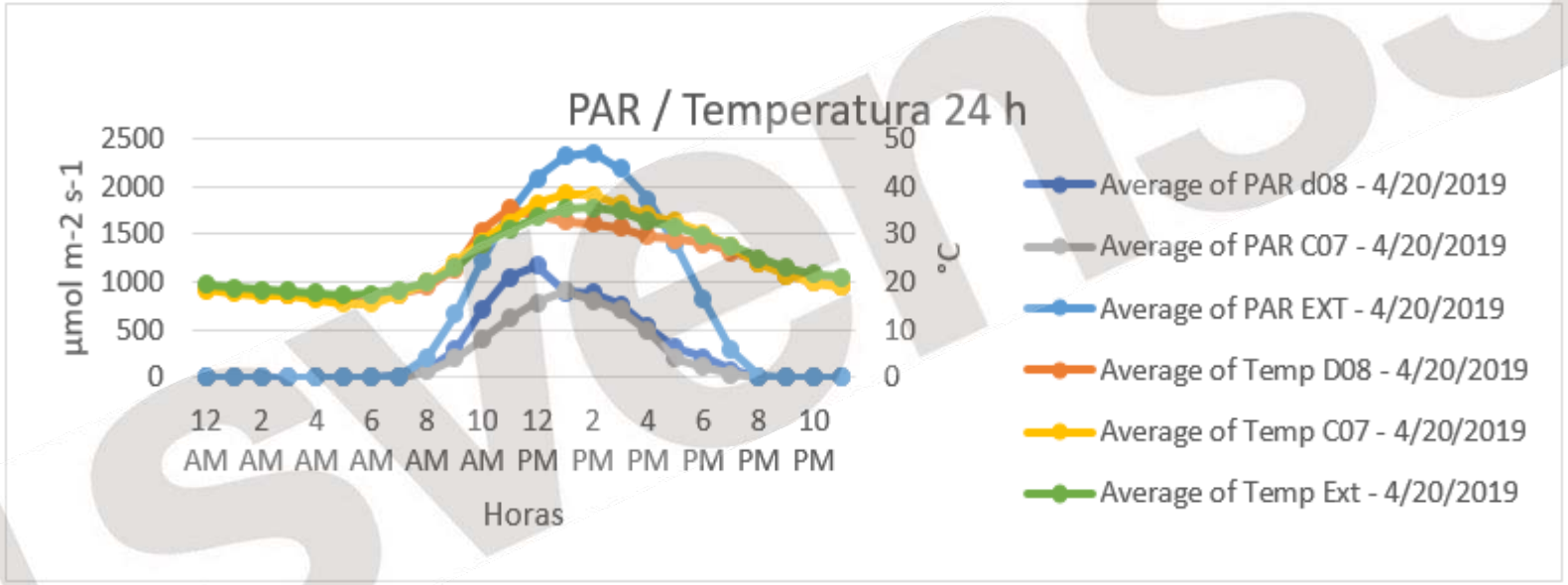
Comparison Screens/Nets

D08 = Harmony 3015 O E

C07 = Black Net

Below is a graph of light (PAR) on a typical day and 24 h temperature in both scenarios, achieving around 7 ° C of difference maintaining more moles per day.



- Normaly, adding more light is more temperature in the greenhouse
- With Harmony more light, and a lower greenhouse temperature

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Comparison:

Harmony diffuse Screen & Yellow Net

Raspberry (NL)

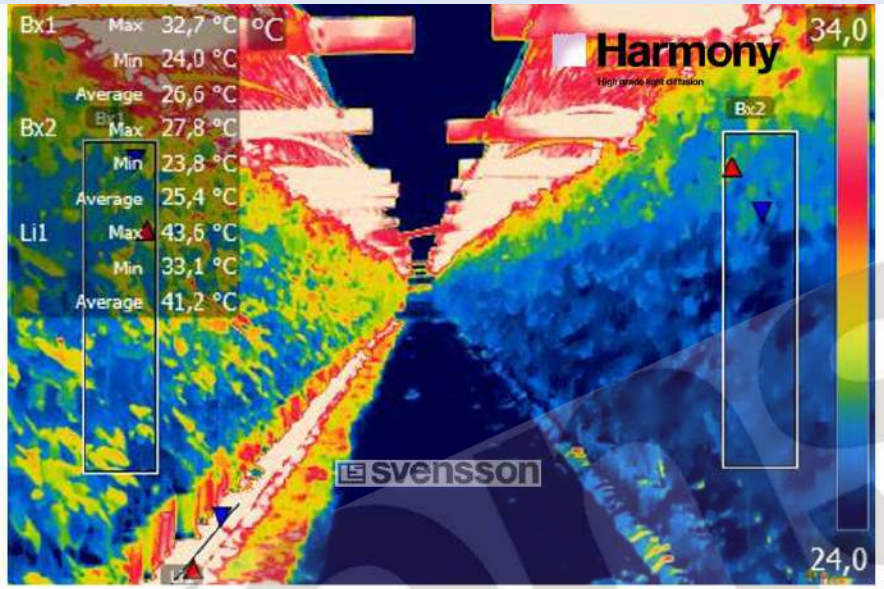
Example in NL with comparison Harmony screen (left) vs the yellow net (right pictures) above the mid path

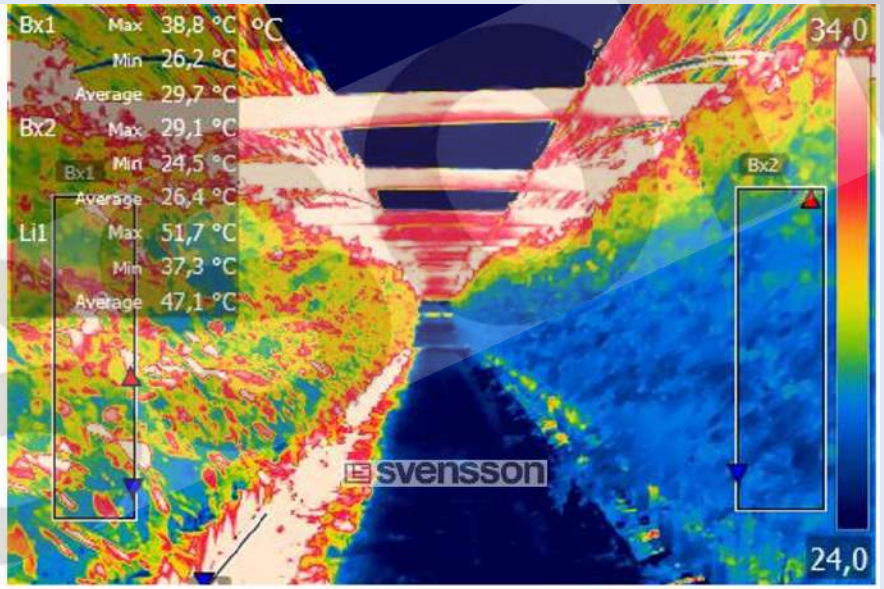
Effect of diffuse light on: pot-temp. /plant-temp. /leave temp.

Example:

- Raspberry's
- Location: the Netherlands
- Top plastic cover

- Difference in plant temperatures 2 - 4 'C.
- Difference in pot temperatures 5 - 7 'C.





Above the path a diffuse Harmony screen

Above the path a yellow net

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Comparison:

Harmony Screen & White ground cover vs Black Net

Blueberry (Agadir - Morocco)

Blueberry production, as is…

Requirements / challenges Blueberries (Morocco)

- Light levels in the range of 500 to 800 umol-2s-1
- High temperature above 42 ‘C causes damage to shoot tips (vegetative growth).
- High temperature [above 35’C] and high light seems to increase photo-oxidative damage to leaves (like bleaching, chlorosis, local necrosis)
- Low night temp. <12 “C also damage the crop.
- Low humidity/high VPD [<35% and >5Kpa] can also damage the growth
- Pots heated up by direct sunlight

Blueberry production, new innovations…

At African Blue

- **Movable screen system, to close at high temperature and high light levels, and close at cool nights**

Trial setup (diffuse screen (Harmony O E & White groundcover)

- Measurement boxes to measure:
  - Light
  - Temperature
  - Humidity
  - Drip & drain

- Crop Measurements:
  - Amount of shoots
  - Size internodes
  - Amount of flowers
  - Yield
  - Fruit sizes
  - Fruit fermness
  - Brix level
  - Etc.

Trial results:

- More compact plants
- More plant shoots
- Less plant stress
- 10-20 % higher yield
- Big fruit sizes
- High brix level
- Excellent fruit quality

Conclusion:

- Benefits of Diffuse light on plant performance:

- Lower plant-head temperature (2,0 – 3,5 degrees)
- Lower leave temperature (1,0 – 2,5 degrees)
- Lower fruit temperature (1,0 – 2,5 degrees)
- More plant shoots, more fruits
- Shorter internodes
- Optimal level of fotosynthese
- Optimal use of CO2
- Less plant-stress (open stomata)
- Stronger plants (less sensitive for pest and deseases)
- Lower “pot” temperature

Mediterranean info / trends

- Increase of Soft fruit productions in Meditarranean region
- **Production is moving** from:
  - f.e. South America to Morocco & to East Europe
- More production “**Local for local”,** so more sustainable
- **Water scarity** is big challange
- Increase of **Insect Net** use (due to insect pressure & less chemicals)
- **Labour** issues is many countries

Example 1 - Trend for next steps: “Top Roof Fix Vents”

- **South Africa:**
- Heat can easy go out of the greenhouse
- Insectnet can easy installed in the top and at the sidewalls

Example 2 - Trend for next steps:

“Strawberry Example Mexico”

- Multispan Greenhouse with movable side walls,
- With screen: LUXOUS 1547 D FR (for bit light diffuse light and keep temperatures in the night
- With Climaflow Fan, for vertical ventilation and more uniform climate in GH and around the plant

Example 3 - Trend for next steps: “Total Vent System & Screen”

- Hillwood Berries – Queensland – Australia
- Hot & Humid climate
- Heat can easy go out of the greenhouse
- Flexible rolling-roof system, can react on various circumstances
- Shade screen can easy be installed
- Can stand in very strong wind

https://www.youtube.com/watch?v=RgU2jnoG0aU

Questions?

Name: Pieter Mol

Mobile: +31 611 478 430

Email: pieter.mol@ludvigsvensson.com

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ludvigsvensson.com