



GLITCH

Tomaat: Haal meer uit full LED

Lieve Wittemans
Wendy Vanlommel

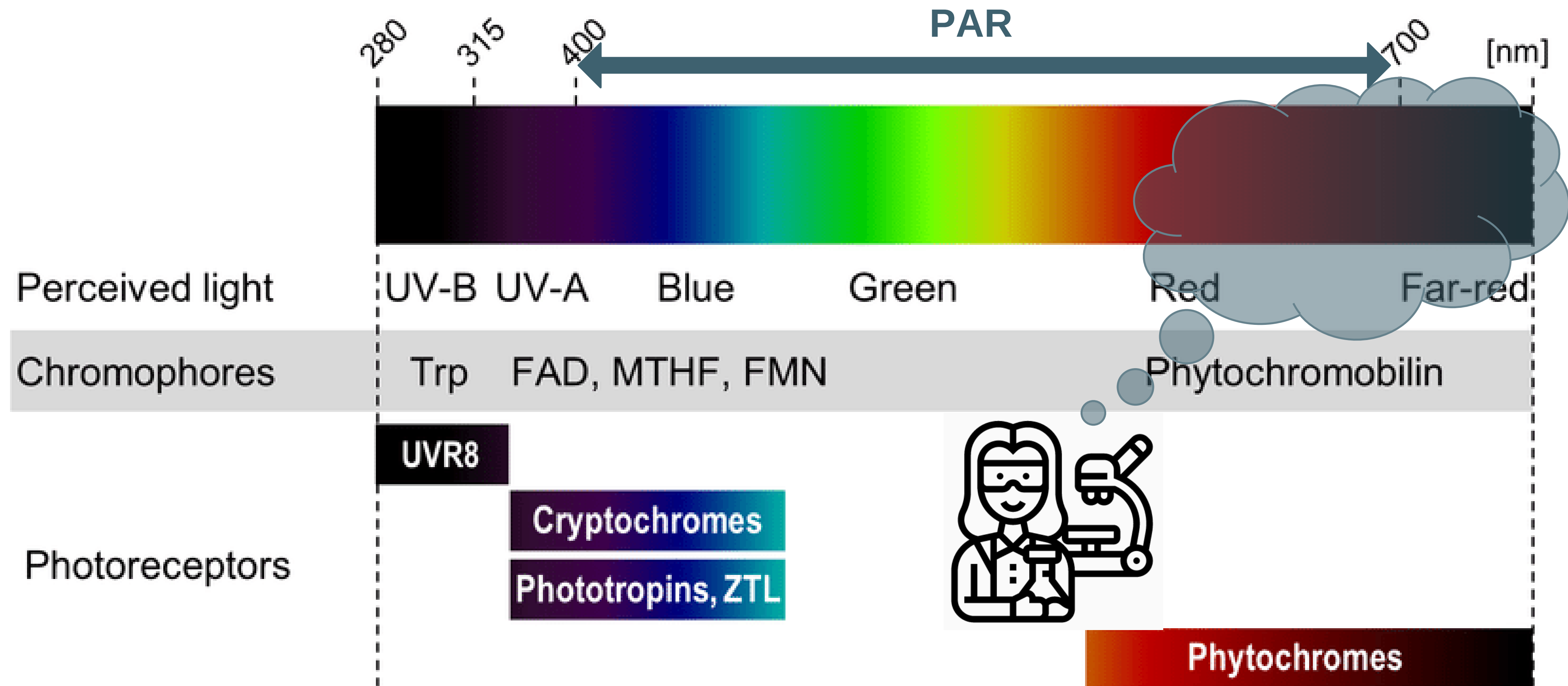
Proefstation voor de Groenteteelt
Proefcentrum Hoogstraten



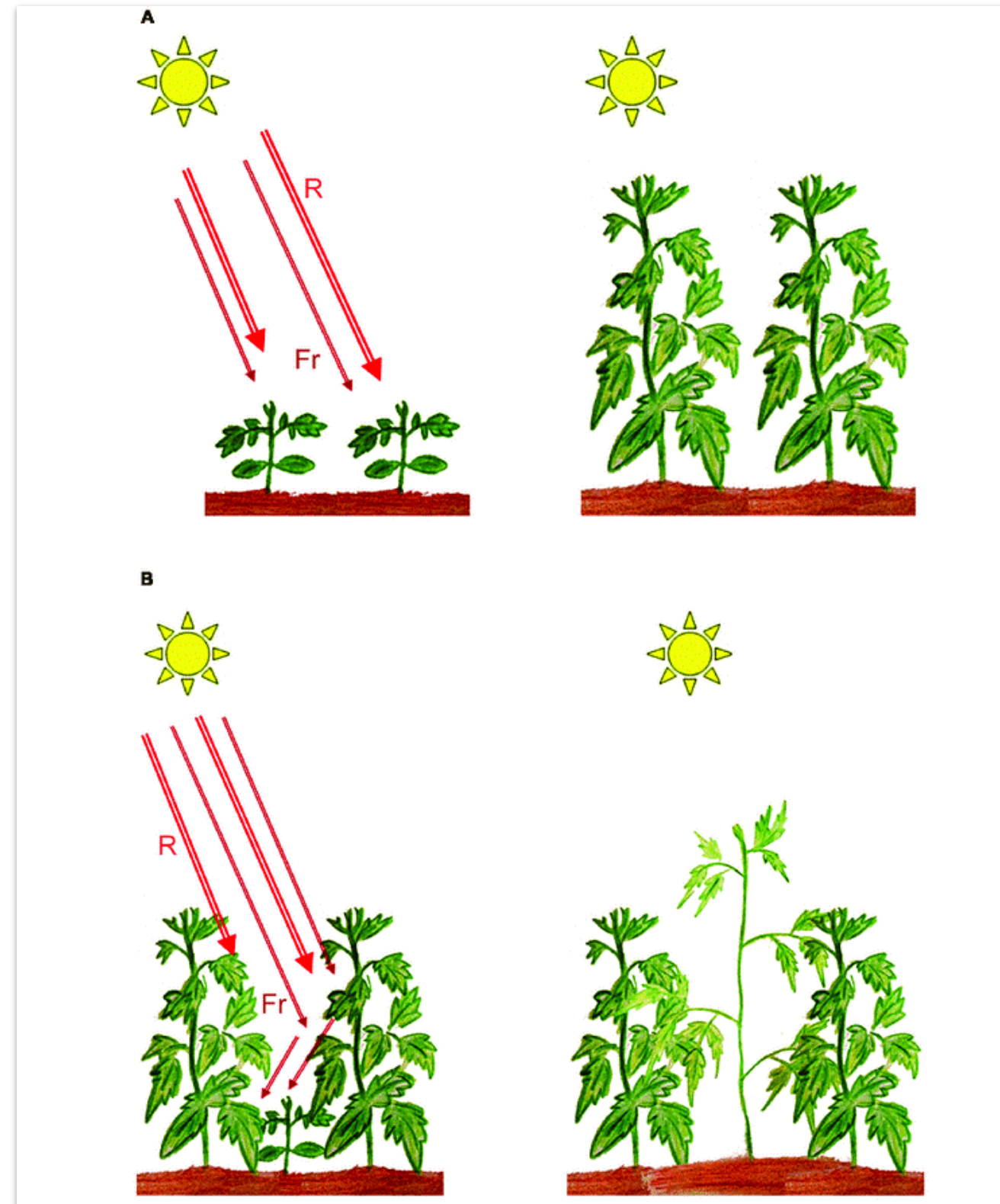
Interreg 
Vlaanderen-Nederland
Europees Fonds voor Regionale Ontwikkeling



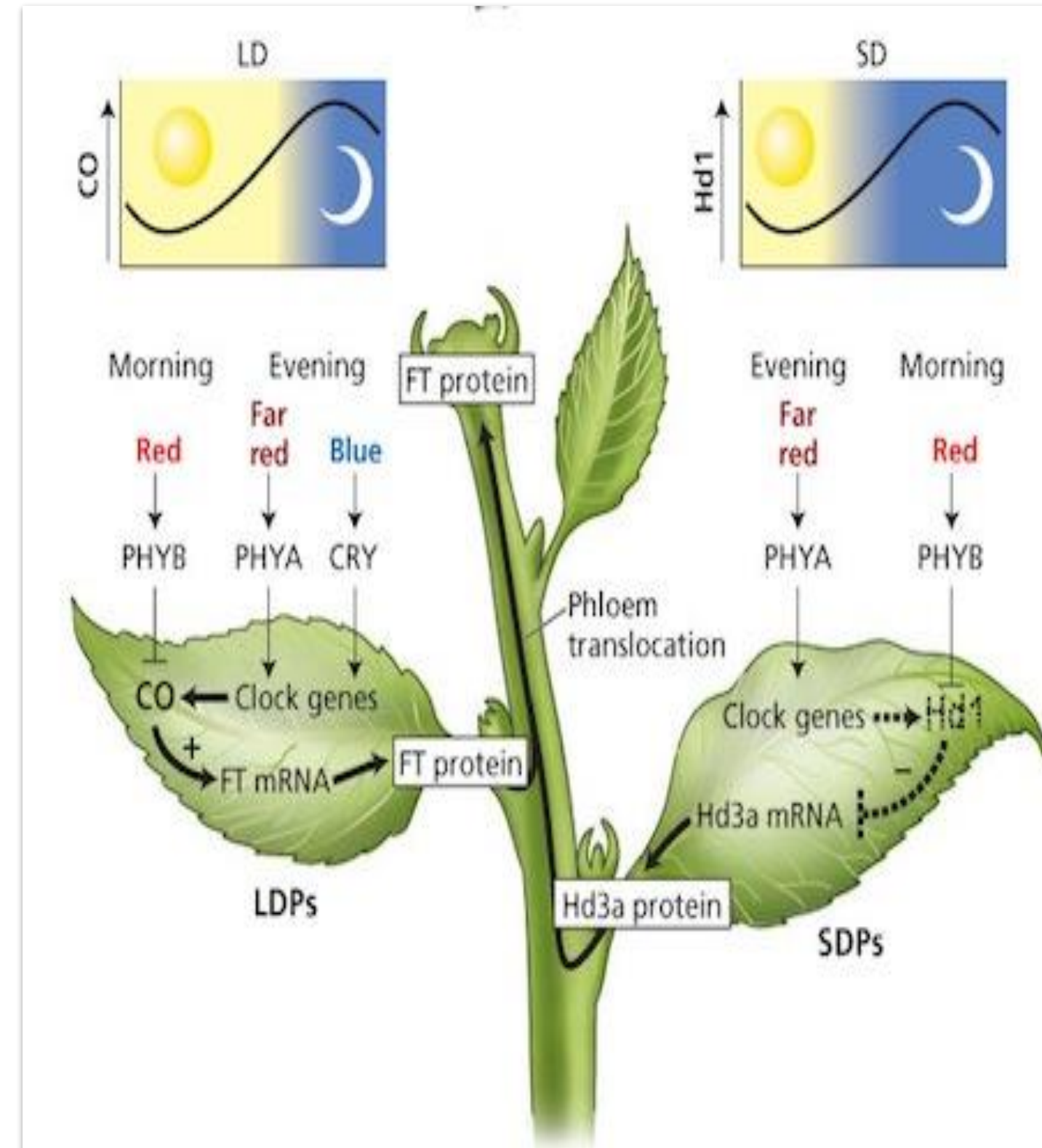
Sturen van fysiologische processen via fotoreceptoren



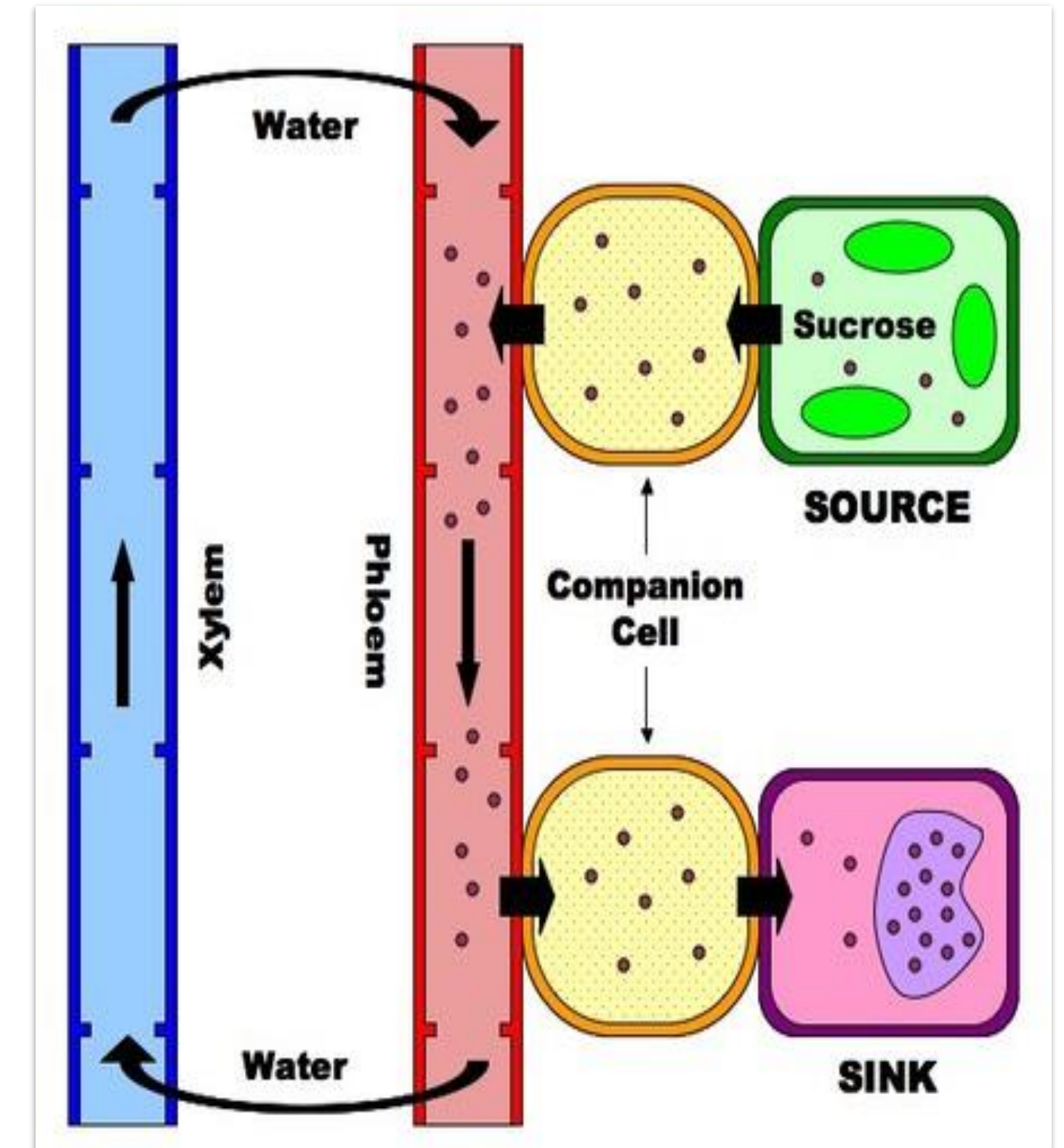
Stel je eens voor ...



Shade avoidance
response

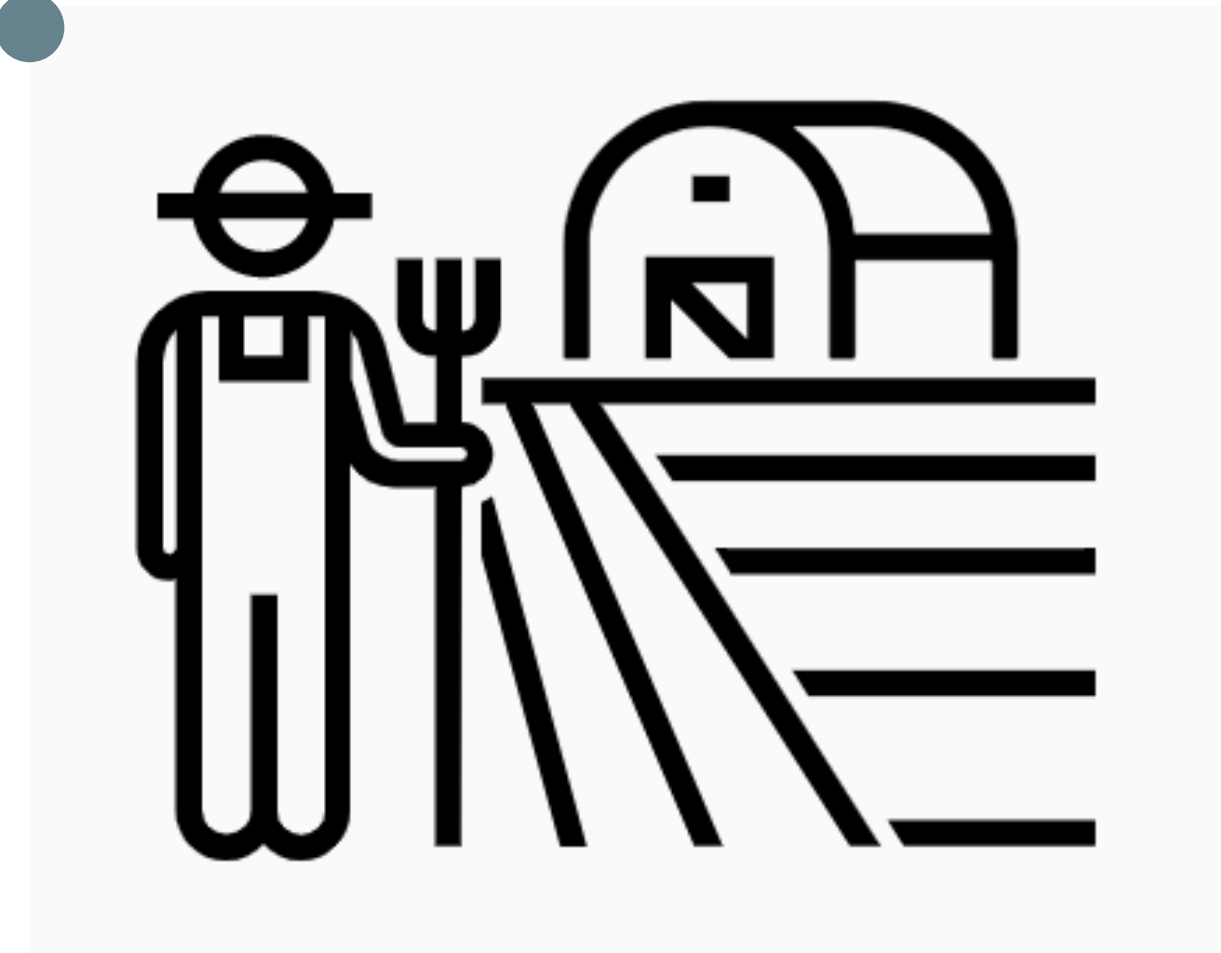
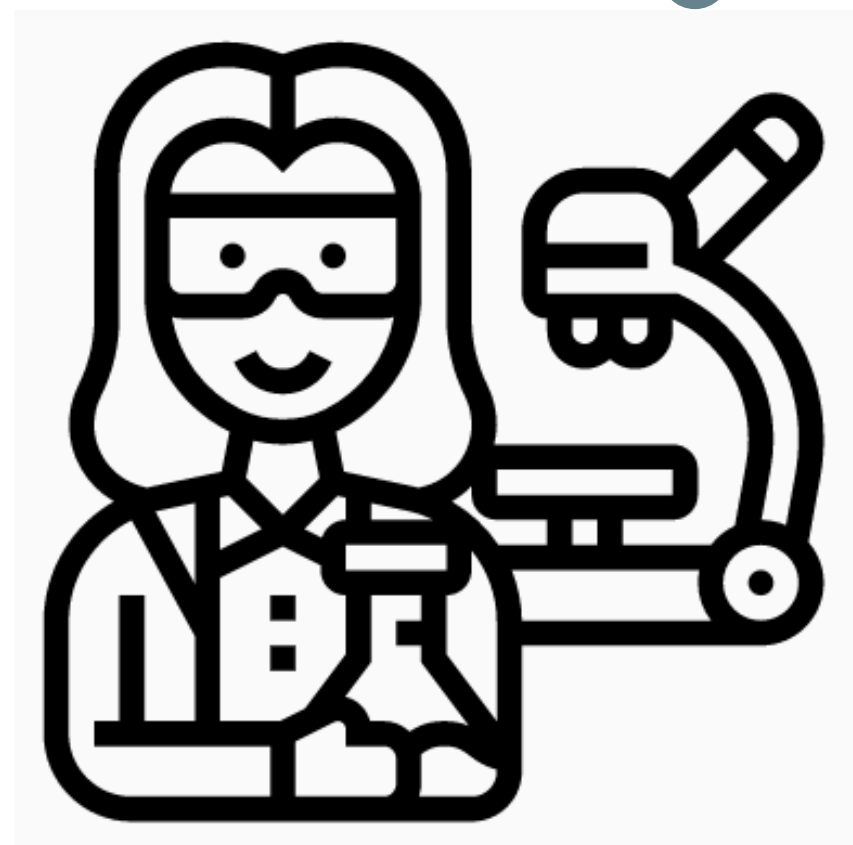
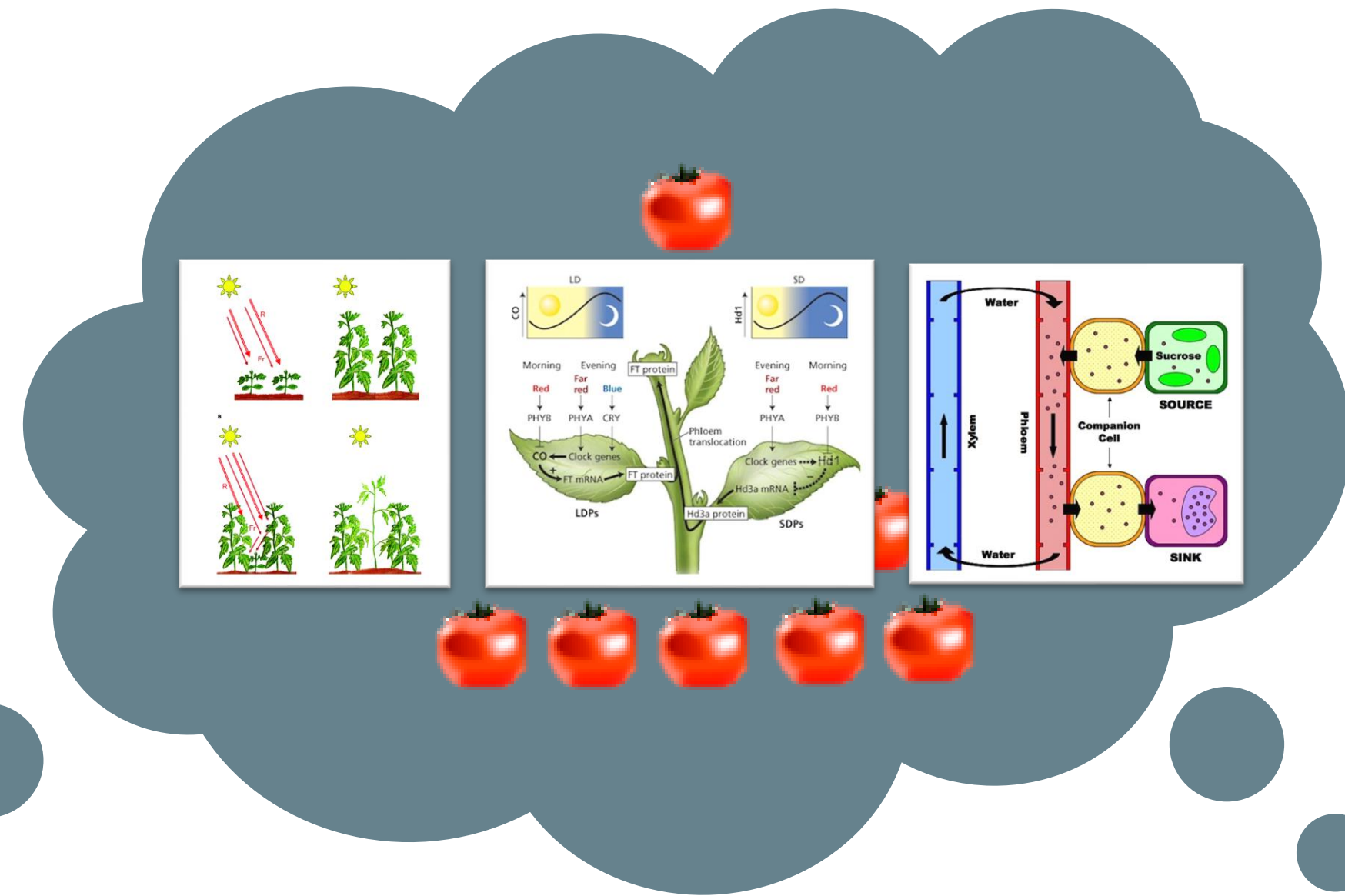


Bloei
Interne klok



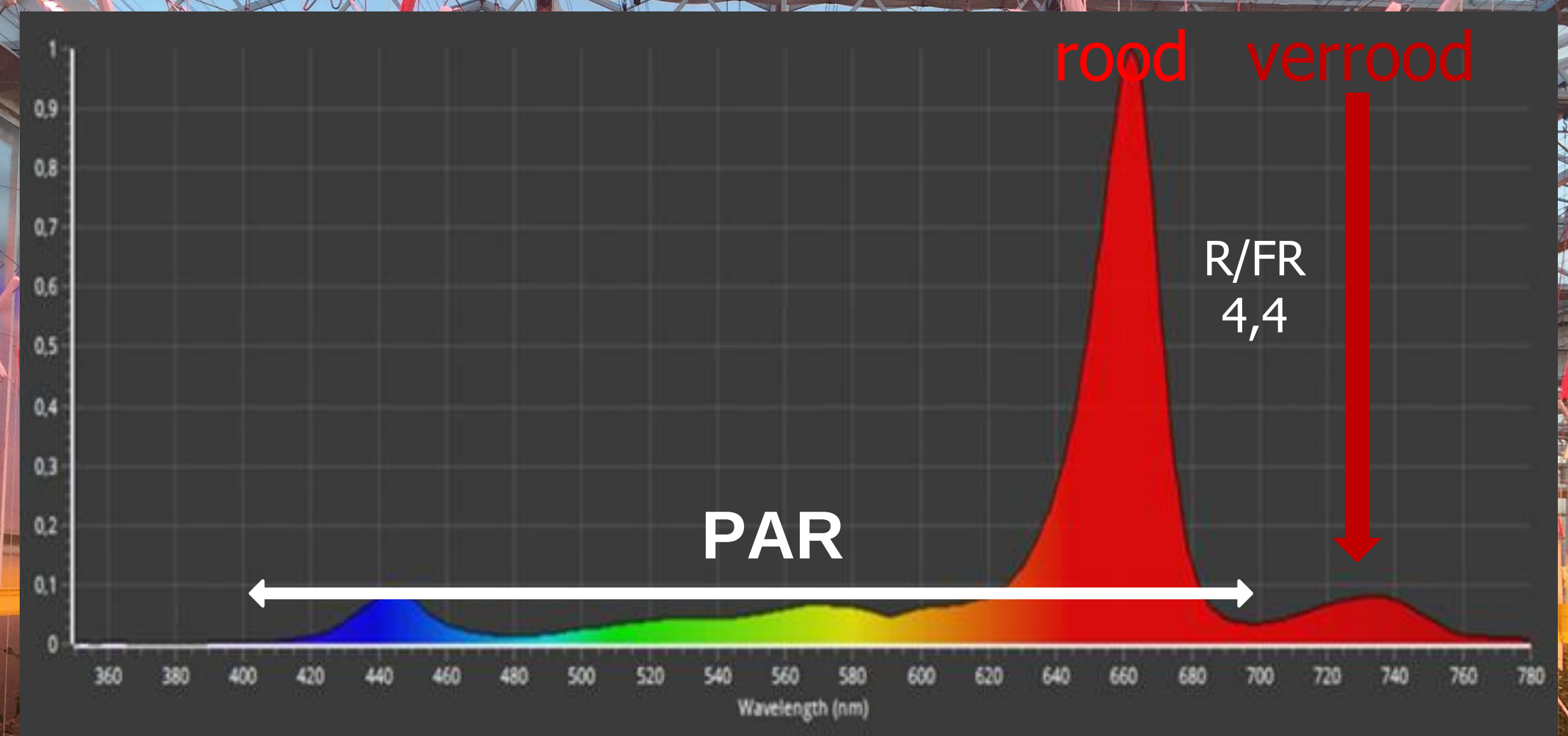
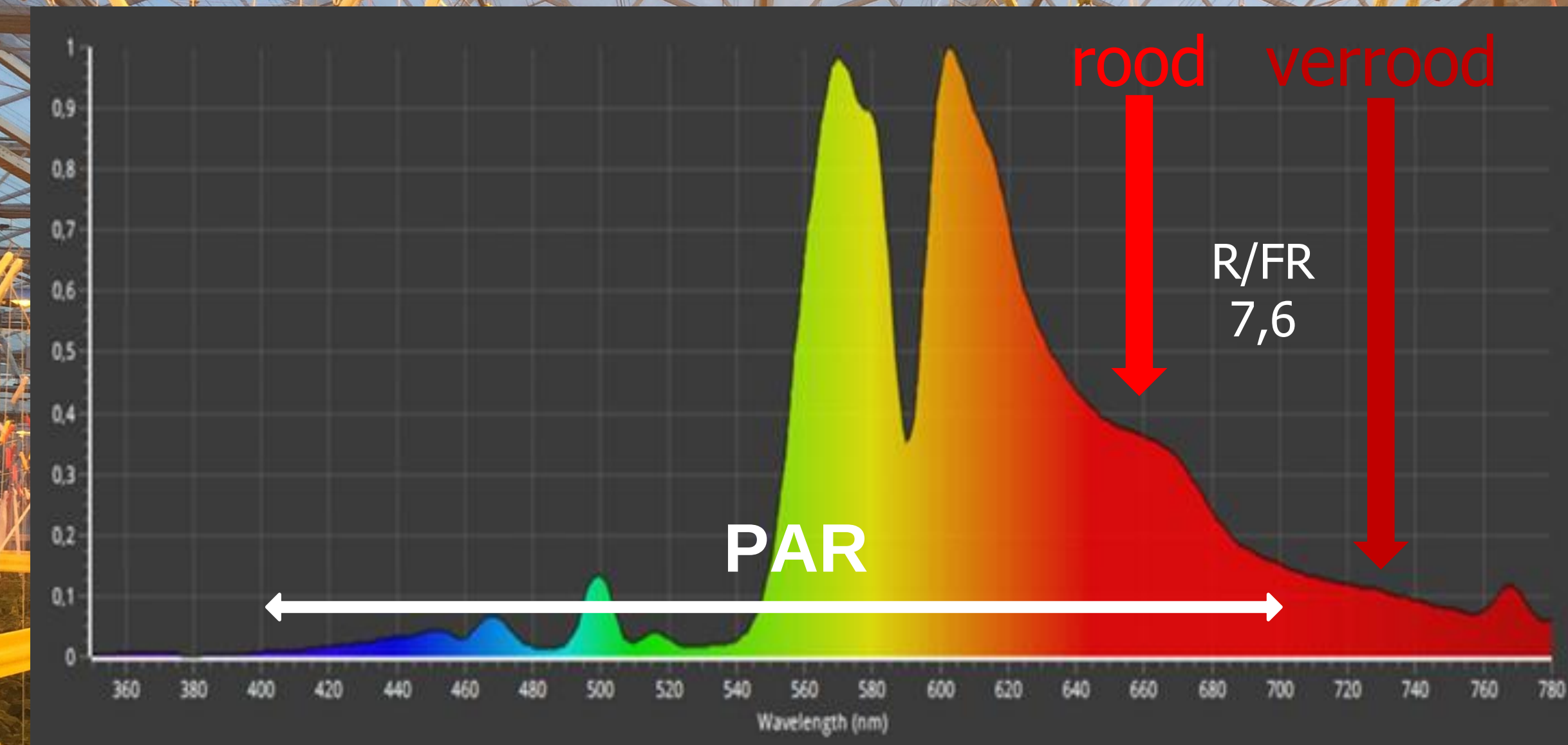
Assimilatenbalans

Mogelijkheden met verrood



SON-T

LED



Gavita GAN Electronic 1000W 400V DE

Signify GreenPower LED toplighting module DR/W/FR LB

PAR: 170 $\mu\text{mol}/\text{m}^2.\text{s}$

PAR: 153 $\mu\text{mol}/\text{m}^2.\text{s}$

SON-T

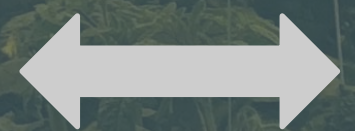
LED



Xandor (Axia Vegetable Seeds)
DR 0141 TX (De Ruiter)
Geënt-getopt



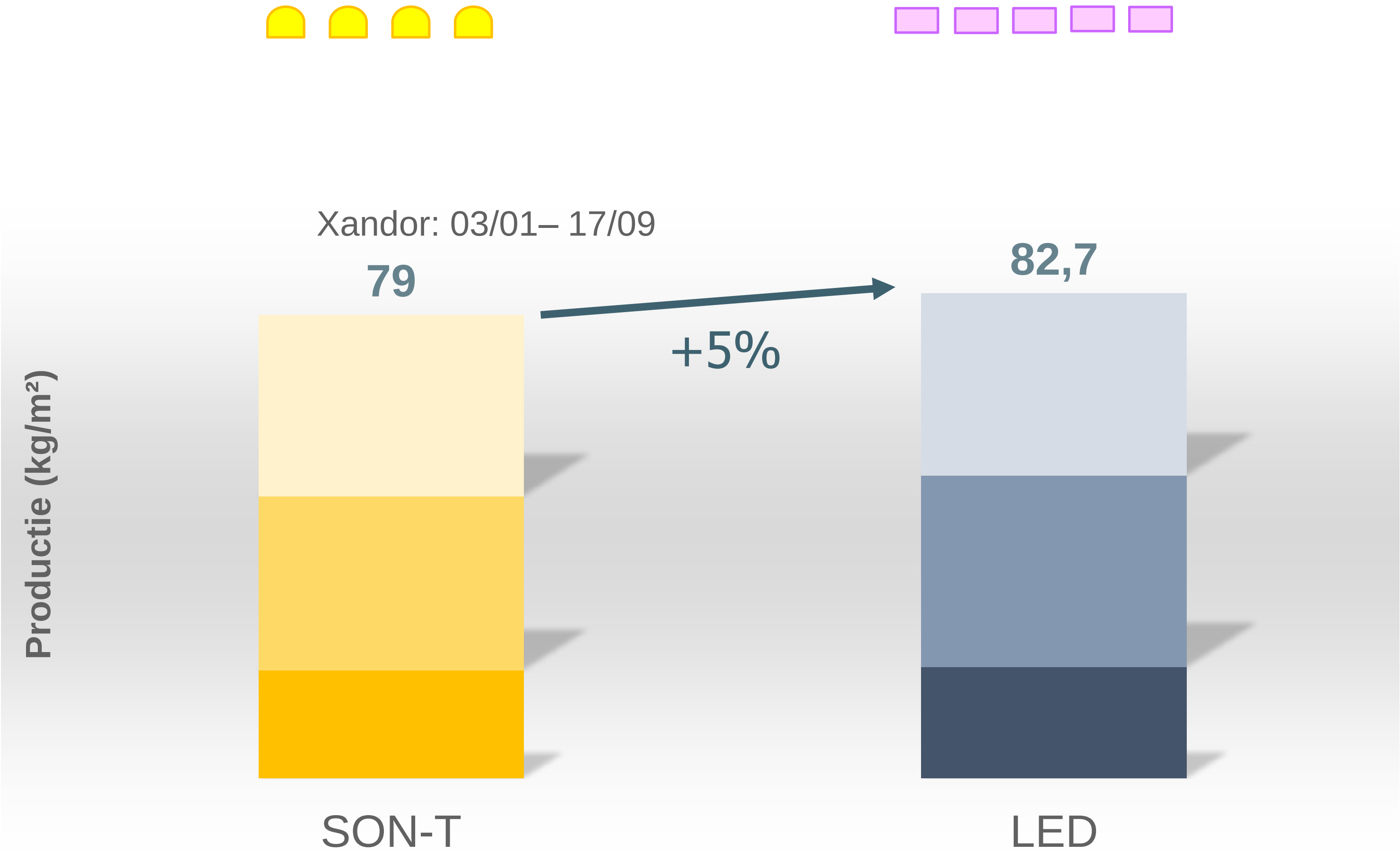
24/10/2019 – 17/09/2020



50 cm → 37,5 cm



Productie





Productie



GLITCH



Xandor: 03/01– 17/09

Productie (kg/m²)

79		82,7
140 g	zomer	140 g
125 g	lente	128 g
119 g	winter	128 g
SON-T		LED



Energieverbruik

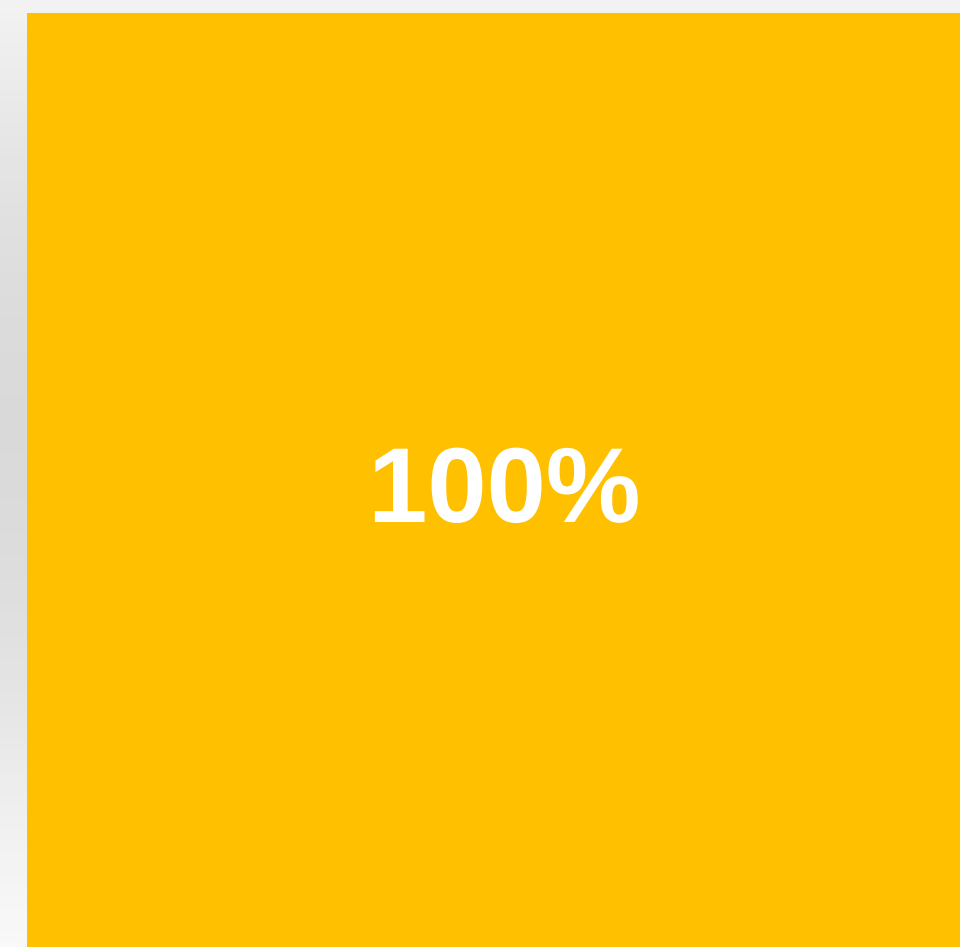


GLITCH



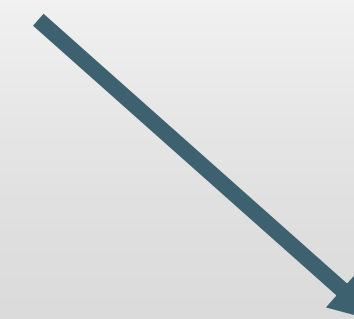
Xandor: 24/10 – 17/09

Energieverbruik per kg
tomaat (kWh/kg)

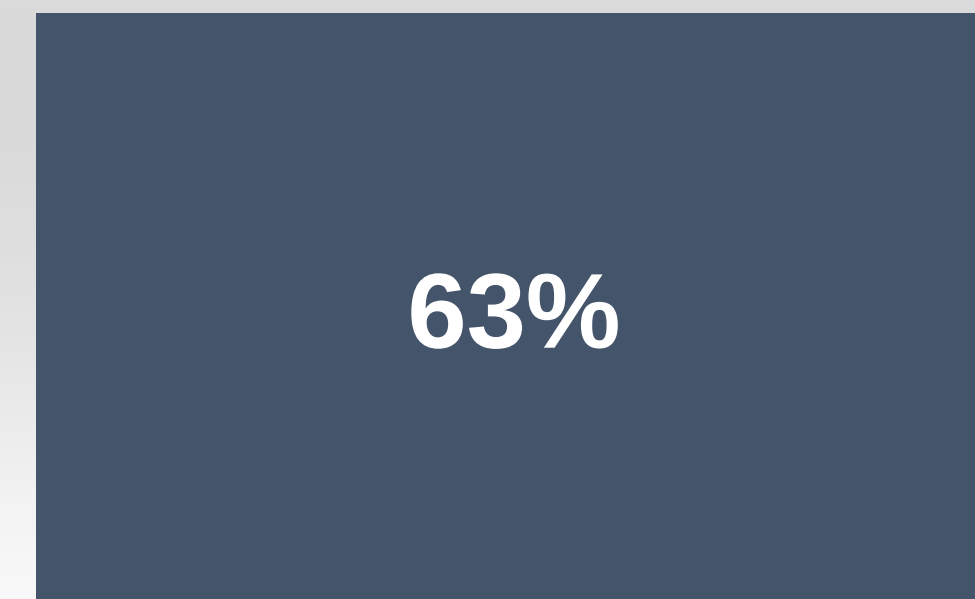


100%

SON-T



-37%



63%

LED



Lichtefficiëntie

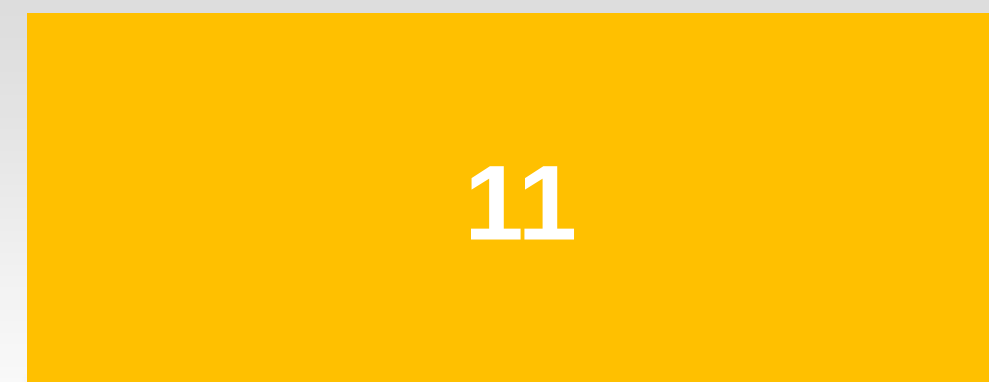


GLITCH



Xandor: 24/10 – 17/09

Lichtefficiëntie (g/mol)



SON-T

+0,5 g/mol



LED



Conclusies



- - 10% PAR
- +10% verrood



- Productie: 5% hoger dan SON-T (vnl. voorjaar)
- Hoger vruchtgewicht
- Iets hogere lichtefficiëntie



- Elektriciteitsverbruik per kg tomaat: ↓ 37%



- 1 tros minder aangelegd
- Langere plant- en behanglengte



- Vergelijkbare kwaliteit

Drie verschillende posities van LEDs vs SON-T

210 $\mu\text{mol}/\text{m}^2.\text{s}$

135 $\mu\text{mol}/\text{m}^2.\text{s}$

135 $\mu\text{mol}/\text{m}^2.\text{s}$

75 $\mu\text{mol}/\text{m}^2.\text{s}$

75 $\mu\text{mol}/\text{m}^2.\text{s}$

toplight – lineair

toplight – lineair
+ interlight

toplight – compact
+ interlight

Drie verschillende posities van LEDs vs SON-T

Doel

Optimalisatie posities van de lampen in full led

Methode

Dezelfde hoeveelheid licht ($210 \mu\text{mol}/\text{m}^2.\text{s}$), op een andere manier bij de planten brengen

toplight – lineair

toplight – lineair
+ interlight

toplight – compact
+ interlight

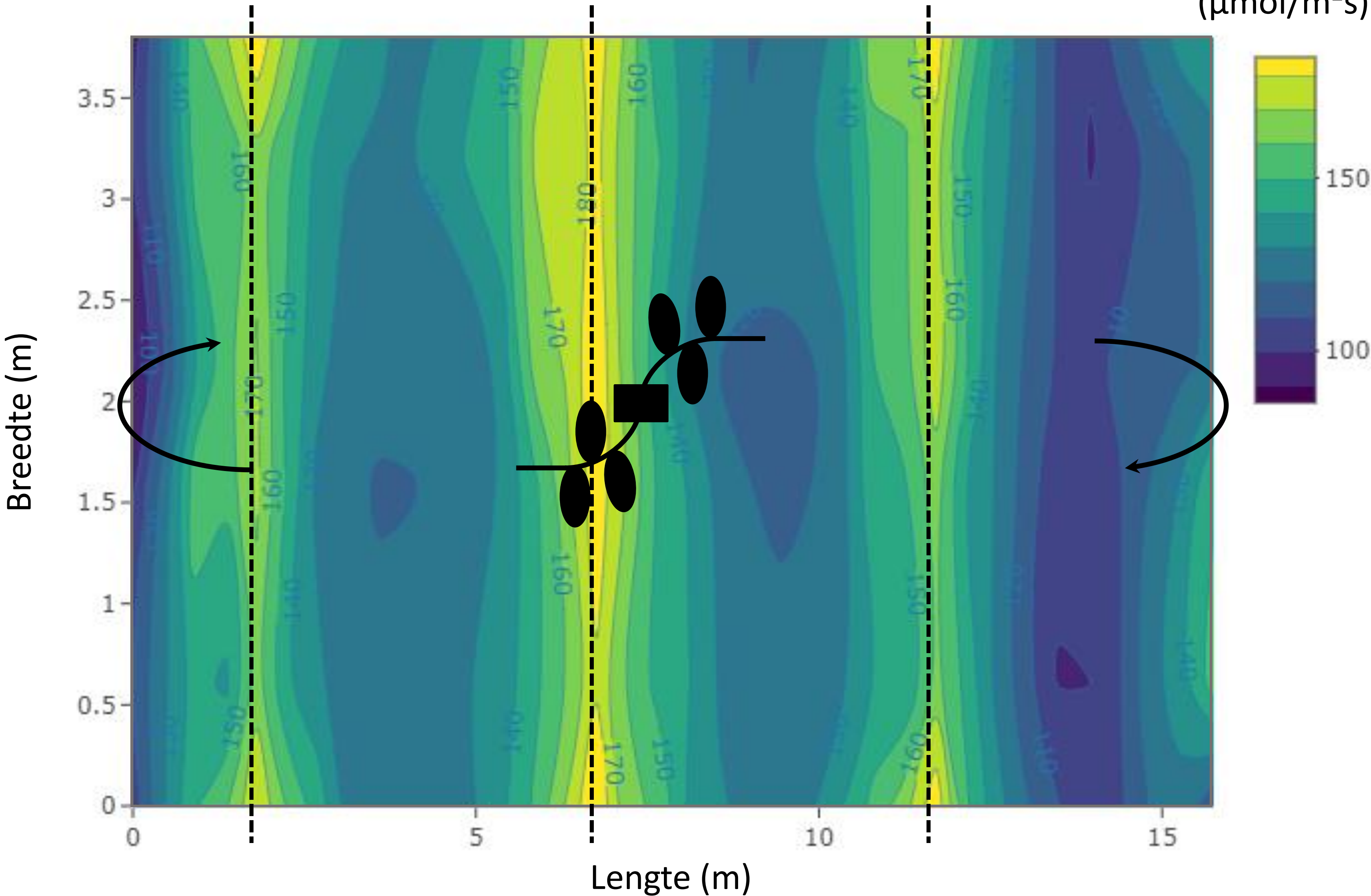
Lichtverdeling ter hoogte van de kop



215 $\mu\text{mol}/\text{m}^2\text{s}$ SON-T

Licht intensiteit
($\mu\text{mol}/\text{m}^2\text{s}$)

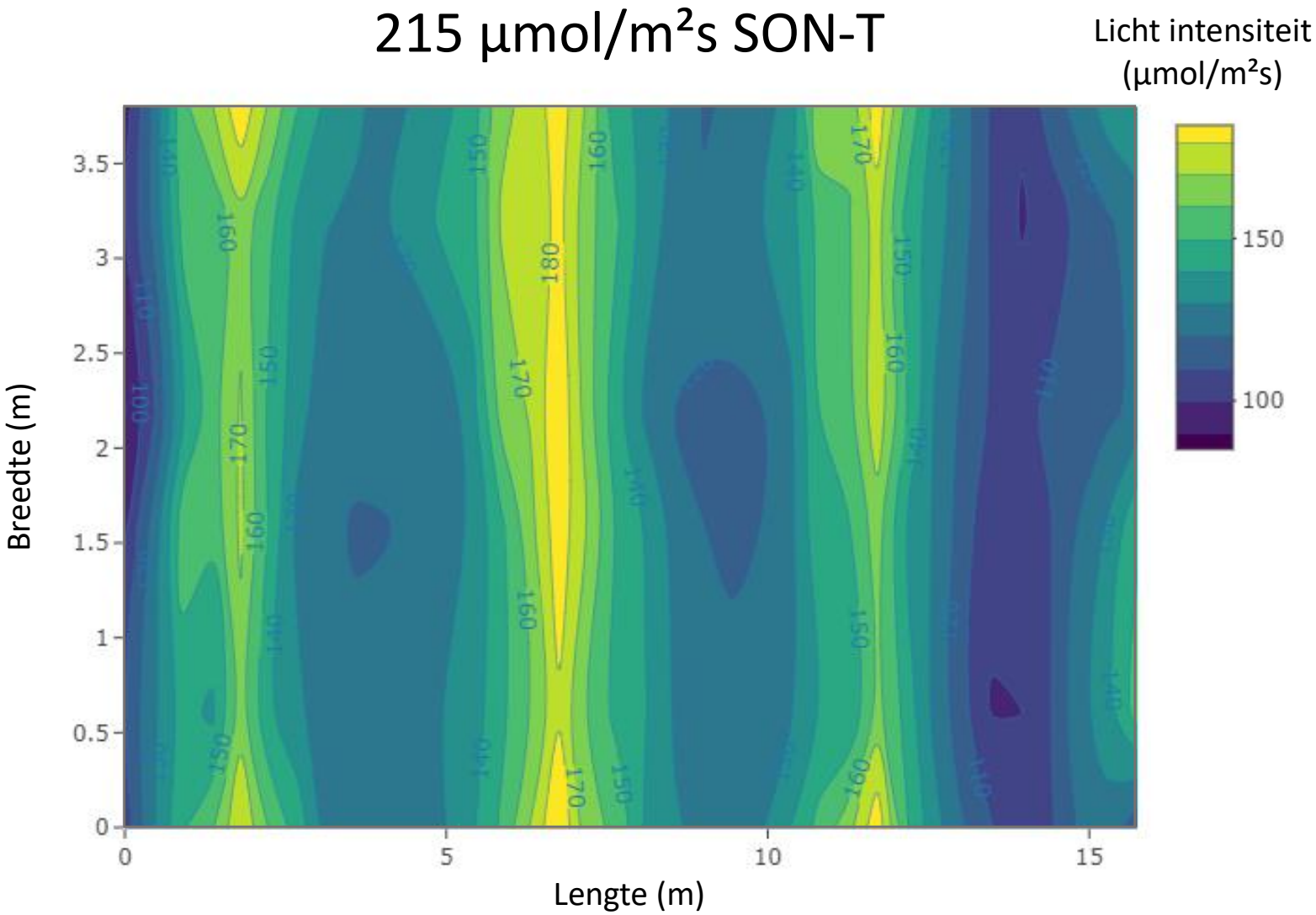
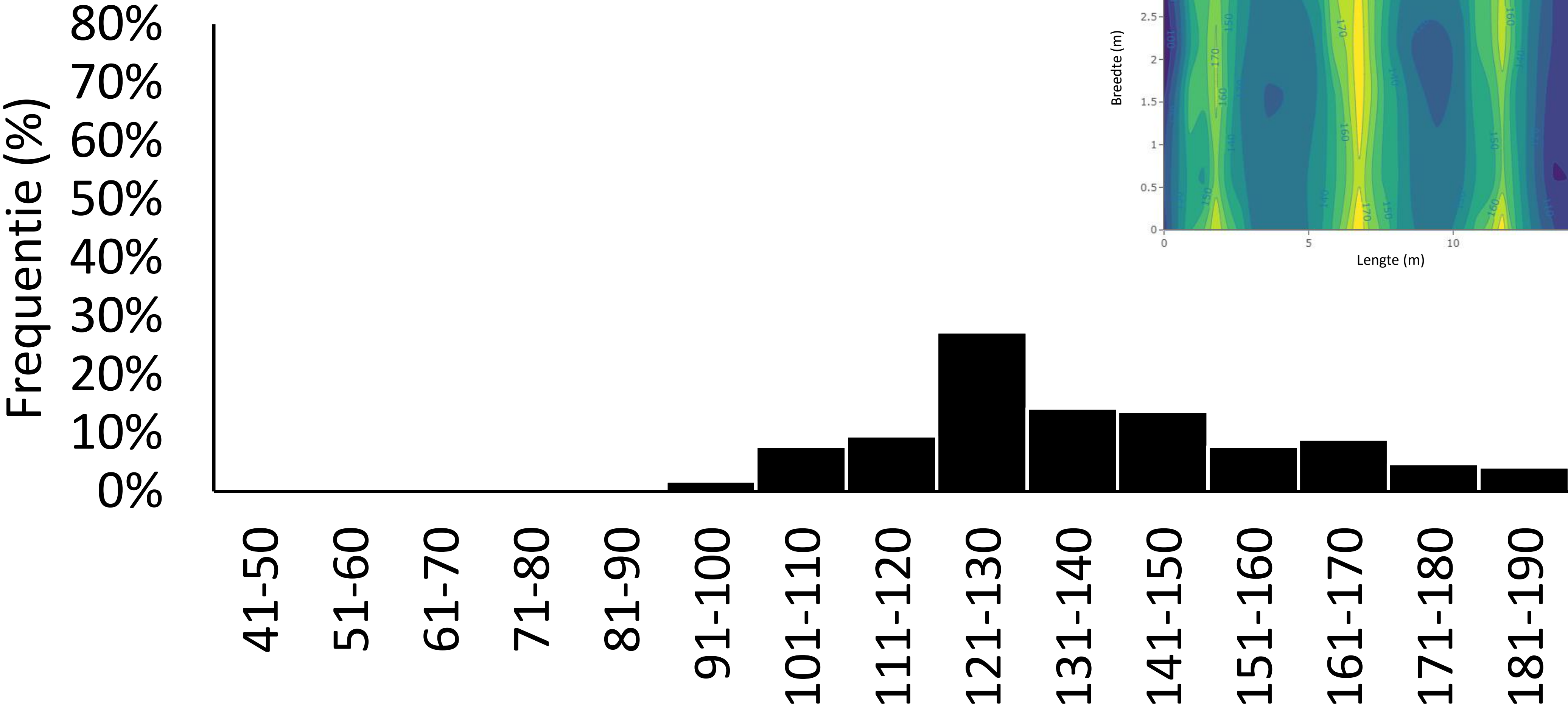
BETONPAD



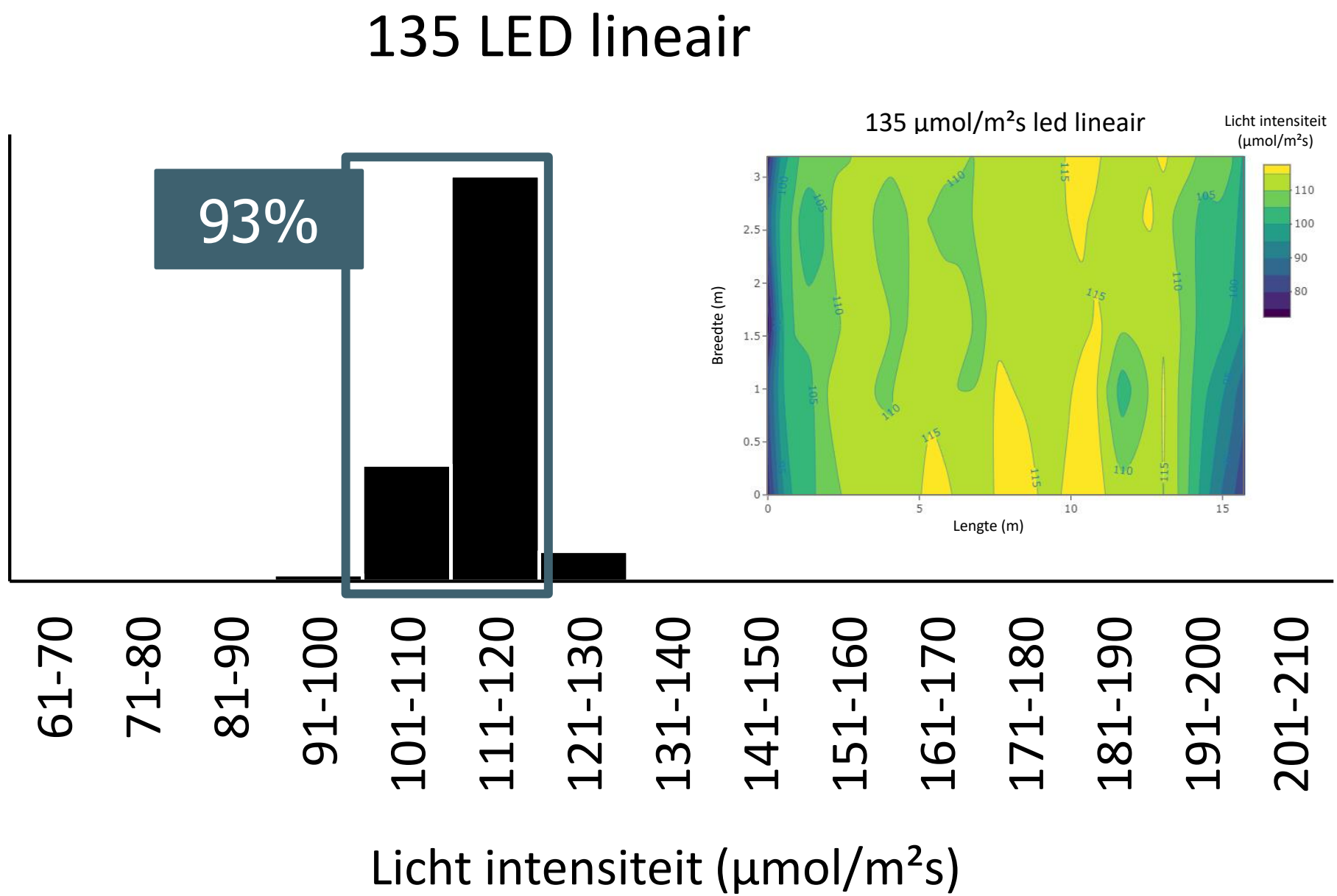
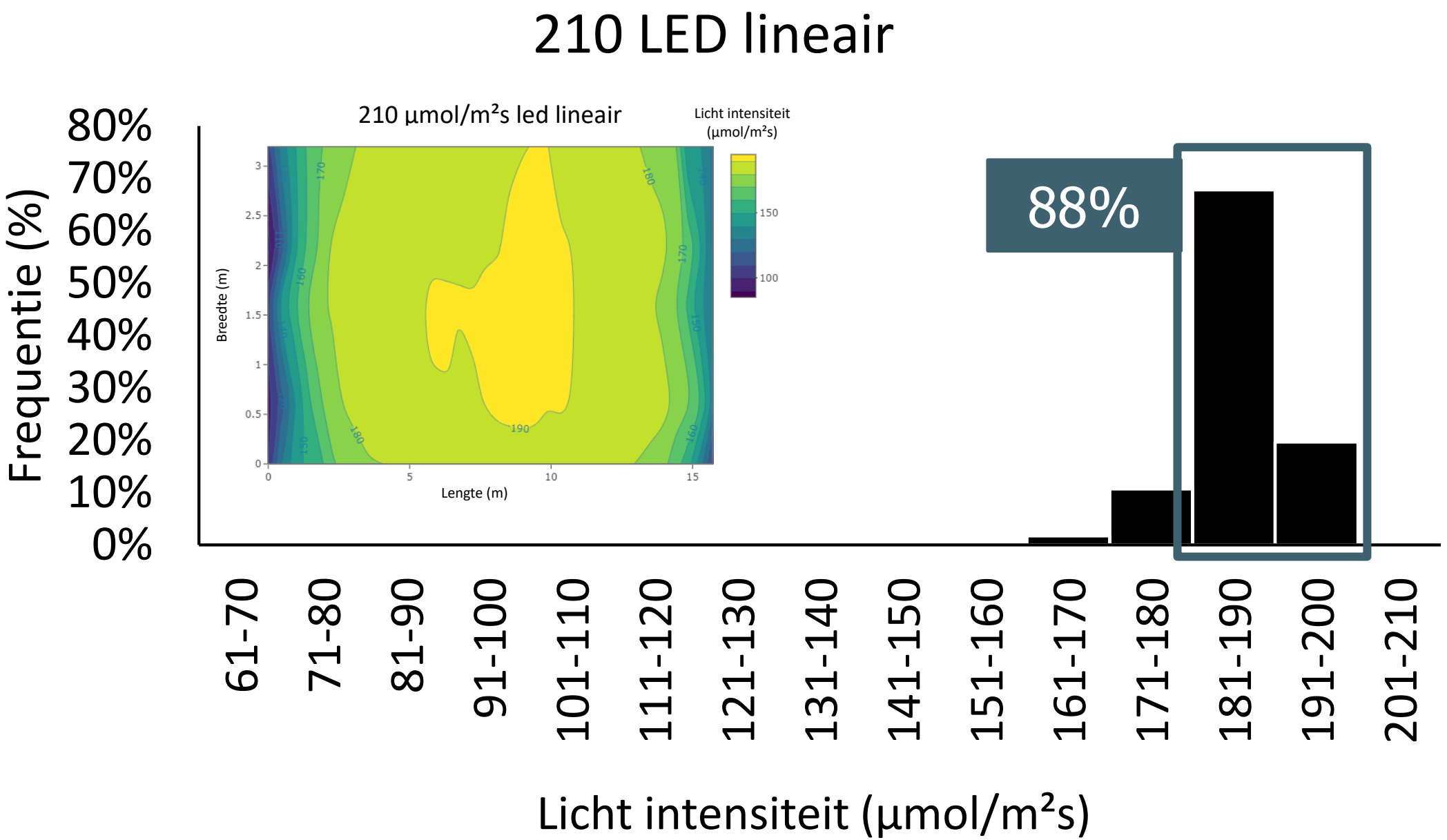
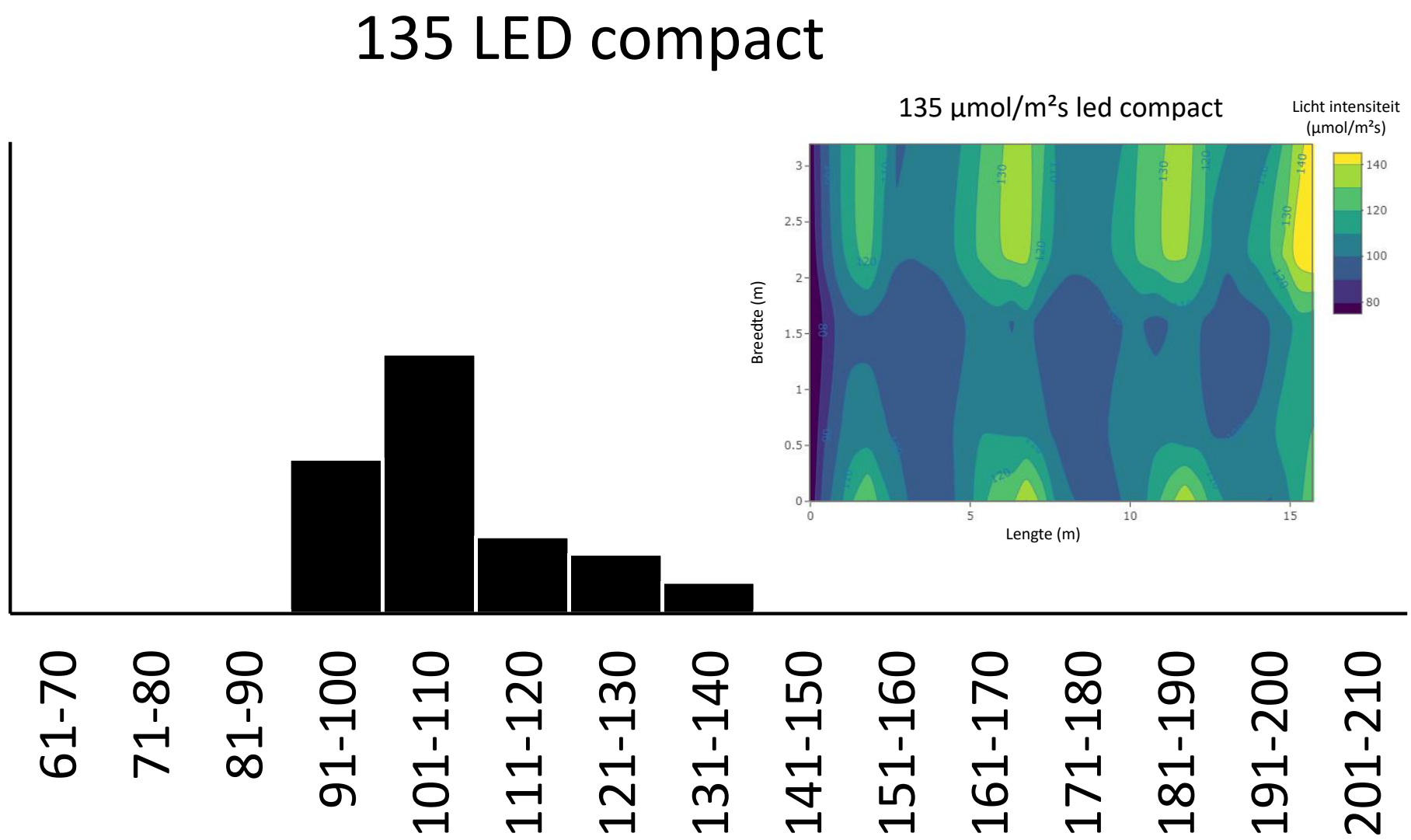
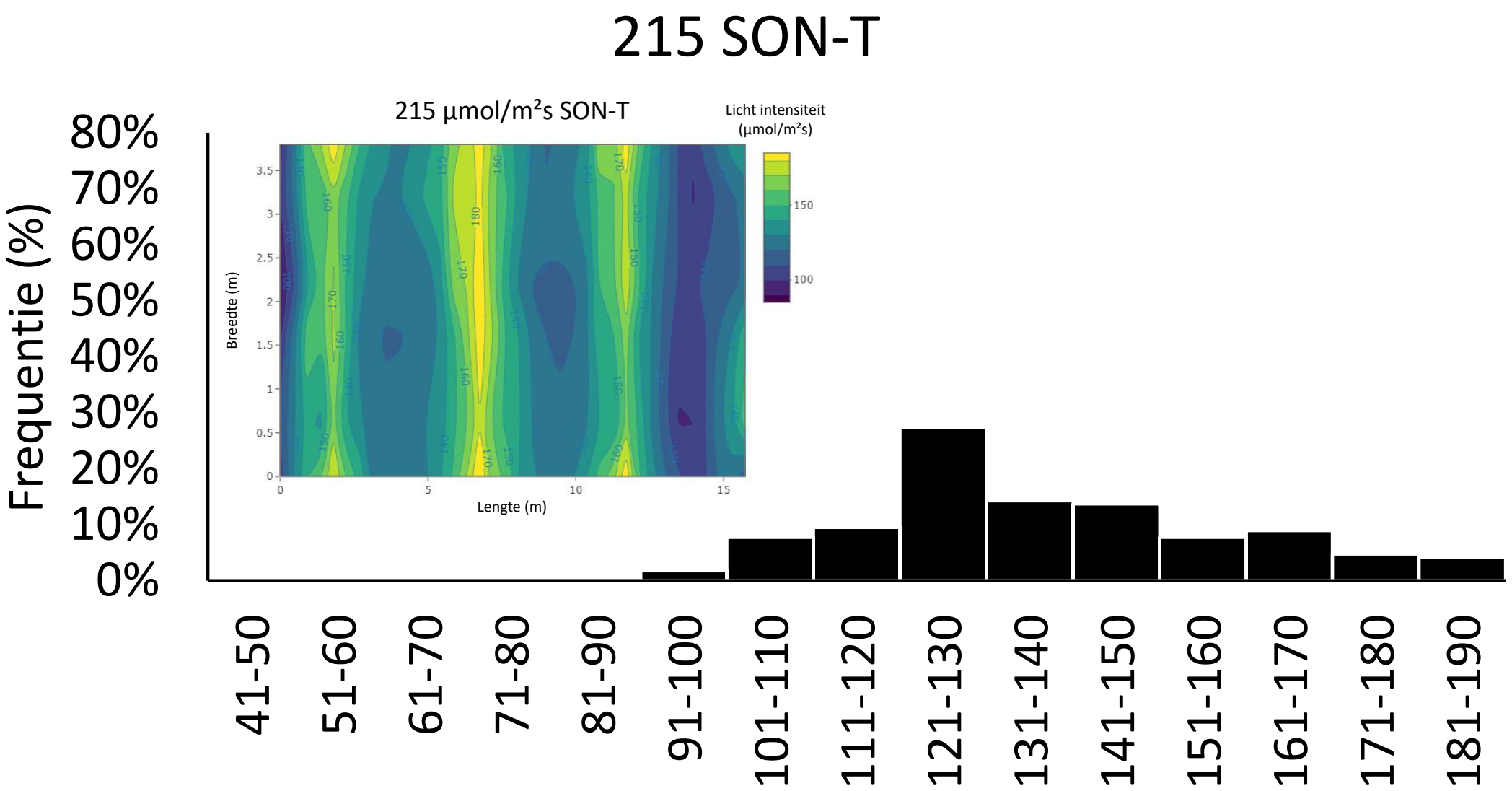
Lichtverdeling ter hoogte van de kop



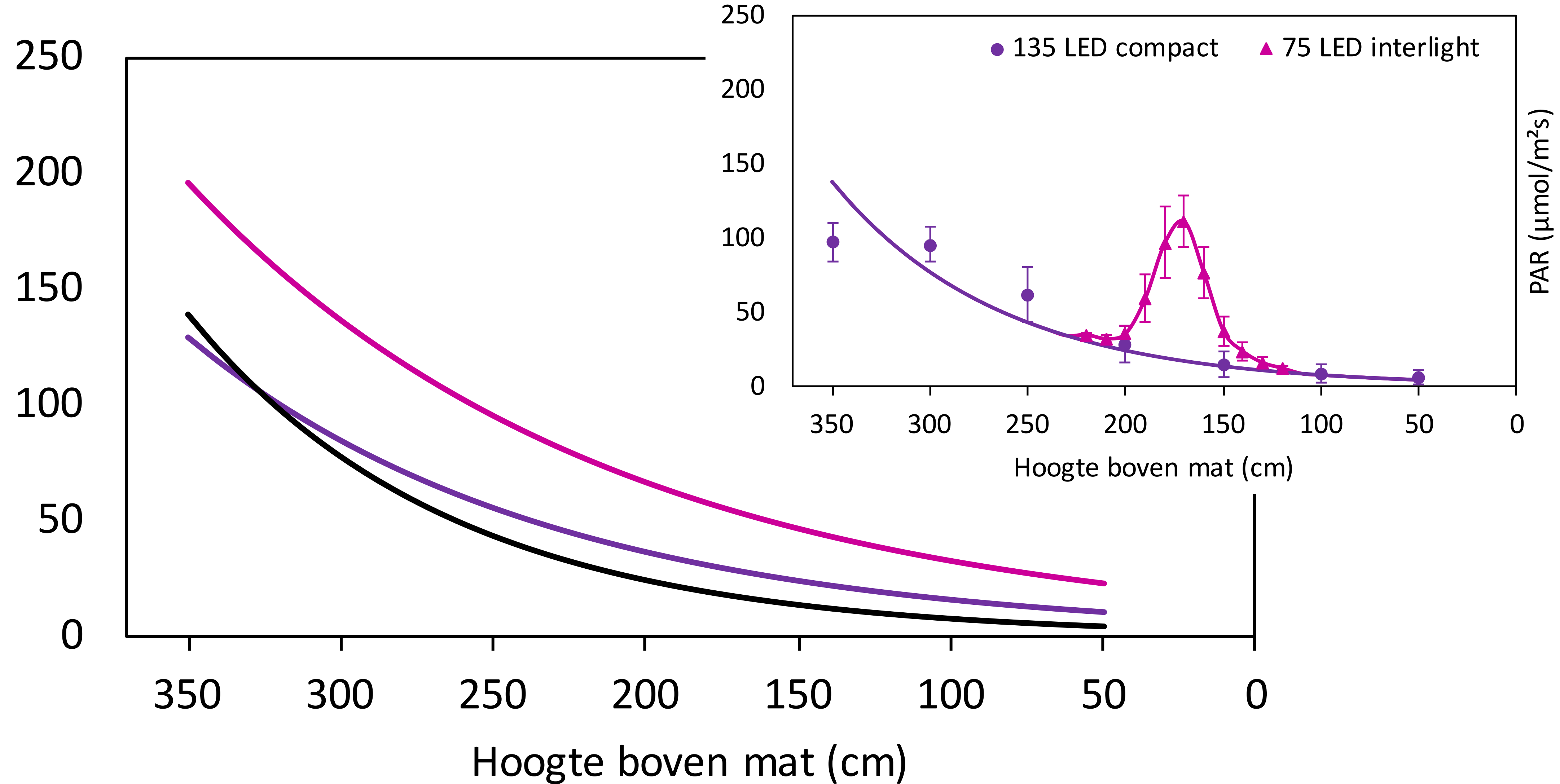
215 SON-T



Lichtverdeling ter hoogte van de kop



Lichtdoordringing in het gewas

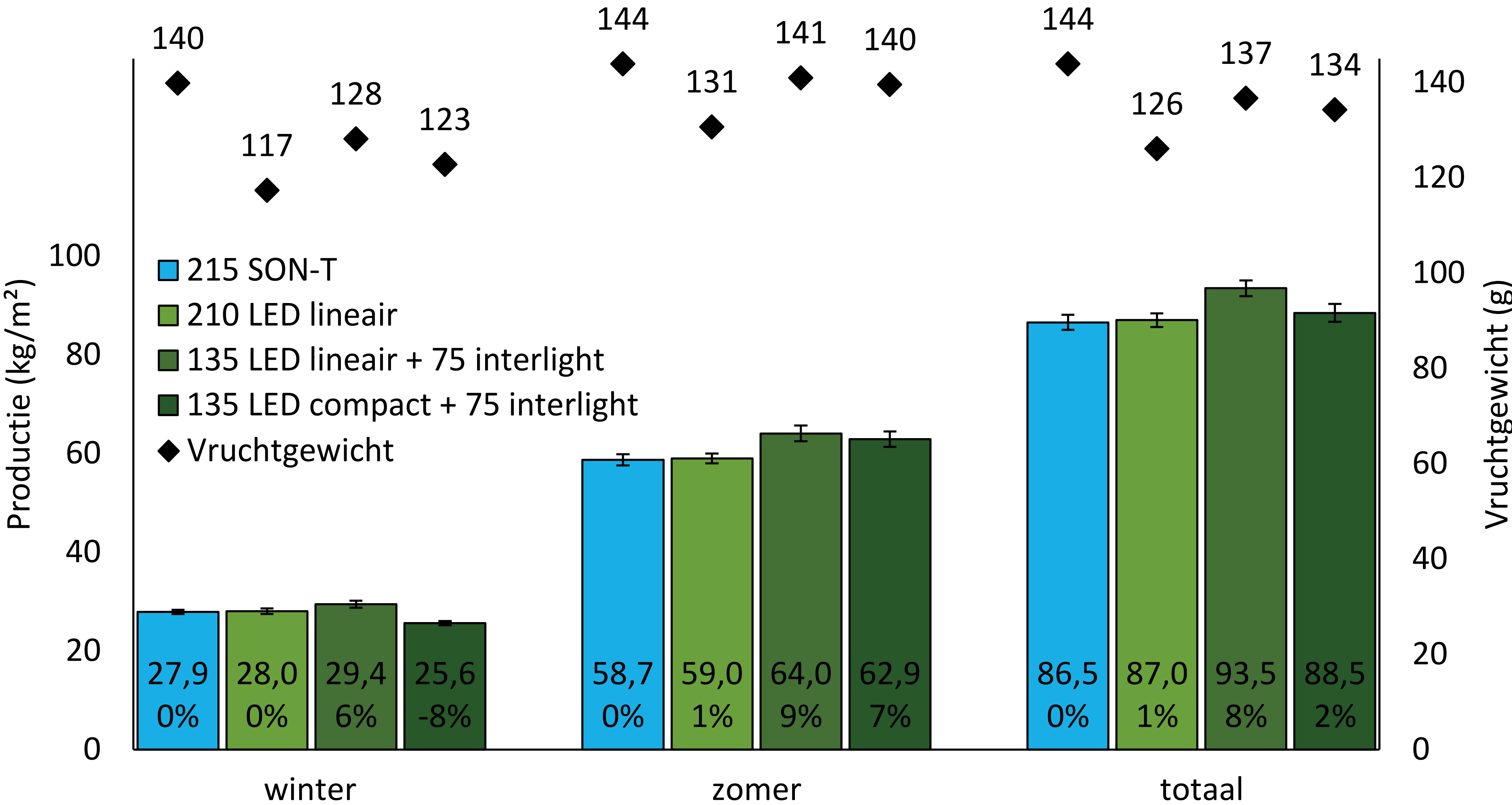


Productie (kg/m²)

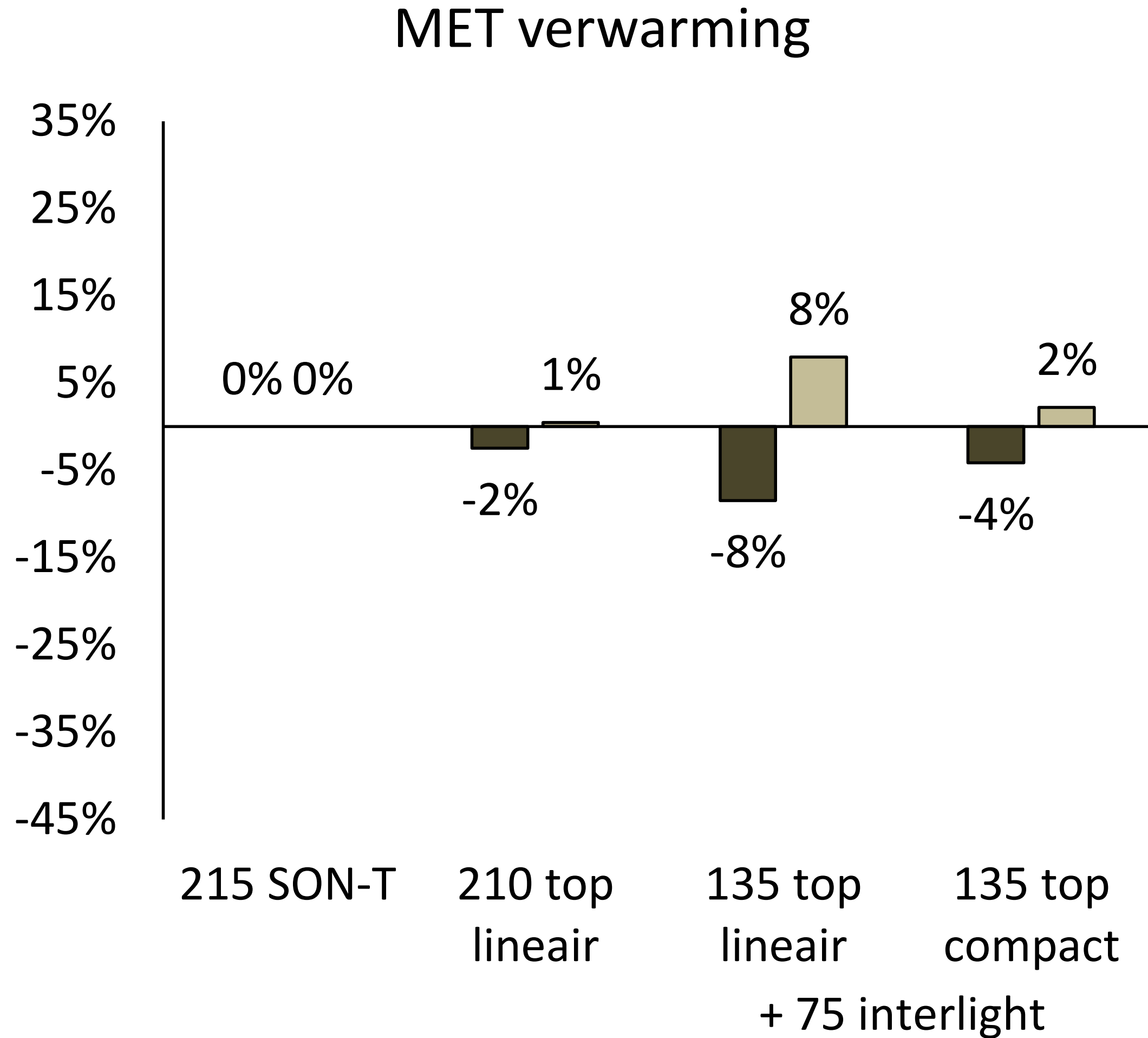
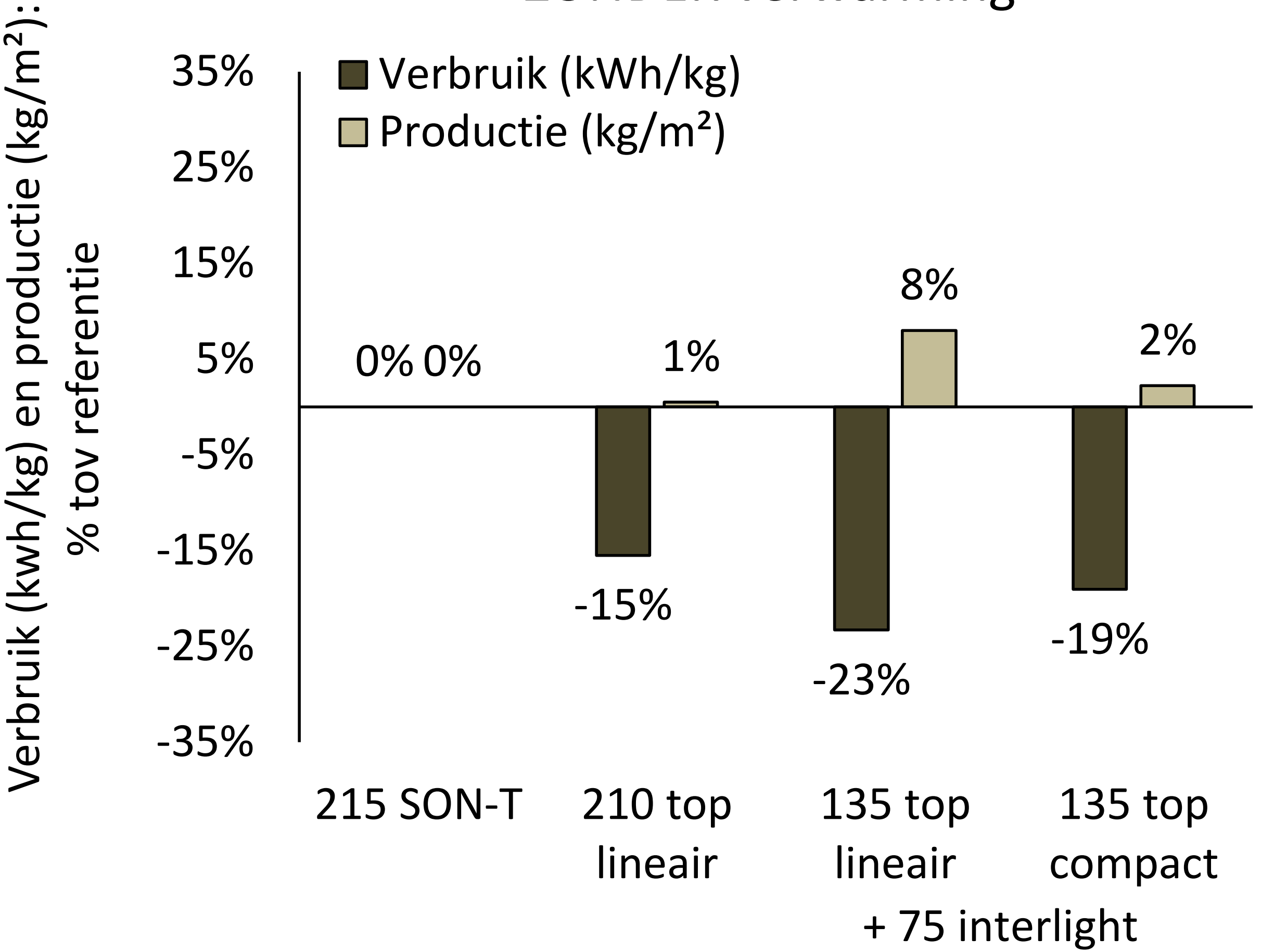


SON-T = 3,33 st/m²

Full LED = 4,2 st/m²



Energieverbruik totaal (kWh/m²)



Conclusie

Full LED

Hogere productie dan SON-T

Lineaire toplight + interlight

Beste lichtverdeling

Hoogste productie (zowel in winter, zomer als totaal)

Minste energie nodig om 1 kg tomaten te produceren

Vruchtgewicht

Neemt meer toe bij interlight dan bij toplight

→ Bij toplight beter geen hogere stengeldichtheid



GLITCH



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