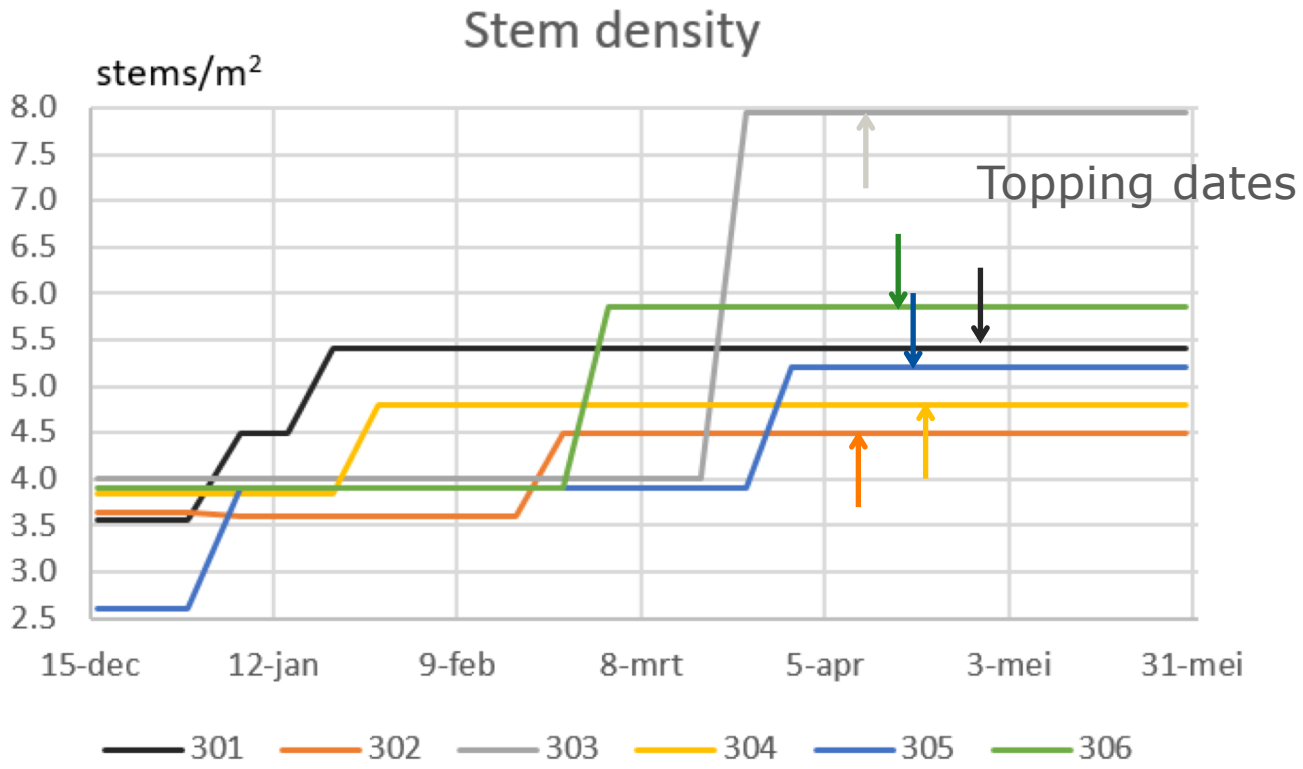
Analyses of results

Anne Elings, Feije de Zwart, Anna Petropoulou, Isabella Righini, Silke Hemming

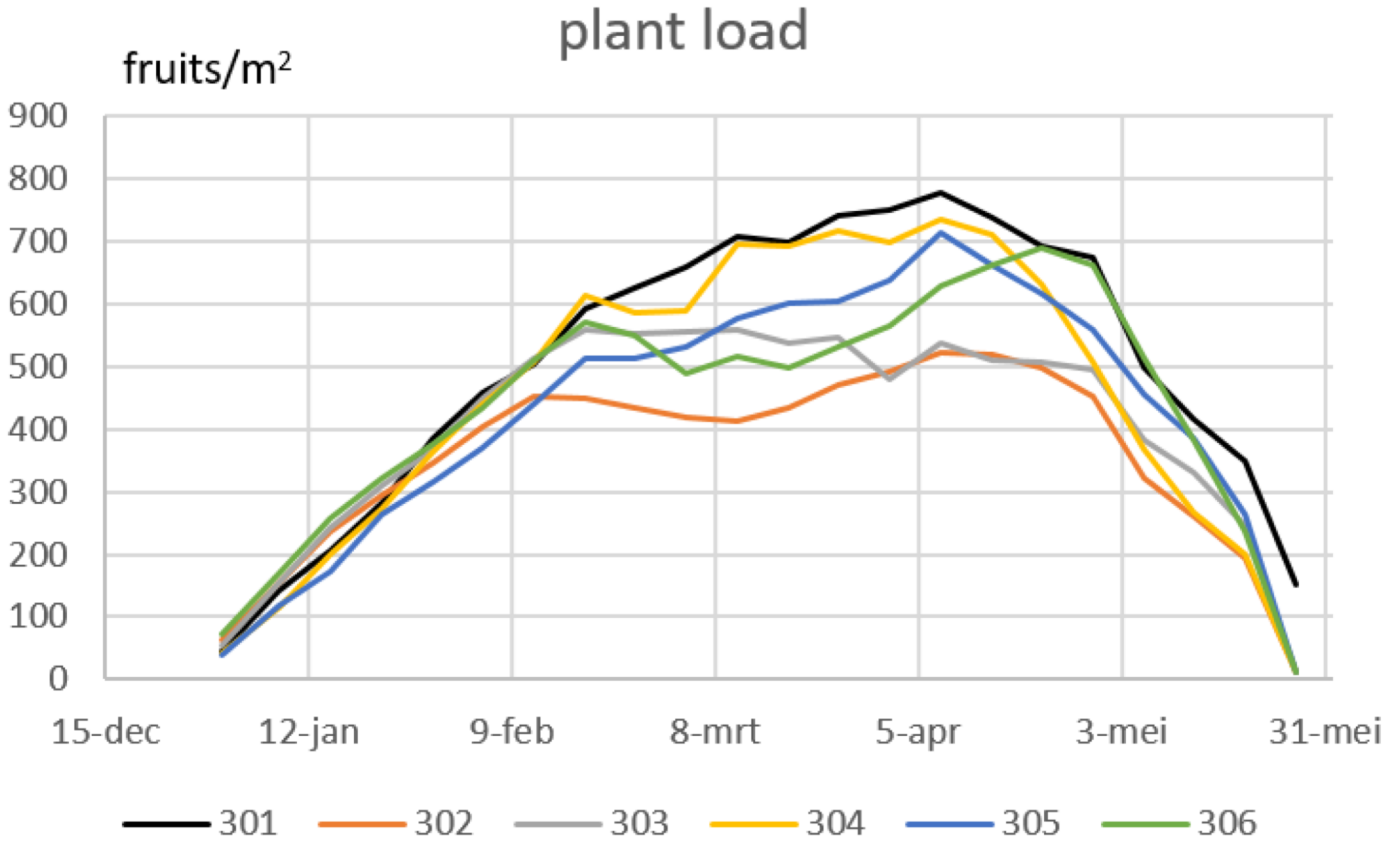
6 equal greenhouses, equal equipment, equal staff

Equal tomato variety … but 6 different crop strategies…



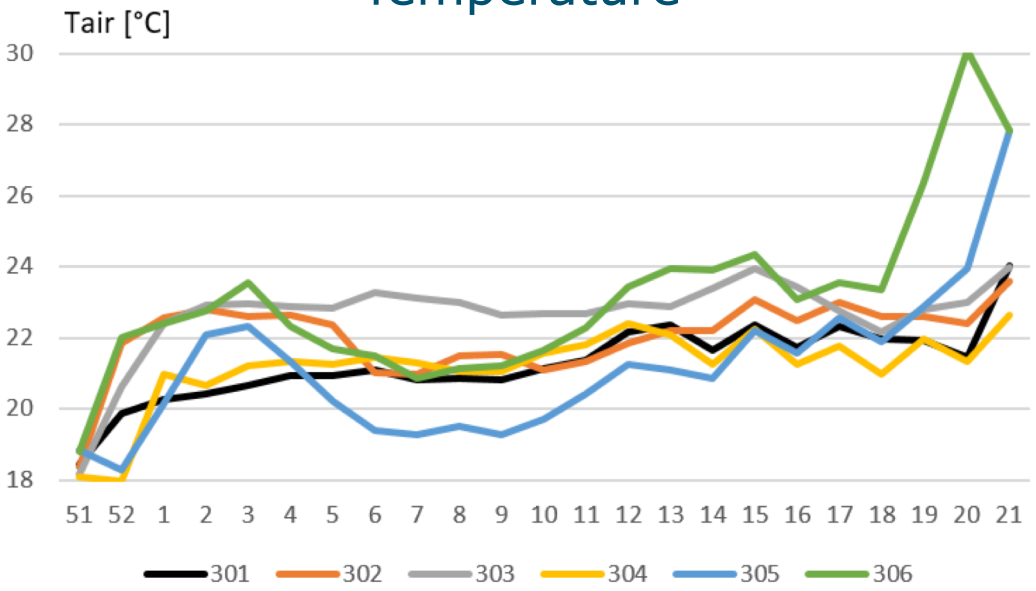
WAGENINGEN UNIVERSITY & RESEARCH Tencent heliospectra LETS GROW COM kpn Grodan axia vegetable seeds

... with different plant load development

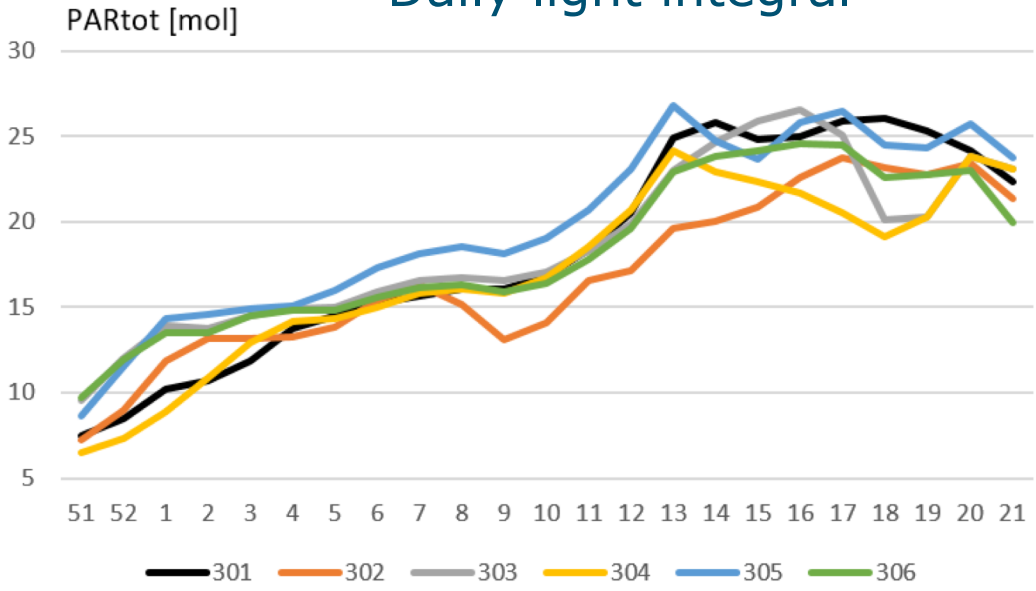


… different climate strategies…

Temperature



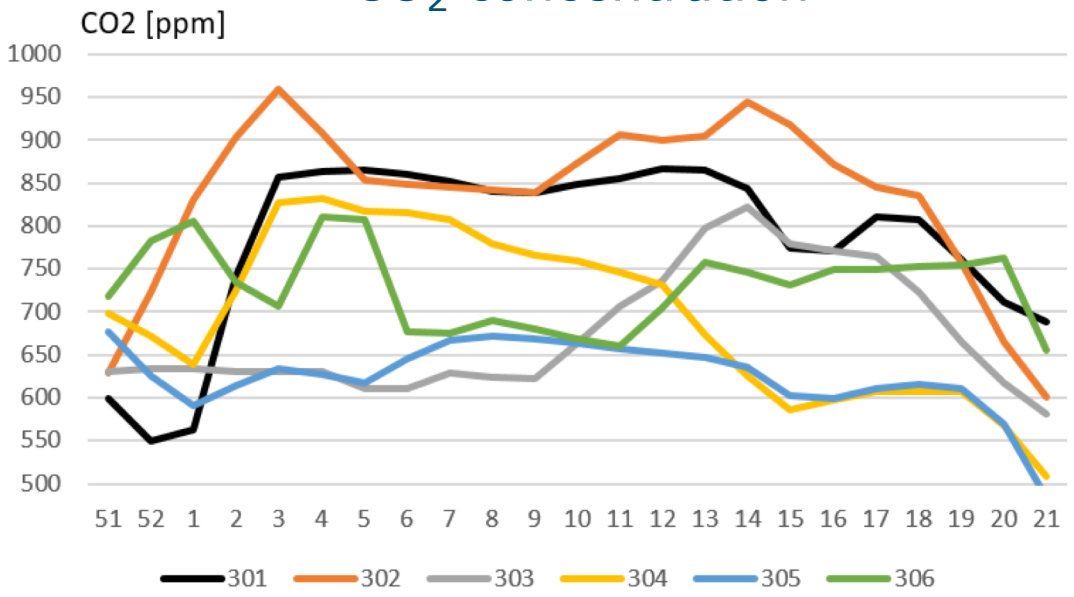
Daily light integral



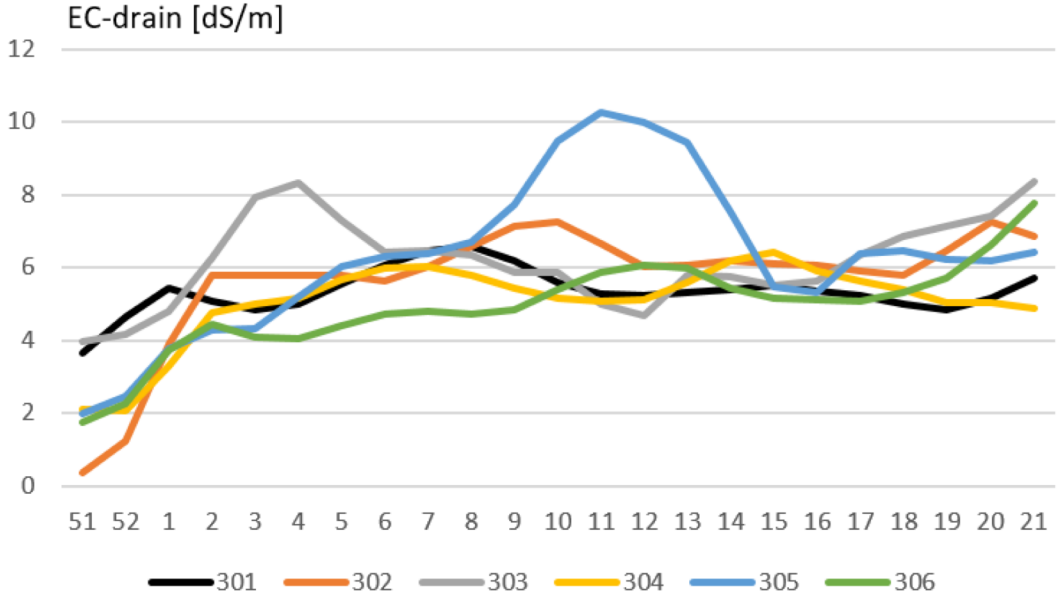
WAGENINGEN UNIVERSITY & RESEARCH · Tencent · heliospectra · LETS GROW COM · kpn · Grodan · axia vegetable seeds

... different climate and irrigation strategies

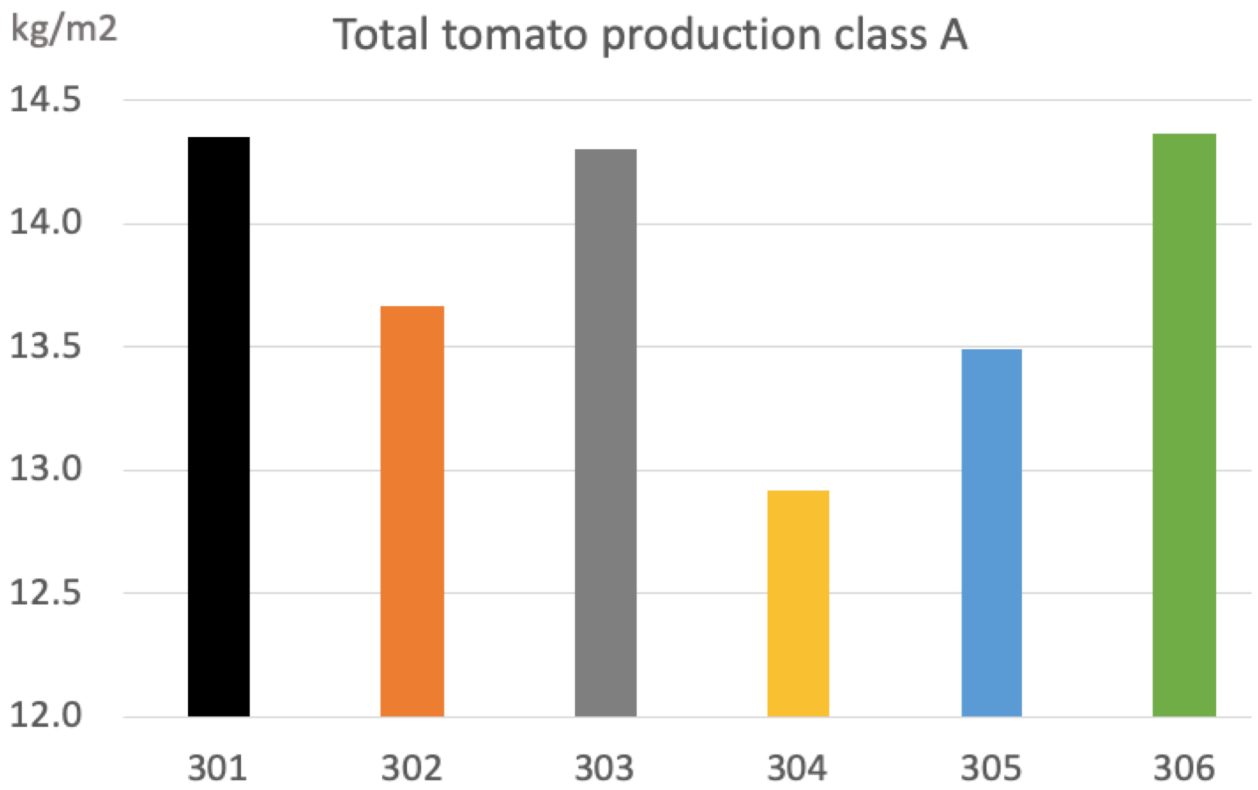
CO_2 concentration



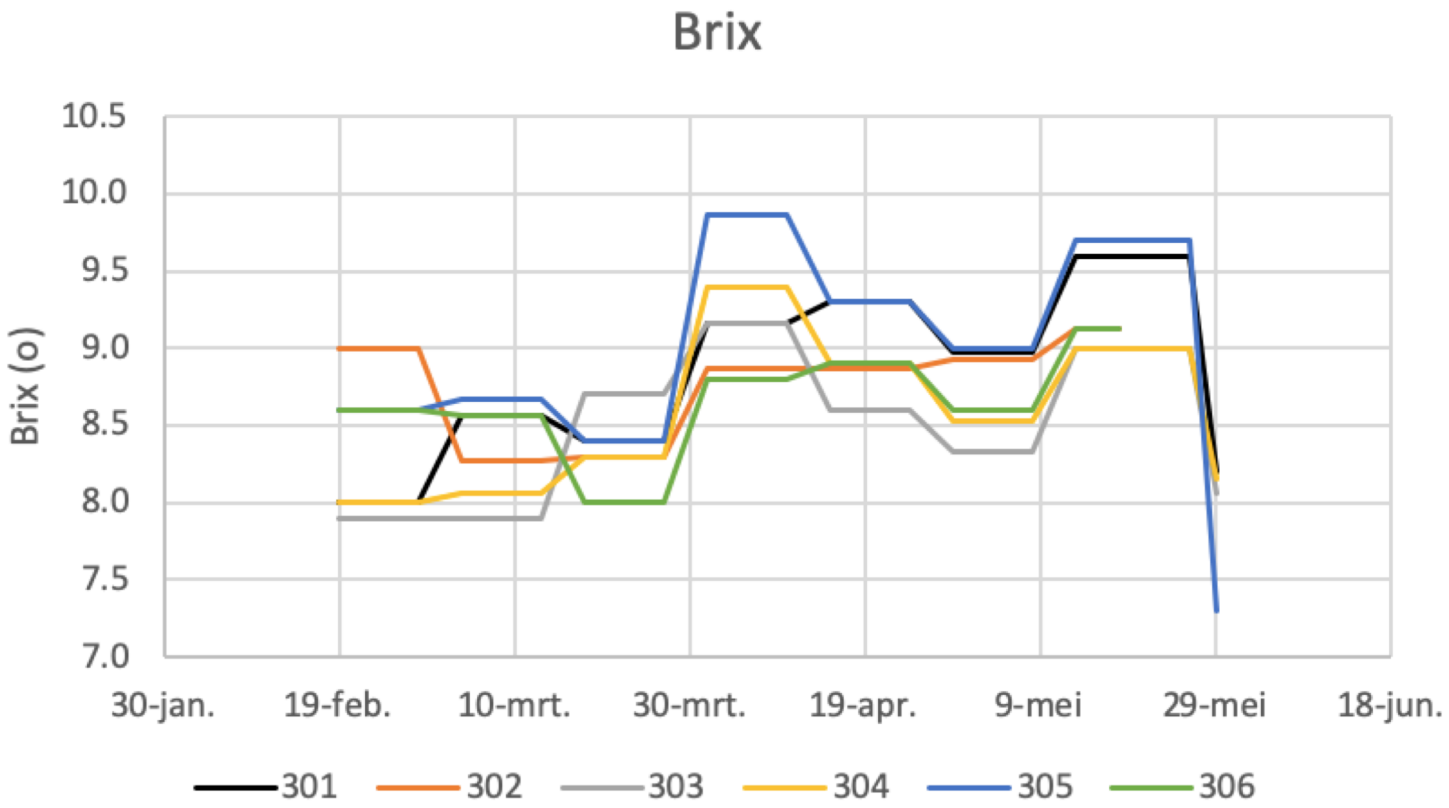
EC



… resulting in different production….



….and different fruit quality/taste…



But…also in different resources used = SUSTAINABILITY

Per kg class A tomato

heat (MJ)	electricity (kWh)	CO_2 (kg)	water (l)	nutrients (g)
12,9	18,7	0,63	25,0	83,0
18,5	17,6	0,74	25,2	81,0
25,3	19,9	0,87	25,9	78,0
25,9	17,7	0,56	26,9	90,0
12,8	24,0	0,72	27,9	100,0
33,0	19,0	0,60	27,4	99,0

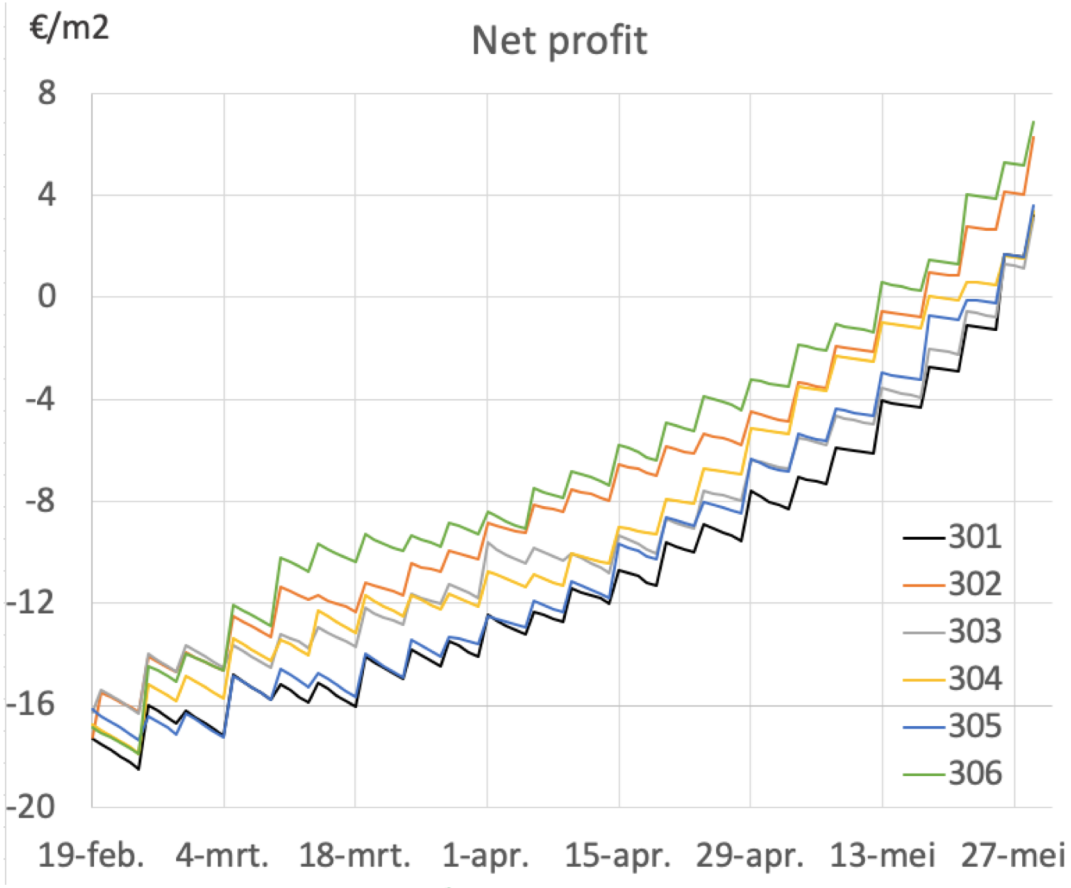
20% of total points

WAGENINGEN UNIVERSITY & RESEARCH Tencent heliospectra LETS GROW .COM kpn Grodan axia vegetable seeds

…and finally…..

=NET PROFIT

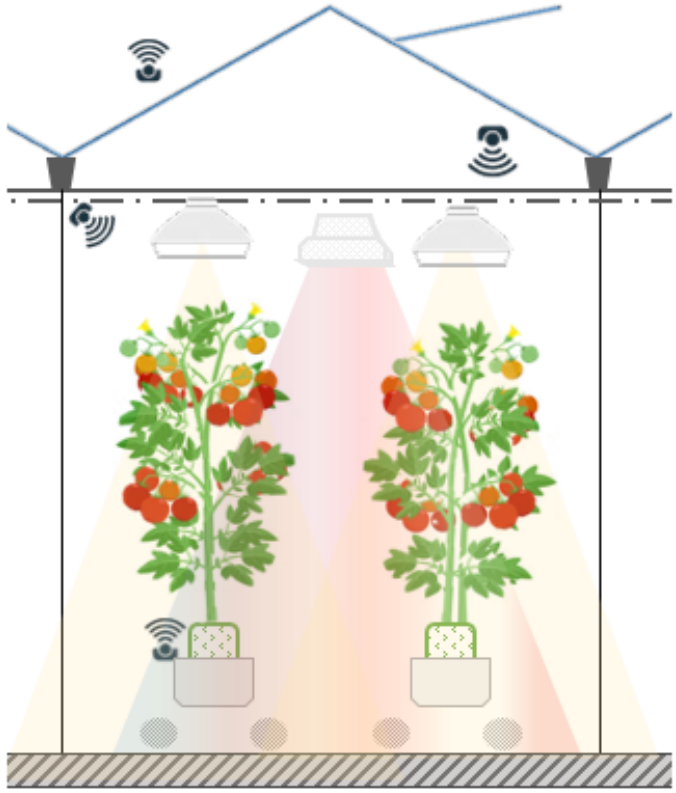
50% of total points



Net profit (€/m^2)
6,86
6,26
3,59
3,35
3,19
3,10

Take home messages

- All AI teams outperformed the human reference
- Different climate strategies result in comparable total production but different sustainability
- Crop management is key for high (quality) production
- Objective data needed on all aspects of growing (lack of data hampers development)
- Data interpretation needed for autonomous growing (AI or human experts)
- Crop handling very important for autonomous growing (Excellent humans or robotics)



WAGENINGEN UNIVERSITY & RESEARCH Tencent heliospectra LETS GROW COM kpn Grodan axia vegetable seeds

Thank you all!

AUTONOMOUS GREENHOUSES

WAGENINGEN UNIVERSITY & RESEARCH · Tencent · heliospectra · LETS GROW COM · kpn · Grodan · axia vegetable seeds

Final results

Points given by jury:

	Net profit	Sustainability	AI strategy	Total
Automatoes	25	10	15	50
AiCU	20	8	12	40
DIGILOG	15	6	3	24
IUA.CAAS	10	4	6	20
The Automators	5	2	9	16