



Lighted sustainable year-round strawberry cultivation with fresh everbearers

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Worldwide Expertise for Food & Flowers

Content

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Learning points from previous projects

- ✦ Steering energy balance of everbearers is 'difficult'
 - Optimisation of plant propagation
 - RTR steering
- ✦ Dormancy during winter production
 - Earlier planting
 - Minimum Day Length of 16 hours already started during propagation to prevent dormancy impulse
 - Genetics
- ✦ Build-up weekly production levels was too slow
 - Higher plant density
 - Cultivation is focused on winter period

Assumptions current trial

✦ Year-round production:

- September – November: creating a balanced plant with enough vigour for the winter period
- November – April: production in balance → 9 kg/m²
- April - ...: unlit spring production as a controlled peak

✦ Total production goal: 17.5 kg/m²

✦ Efficient use of heat and energy:

- Everbearer plants have fewer leaves = less moisture = less dehumidification
- Smaller difference in day-night temperature
- Lamps provide heat
- Use of two screens

✦ Sustainable growing strategy (IPM, use of beneficials)

Plant propagation

- ✦ Week 22 (June 1): tipping, same as plants for double cropping
- ✦ Week 28 (July 10): plants in greenhouse (in trays)
 - On propagation field 21,000 GDH
 - Day Length extended to 16 hours in greenhouse
→ to prevent dormancy
- ✦ Week 31 (August 3): planting at gutter
 - About 28,000 GDH at planting



Trial information

- ✦ Planting date: August 3, 2023
- ✦ End of trial: June 17, 2024
- ✦ Planting density:
 - 8 pl./m¹ – 7,02 pl./m²
- ✦ Plant types:
 - Fresh plants!
 - Mainly mini trays and some tray plants
- ✦ Everbearers + low chill varieties:
 - 6 varieties + 4 selections

| | | |
|-----|-------------|------|
| 501 | Karima | MT |
| 502 | Favori | Tray |
| 503 | Favori | MT |
| 504 | Florice | Tray |
| 505 | Florice | MT |
| 506 | Lim 09 | MT |
| 507 | Limore® One | MT |
| 508 | Albion | MT |
| 509 | Variety X | MT |
| 510 | Variety Z | MT |
| 511 | Variety Y | MT |
| 512 | Variety Q | Tray |
| 513 | Variety Q | MT |

Cultivation strategy

- ✦ RTR 12 + 4.5, since week 41 RTR 12 + 3 to keep plant in balance (week 36 start harvest)
- ✦ Minimum 16 hours Day Length with flowering bulb + 30 min End Of Day with Far Red
- ✦ Goal: balance → trusses were kept on the plants earlier. Trusses are removed for the last time 2,000 GDH (= 1 week) after planting.

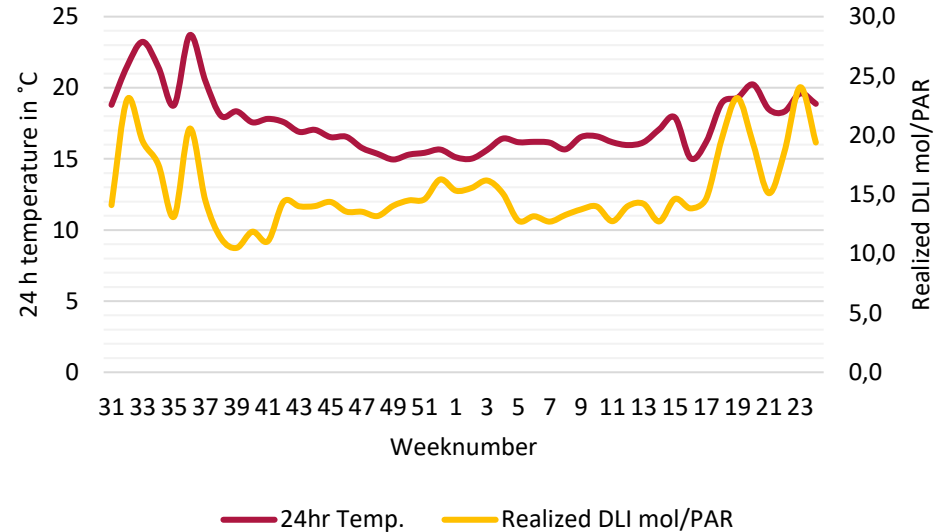
Climate

- ✦ Heating: started week 41
- ✦ CO²: started in week 32 (400-450 ppm) built up slowly
- ✦ 15,850 GDH till first harvest (week 36)
- ✦ 24-hours RH: 70-80

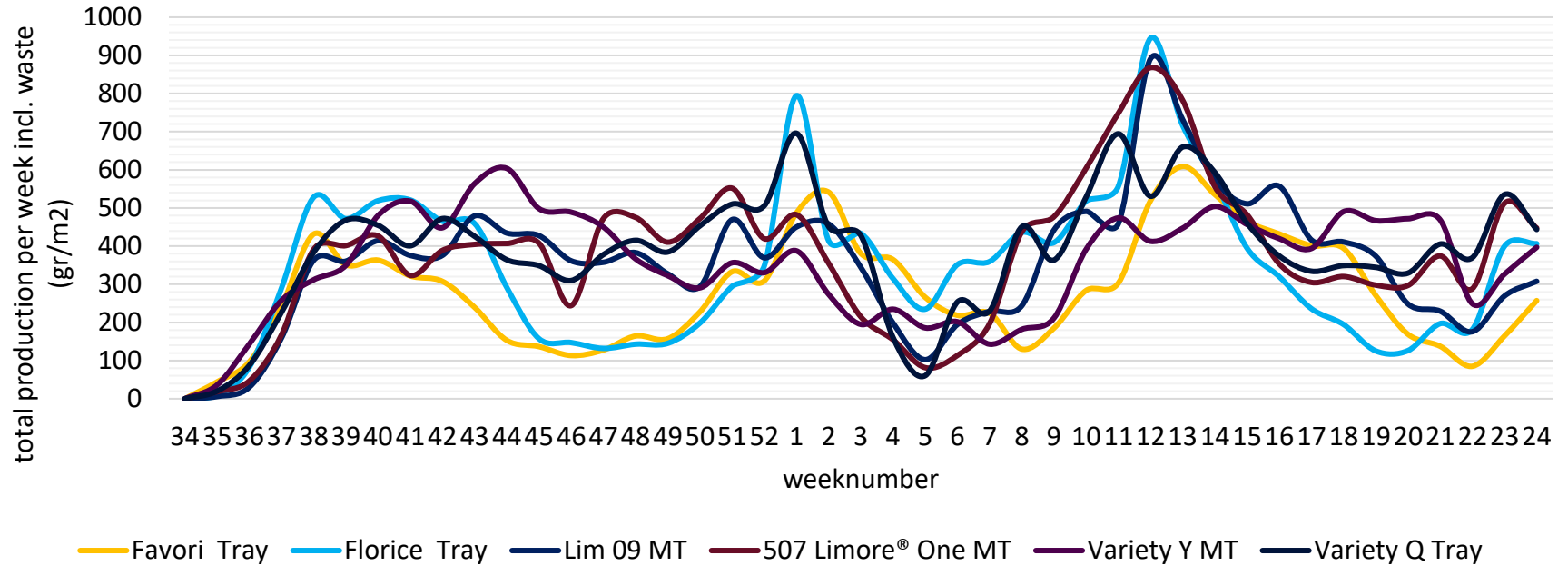


Daily Light Integral

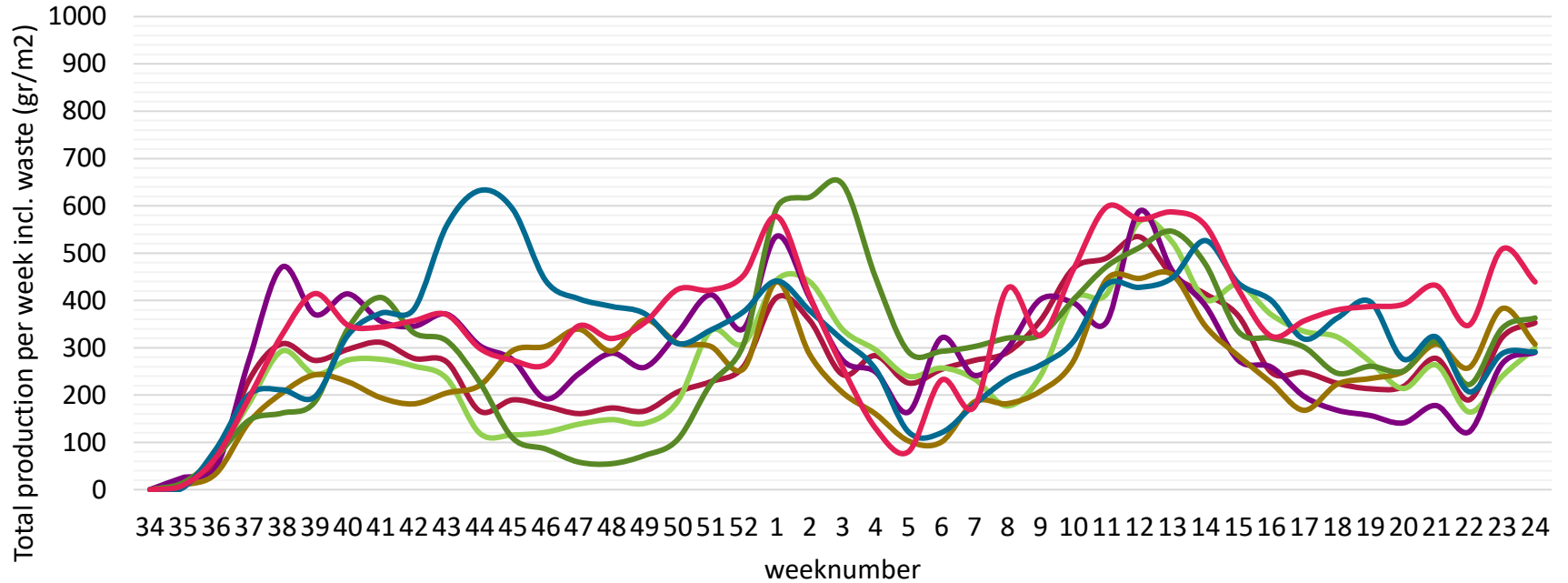
- ✦ Amount of light per day which is available for the plants.
- ✦ Week 40: started with lighting.
- ✦ Average 24H Temp. week 31-24 = 17,5 °C
- ✦ Average 24H Temp. week 41-17 = 16,2 °C
- ✦ Average DLI week 41-17 = 14,1 mol/PAR



Production curve

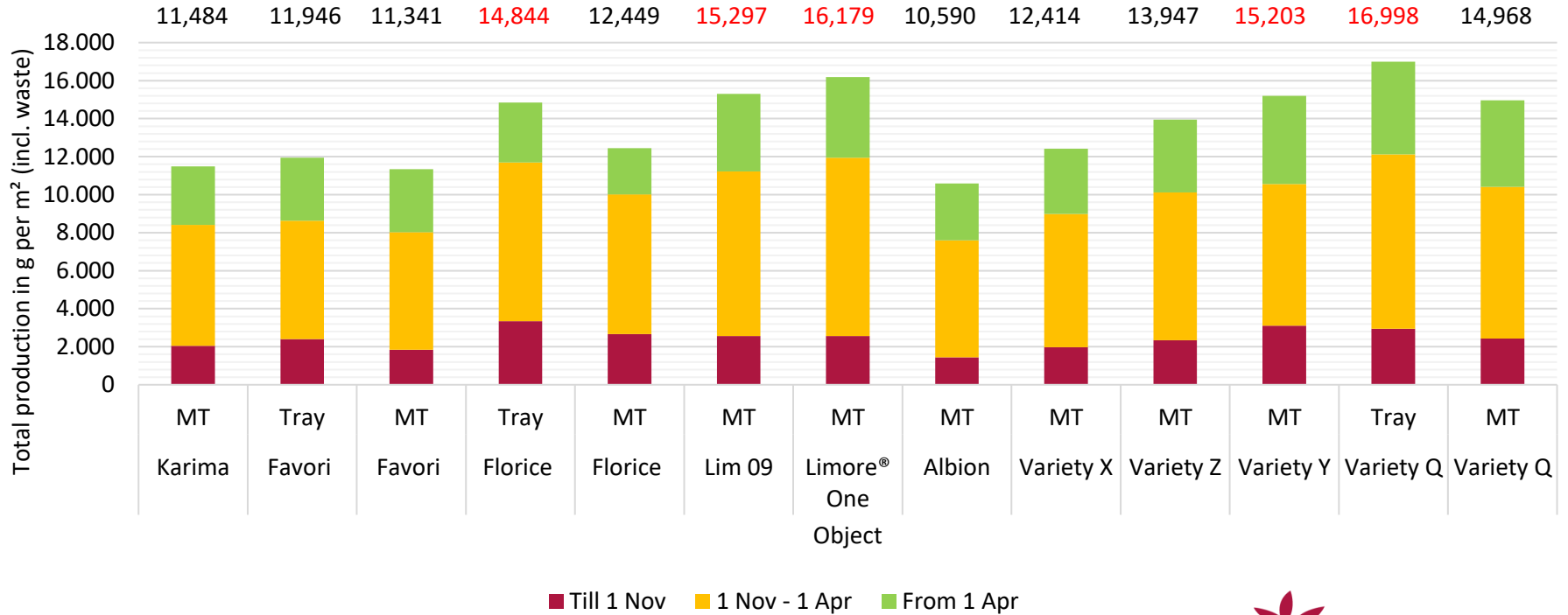


Production curve



Karima MT Favori MT Florice MT Albion MT Variety X MT Variety Z MT Variety Q MT

Total production per m² until June 17



Favori Tray



Florice Tray



Lim09



Variety Q Tray

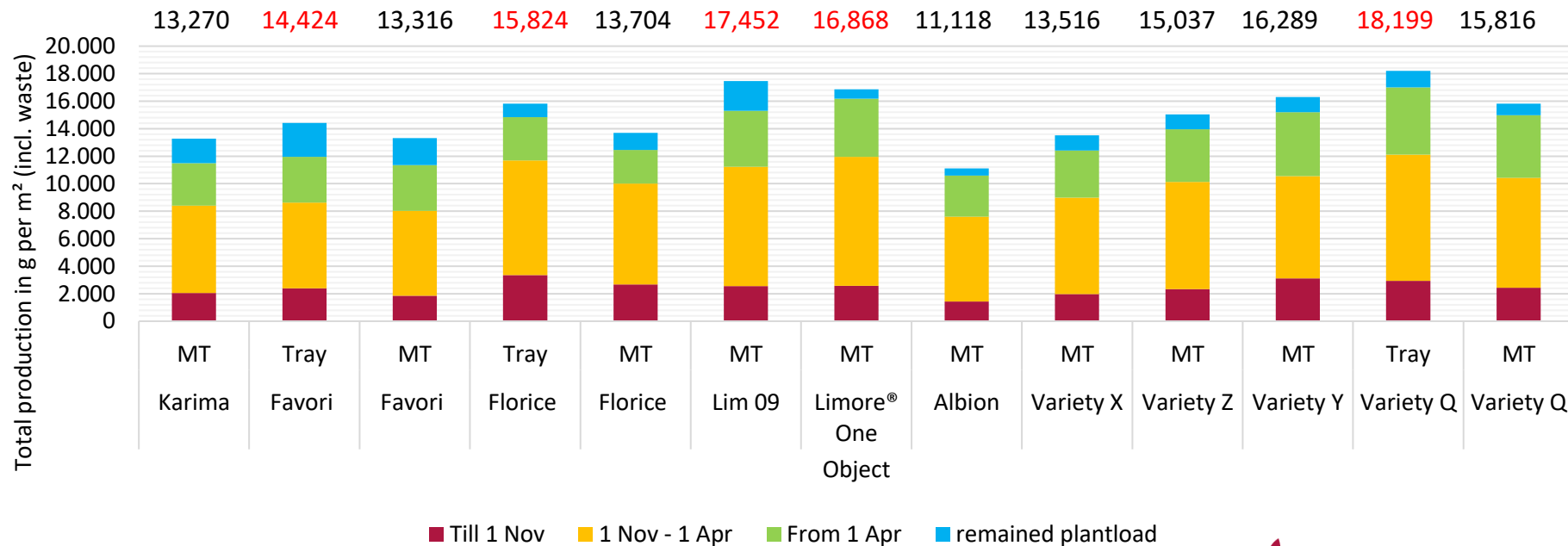


Limore® One

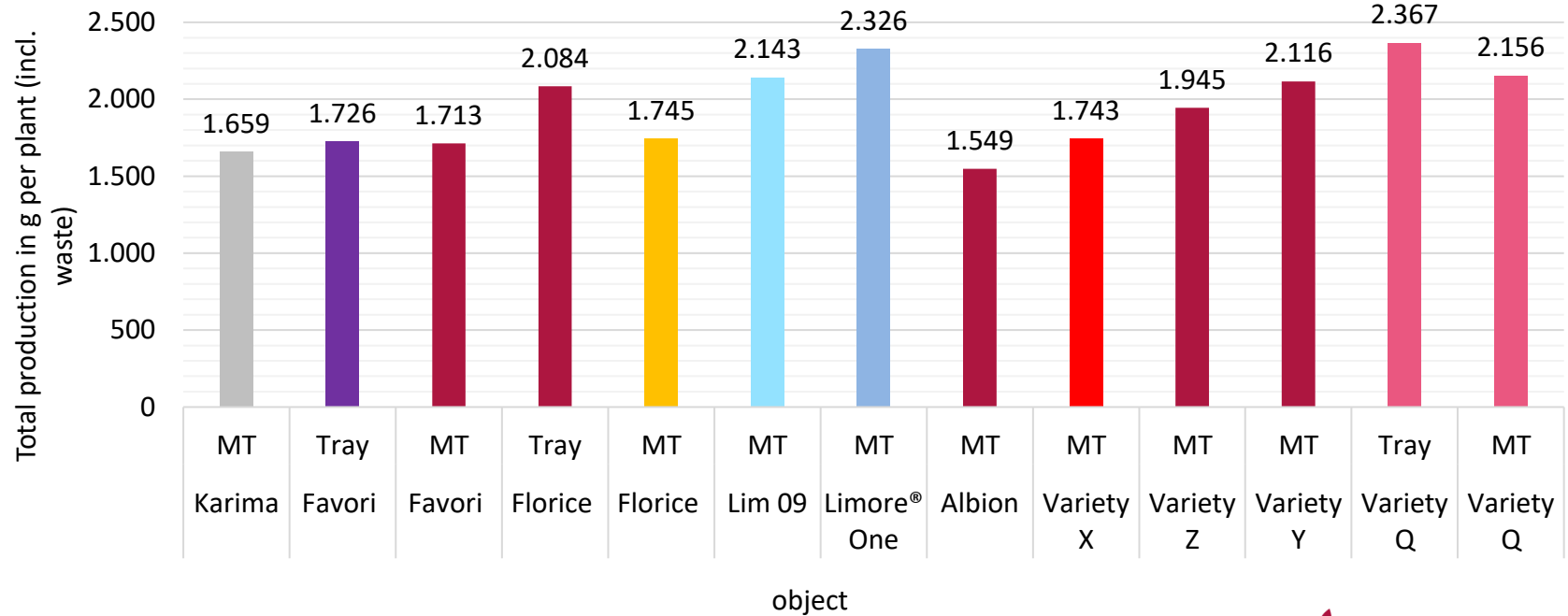


Pictures of crop after last picking of June 17.

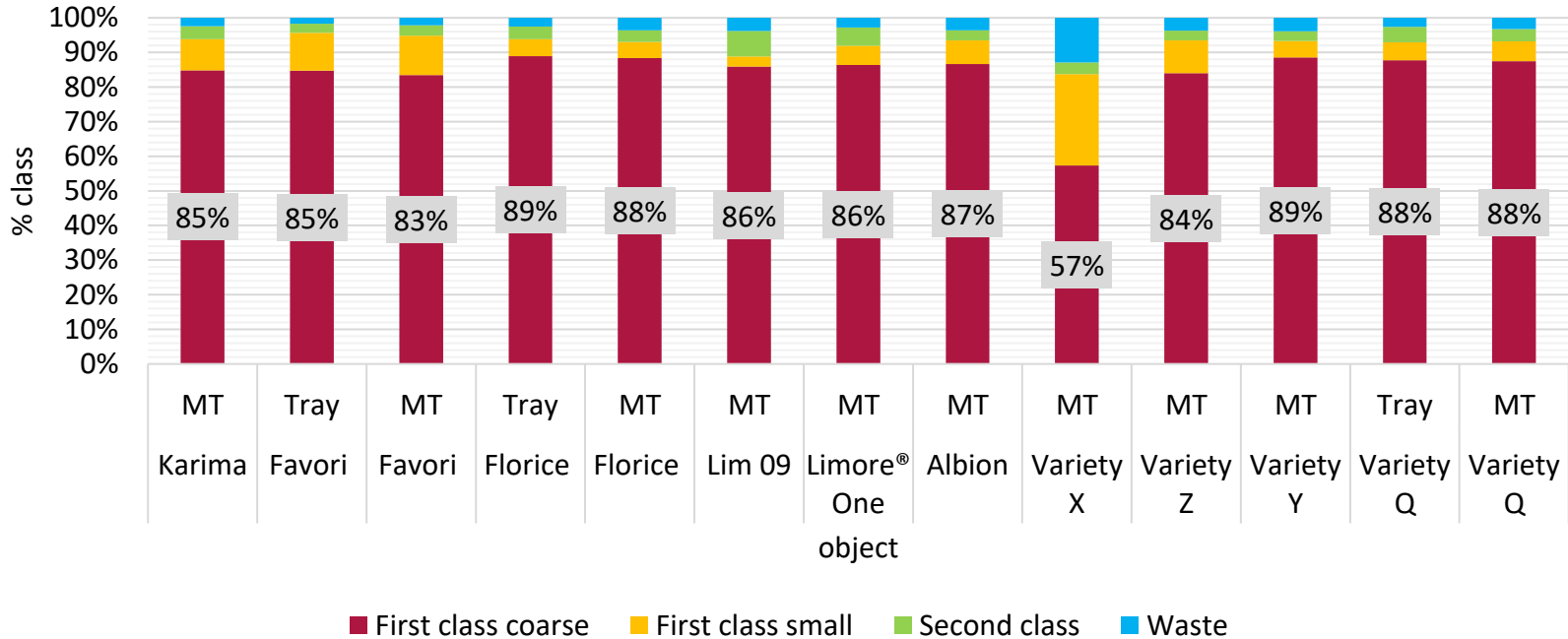
Total production per m² until June 17 + calculated remaining fruits/flowers



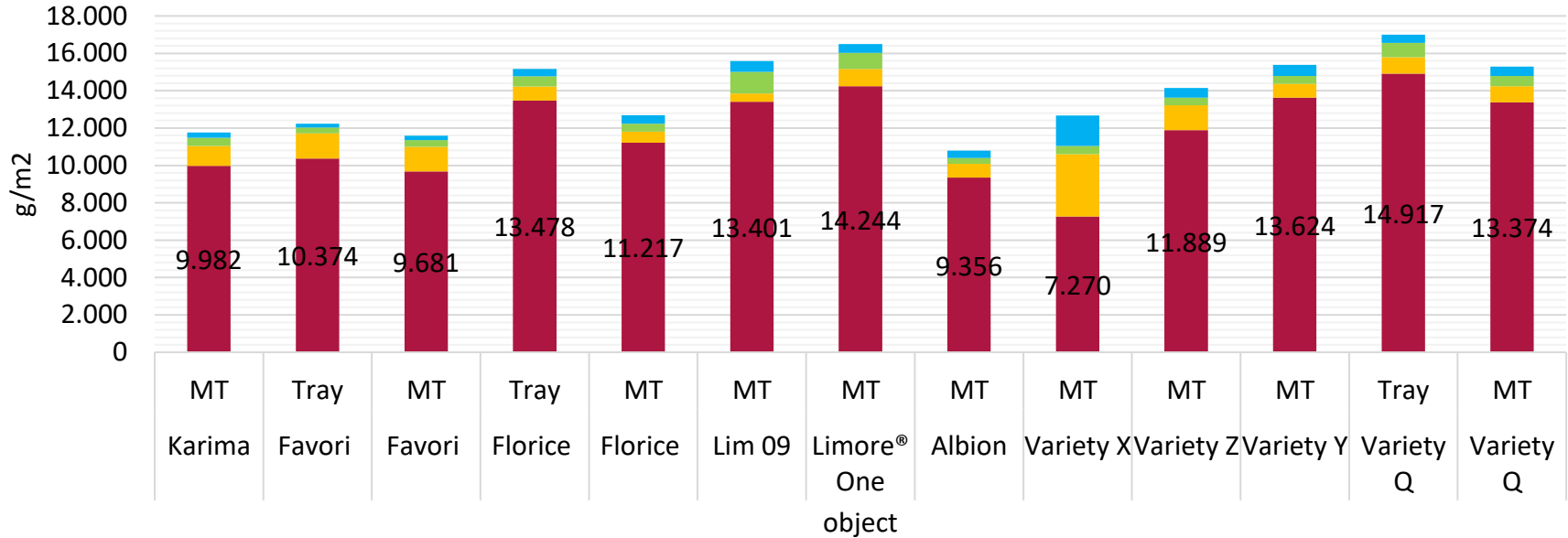
Total realized production per plant (goal was 2,5 kg/plant)



Total sorted production: percentages

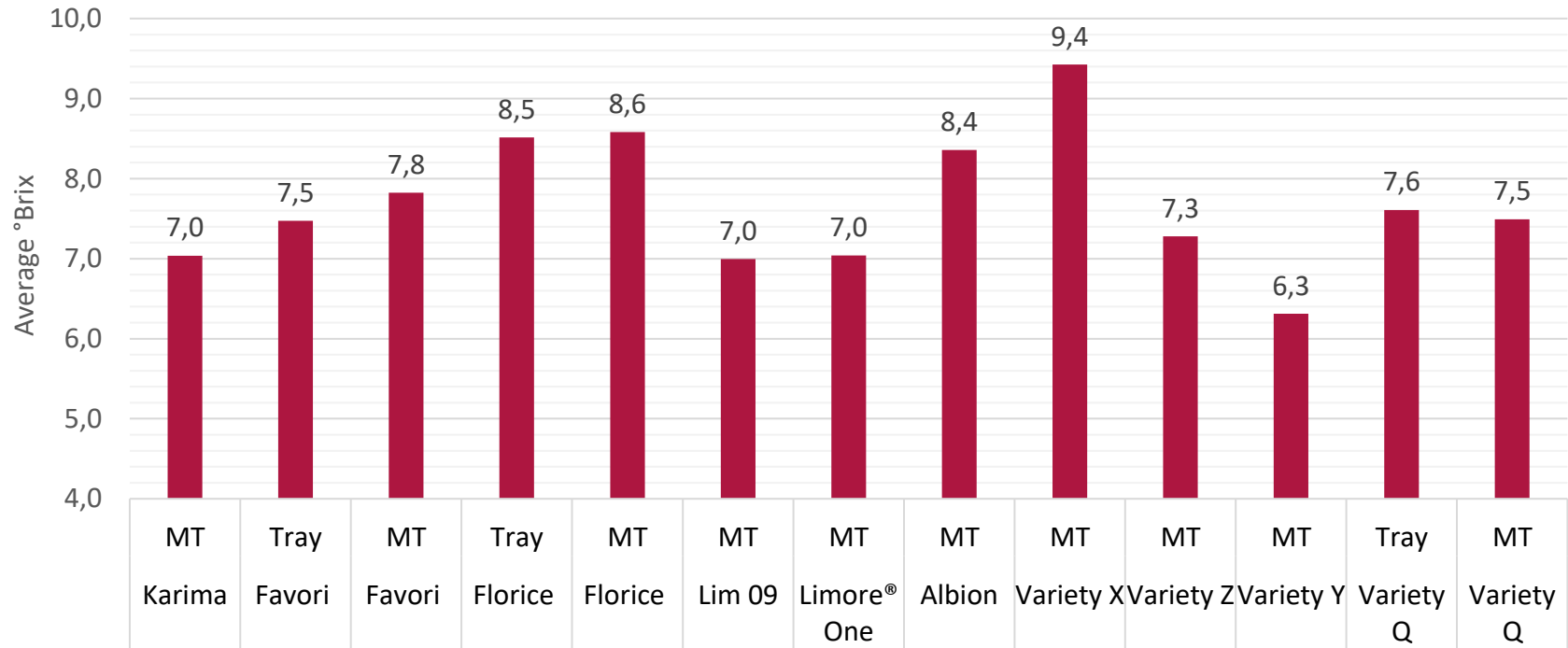


Total production class I fruits per m² until June 17

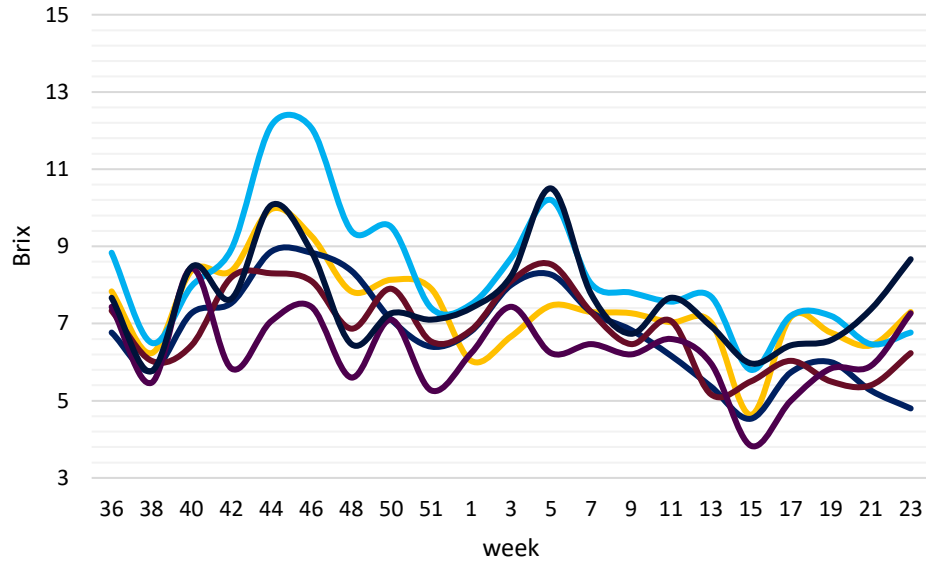


■ 1st class big
 ■ 1st clas small
 ■ Second class
 ■ Waste

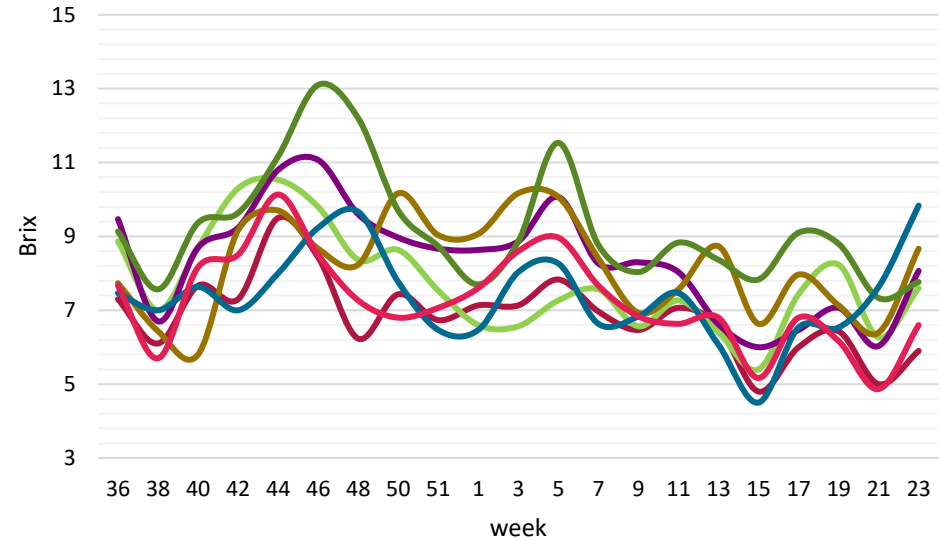
Sugar content (biweekly measured week 36-23)



Sugar content during cultivation

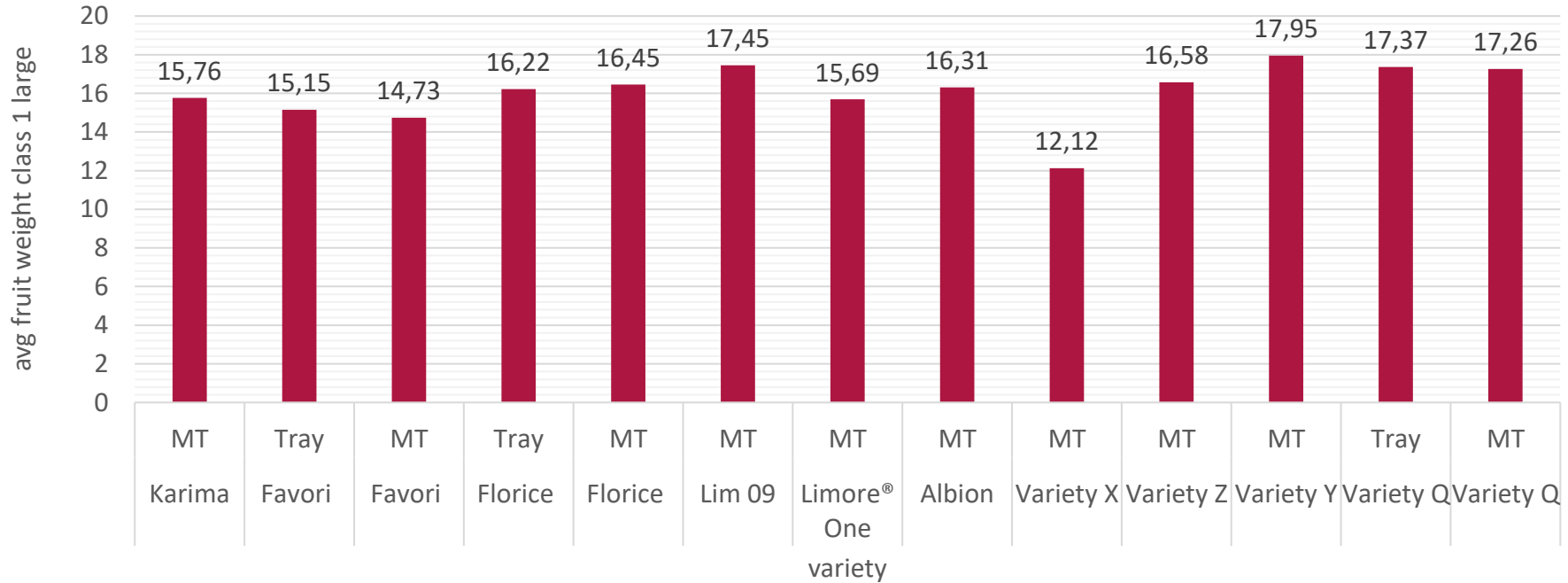


— Favori Tray — Florice Tray — Lim 09 MT
— Limore® One MT — Variety Y MT — Variety Q Tray

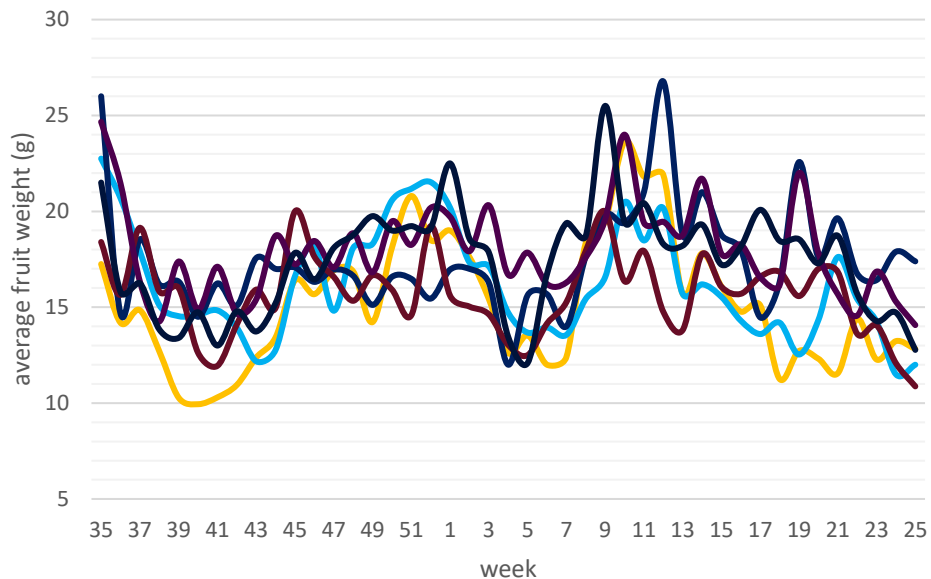


— Karima MT — Favori MT — Florice MT — Albion MT
— Variety X MT — Variety Z MT — Variety Q MT

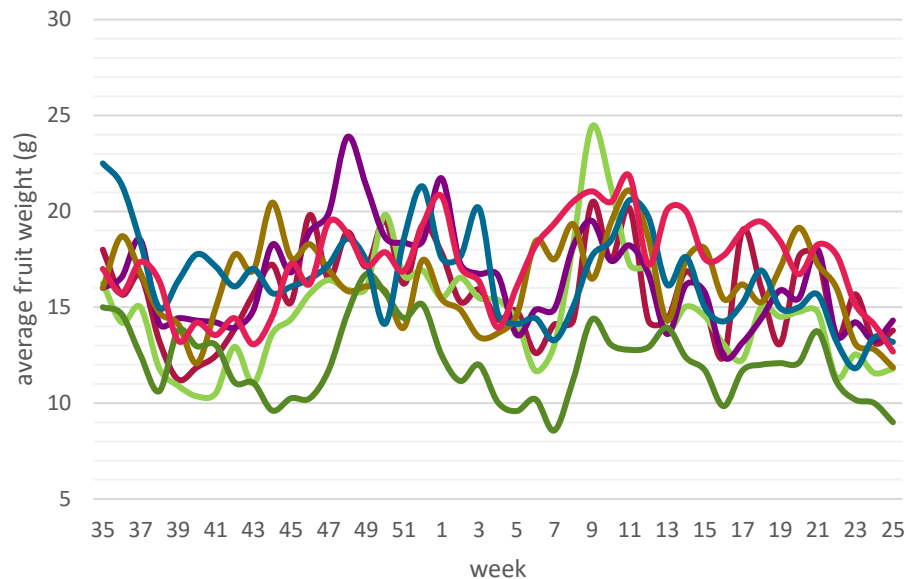
Average fruit weight class 1 large



Average fruitweight class 1 large



— Favori Tray — Florice Tray — Lim 09 MT
— Limore® One MT — Variety Y MT — Variety Q Tray



— Karima MT — Favori MT — Florice MT — Albion MT
— Variety X MT — Variety Z MT — Variety Q MT

Conclusions

- ✦ Total gas use: 4.22 m³/m² (half October – End of May).
- ✦ Total energy use: 166 kWh/m².
- ✦ In autumn, some green flowers (less fertile plants): cyclical lighting.
- ✦ Most dark period of the year (December/January) still of influence on flower initiation / building trusses.
- ✦ Less dormancy: 2 times some misshapen fruits are removed. (January/February), these are not included in production results.
- ✦ Karima: results could have been negative influenced by the location in the department (row 1).
- ✦ Florice, Variety Y, Variety Q, Lim09 and Limore® One had highest productions
 - New genetics important for winter cultivation with everbearers (low-chill selections)

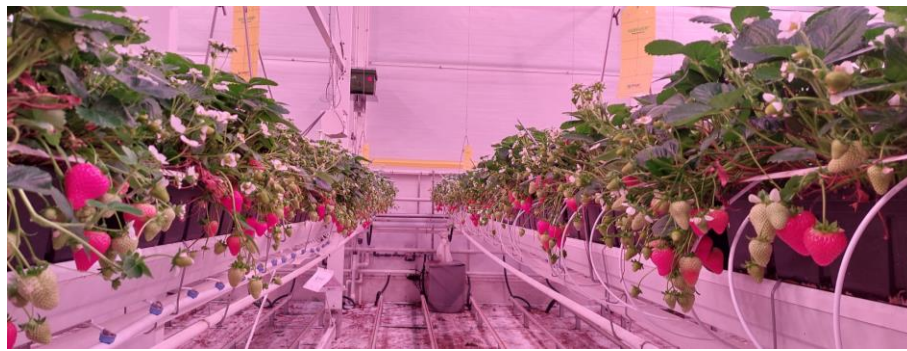
Conclusions

- ✦ Creating balance in the plant: positive energy balance for producing + inducing new trusses
 - RTR-strategy
 - Starting with an adult generative fresh plant
 - EOD Far Red for stretching
 - Light sum from October 13-15 mol/m²/day
 - 24 H temperature: 15-18 °C
- ✦ Higher production per m² possible by increasing the number of gutters?
- ✦ Other circumstances like outside temperature and radiation can be of influence on results.

Next

- ✦ A follow-up trial of this kind of lighted cultivation with everbearers can be seen at Delphy ISFC during the Field Trip.






The logo for Delphy | isfc features a stylized red leaf icon above the text "Delphy | isfc" in a red, sans-serif font.

Thank you for your attention!

Feel free to contact me for questions:

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