Seminar Ireland, April 18 , 2018.

Johan Aelterman

IDRIS Ltd: consulting in strawberries since 1983.

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Representing CIV, Mazzoni & Salvi Clery, Joly, Capri, Murano……

Mazzoni GROUP NURSERY DIVISION

CIV CENTRO INNOVAZIONE VARIETALE ®

SALVI VIVAI ®

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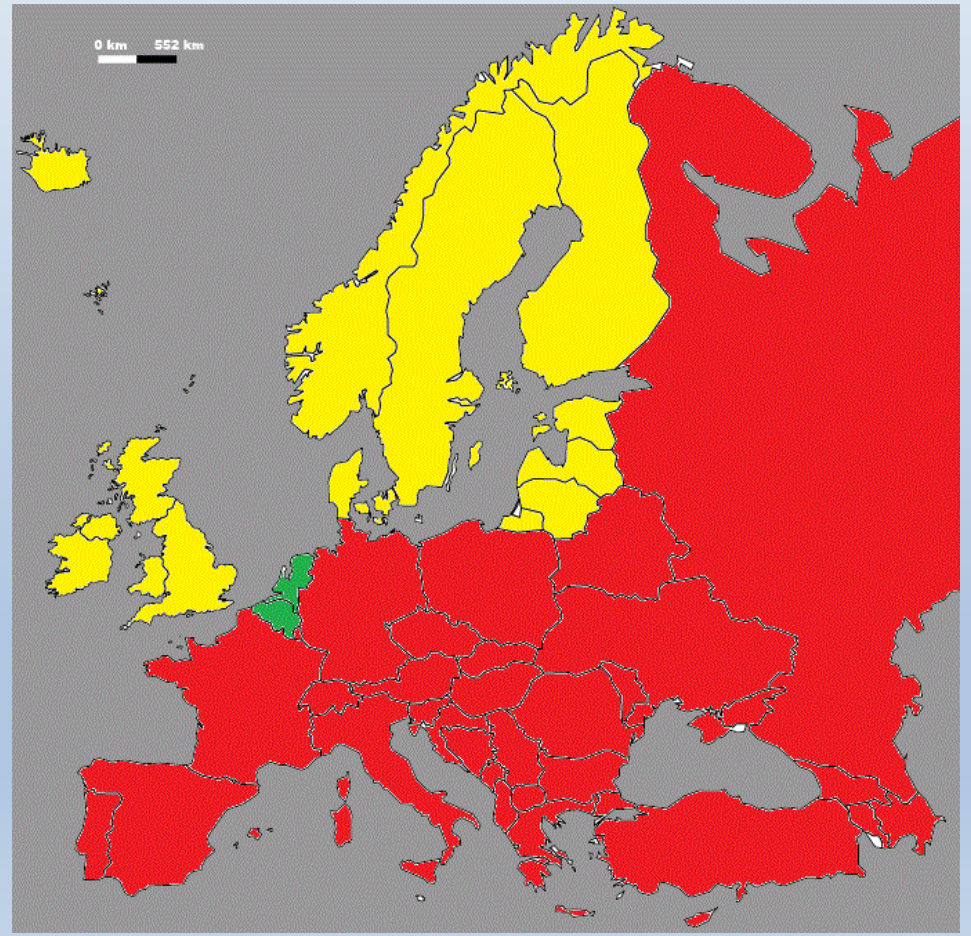

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Agenda

Fertigation CIV varieties

Fruit quality monitoring

Supply planning with everbearers

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CIV Varieties

June bearers

Clery early
Joly organic production and direct sales
Sibilla mid late
Aprica very productive

Everbearers

Capri excellent shelflife and storability
Murano preferred variety of mainy retailers
Majestic premium in UK (Sainsbury's Taste the difference range)

Clery in Ireland and only in Ireland: everbearing character !!!!!!

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Positioning of CIV varieties in market tiers

Premium, direct sales and organic	**Majestic, Joly**
Standard	**Clery, Sibillia, Murano, Capri**
Basic, Value	**Aprica**

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Fertigation of CIV strawberry varieties

CIV strawberry varieties:
Technical note on fertigation, feed recipes and tip burn

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Fertigation of CIV everbearers: Murano, Capri,…

CIV varieties need less nitrogen, NO3 !!!!!!
“Normal” NO3: loss of fruit firmness and flavour!

CIV varieties need only in exceptional conditions ammonium NH4

CIV varieties should be grown with low EC

In general: EC in + EC out = 3

EC drain > 1,5: risk for mildew

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Basic nutrient needs for CIV varieties in general!!!

	Murano basic feed recipes, A & B 1000 lit; 1/100 ; rainwater													
	NH4	K	Ca	Mg	NO3	H2PO4	SO4	Cl	Fe	Mn	Zn	B	Cu	Mo
Start till flowering	0	5	4,2	1,3	8,6	2	2,5	0	23	18	14	23,8	0,7	0,5
Flowering and harvest	0	6	3,7	1,2	8,2	2	2,5	0,5	23	18	14	20,8	0,7	1

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Basic feed recipes

Basic nutrient needs

Water analysis

Basic feed recipes

Software: GREEN-FERT - Greenhouse soil fertilization manager
University Pisa, Italy.

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Feed recipe Murano from planting till flowering – RAIN WATER

Rain water
EC 1.5 mS/cm
100x concentrated

A tank 1000 lit

Calcium nitrate (15,5 % N – 19 % Ca or 26,5 % CaO)	75,6 kg
Iron chelate 3,5 % Fe DTPA	3,6 kg or 3 lit

B tank 1000 lit

Monopotassium phosphate (35% K2O+52 % P2O5)	27,2 kg
Potassium sulphate (50% K20 + 46% SO3)	21,8 kg
Magnesium sulphate (16% MgO + 32%SO3)	30,8 kg

Micro-elements in B tank

Manganese sulphate (31%Mn)	300 g
Zinc sulphate (23 % Zn)	200 g
Borax (11 % B)	100 g
Cupper sulphate (25,3 % Cu)	18 g
Sodium molybdate (39,5 % Mo)	12 g

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Feed recipes need frequent adjustments

An **everbearers is permanently changing from physiological stage**: from vegetative to generative, from flower initiation/differentiation to production, from production to regrowth….

Hence the basic feed recipe has permanently to be adjusted, especially in K, Ca and N.

From flowering on and depending on the fruit charge, an important increase in K can be necessary.
From mid-peak production towards end production peak, a decrease in K with an increase in Ca and N can be necessary.

Follow of substrate and drain analysis important to adjust.
Drain analysis can be done on the farm for K, Ca and NO3,

Always consult your farm adviser for the correct recipe and adjustments.

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Most frequent adjustments

K From flowering on: increase K and follow up K in drain

Ca: uptake only till green set fruit 10 mm
climate important for uptake and transport Ca

NO3 with everbearers: increase when harvest flush is over peak and ctop needs revitalising

NH4 only in exceptional situations and when pH correction is neccesary

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Create good conditions for uptake nutrients

A strawberry plant is able to take up the nutrients from the soil or feed solution within a quite large range.

But the plant can only do so if it has the condition to take up the nutrients!!!

A good root development, enough air in the root zone and generally a good evaporative climate is essential.

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Factors preventing uptake of nutrients

- **If the substrate is soaked, the roots will not take up nutrients.**
- **If the substrate is dry, the roots will not take up nutrients.**
- **If the tunnel/greenhouse is too humid, the plant will not evaporate and take up nutrients.**
- **If the tunnel/greenhouse is too dry, the stomata will close and the plant will not take up nutrients.**

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Tipburn : generally a Ca deficiency in leaves, flowers, fruits, calyx……

-generally not a shortage of Ca in feed recipe!!

-problem due to

-uptake of Ca

-transport of Ca in the plant

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Measures to avoid tipburn:

Build up of sufficient root pressure - Activate climate during day

Drip with a low EC: 1.2-1.3 mS/cm²
Keep drain EC low: stay between 1.2 and 1.5 mS/cm².

First irrigation round needs to have sufficient drain, if not the day before irrigation has been stopped too early!!!

A too low moisture level in the substrate has a very negative effect.

Rooting after planting is very important: make sure at planting there's a good contact with the substrate, also by sides of the containers and in corners!!

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Fruit quality monitoring

Drops in fruit quality in ever bearers

-less fruit firmness causing bruising

-reduced shelf life

-loss of flavour and brix

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Causes of loss of fruit quality in ever bearers

NITROGEN!!!!! Especially in CIV varieties: Capri, Murano, …..

Weather conditions: indirect !!

- **-low evaporative conditions (to high humidity)**
- **-hot weather causing fast ripening**

Too high fruit load----ripening too fast----negative energy balance

Too high plant density

Too low K level !!!!!!! Drain analysis important!!!!

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Fruit quality monitoring
Objective: Consistancy in Fruit Quality

Fruit quality (everbearers) can show dips due to

-weather conditions

-feed out of balance

-crop charge out of balance

From 2018:

Fruit quality monitoring by grower with app

Feed back to grower

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Drain analysis important in everbearers

K potassium !!! For fruit quality

N: generally low, but increase at start and at end production flash

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Monitoring and Early Warning necessary

Early warning growers

Too often too little too late

Actual	Early warning
Weather forecast	Ventilation management Drip and drain adjustments
Analysis substrate, drain Production forecast	Feed recipe adjustments
Plant balance	Truss removal

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Production/supply planning with everbearers

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Production/supply planning with everbearers

How to match an everbearer production planning to a retailer demand curve?

A case study

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Outline

- Demand curve for a supermarket chain (or direct sales, supply window, farm labour planning, ……)
- With a June-bearer
- With an everbearer
- Manipulating growing degree hours
- Other techniques

PRODUCTION JUNEBEARER : TRAYFIELD IN NURSERY

PRODUCTION EVERBEARER: GROWER DURING SEASON (FIRST FLUSH IN NURSERY)

WITH AN EVERBEARER A SMALL FRIGO B PLANT AND A HEAVY TRAY PLANT CAN SHOW THE SAME YIELD AT THE END OF THE SEASON !

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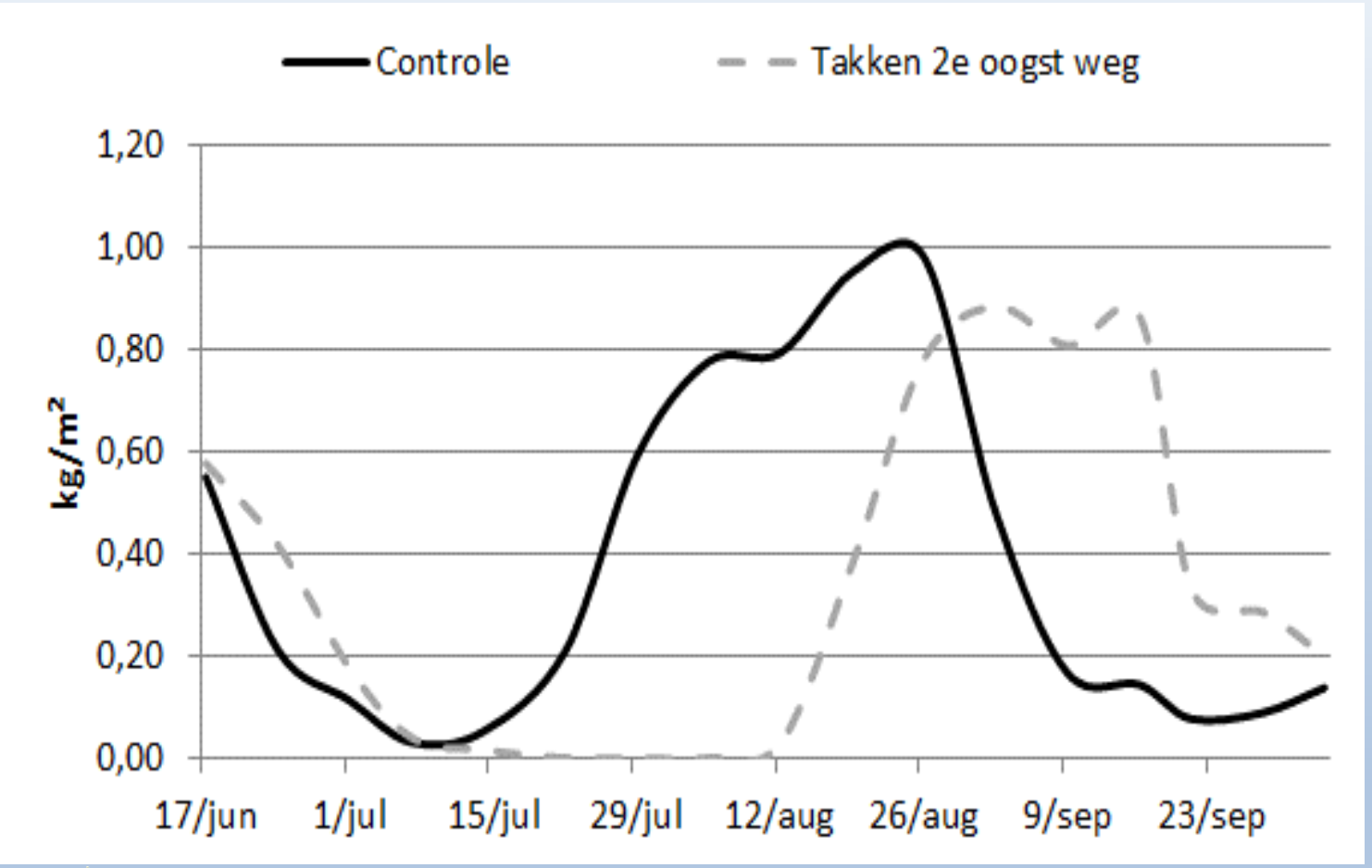
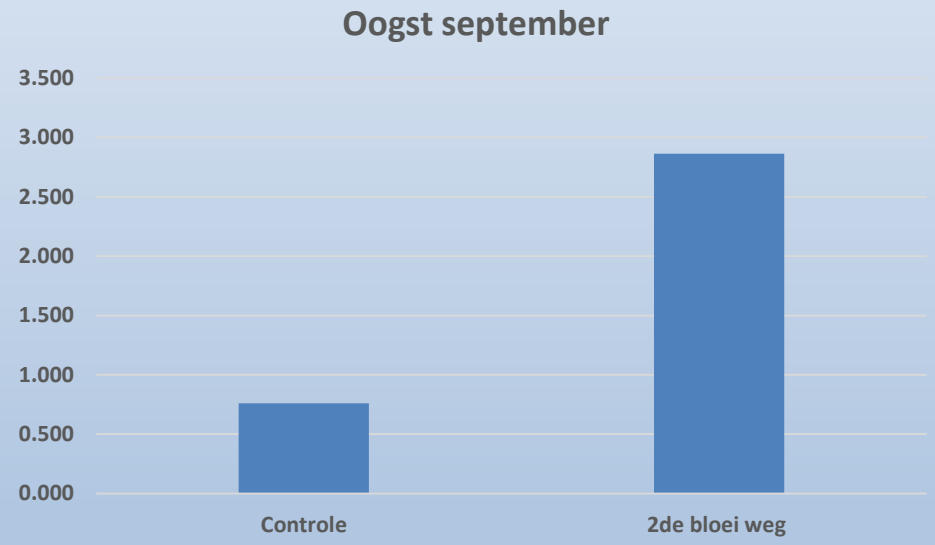
Removal of second flowering: second peak shifts from August to September





-PCH 2016
-begin juli 7-8 bloemtakken weggenomen

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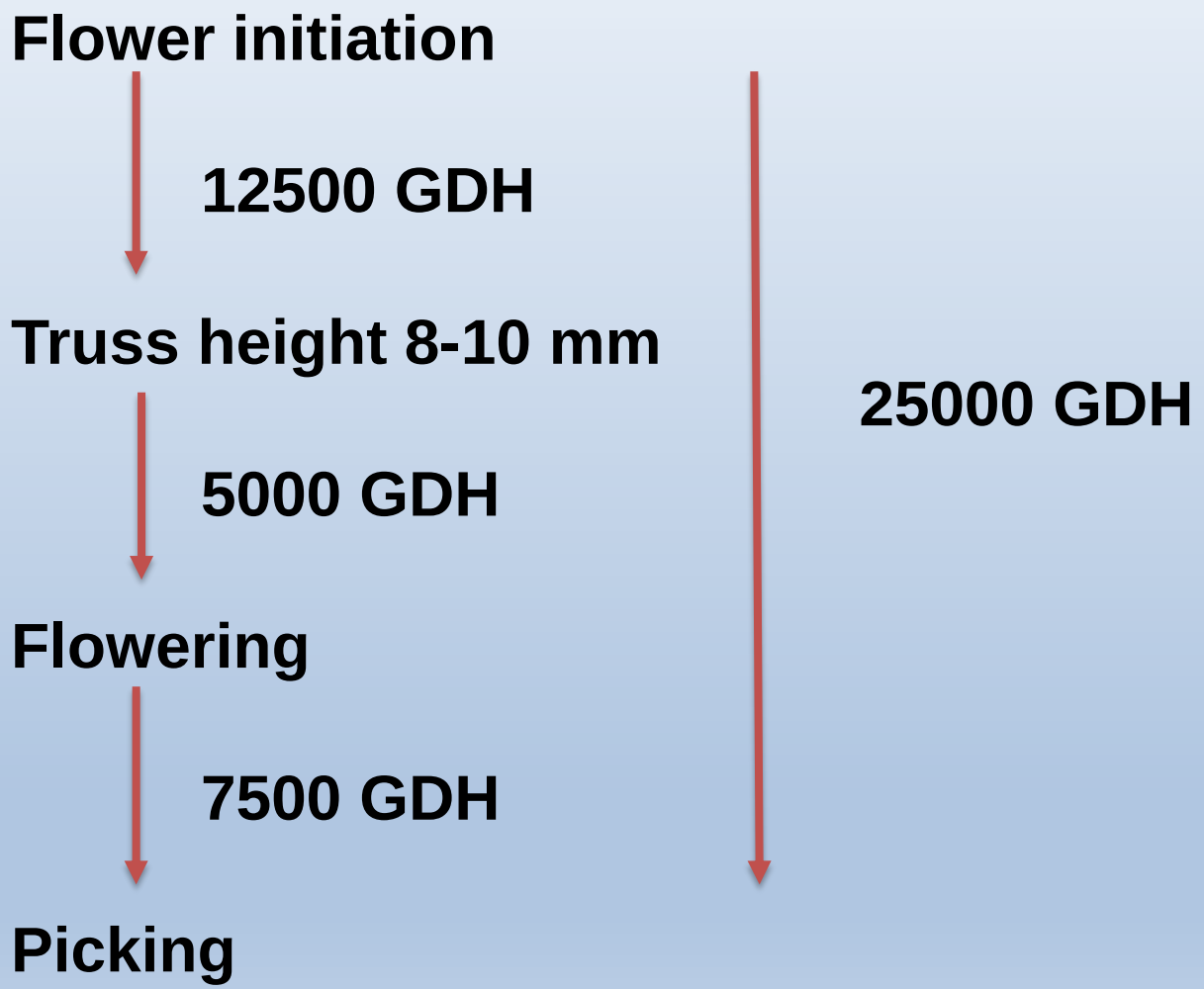
GDH FROM FLOWER INITIATION TILL FRUIT



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Flower initiation in everbearers

Flower initiation in everbearers optimal when:

Daylength > 16 h

Temperatures 15  25 °C

In summer: a truss removed from a Murano plant will always be replaced immediately by a new truss

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Removal trusses Murano in summer

Delaying a production peak

Avoiding production peak (and smaller fruit and lower prices) du to heat wave

Reducing labour peak

Increasing fruit size and increasinf picking efficiency

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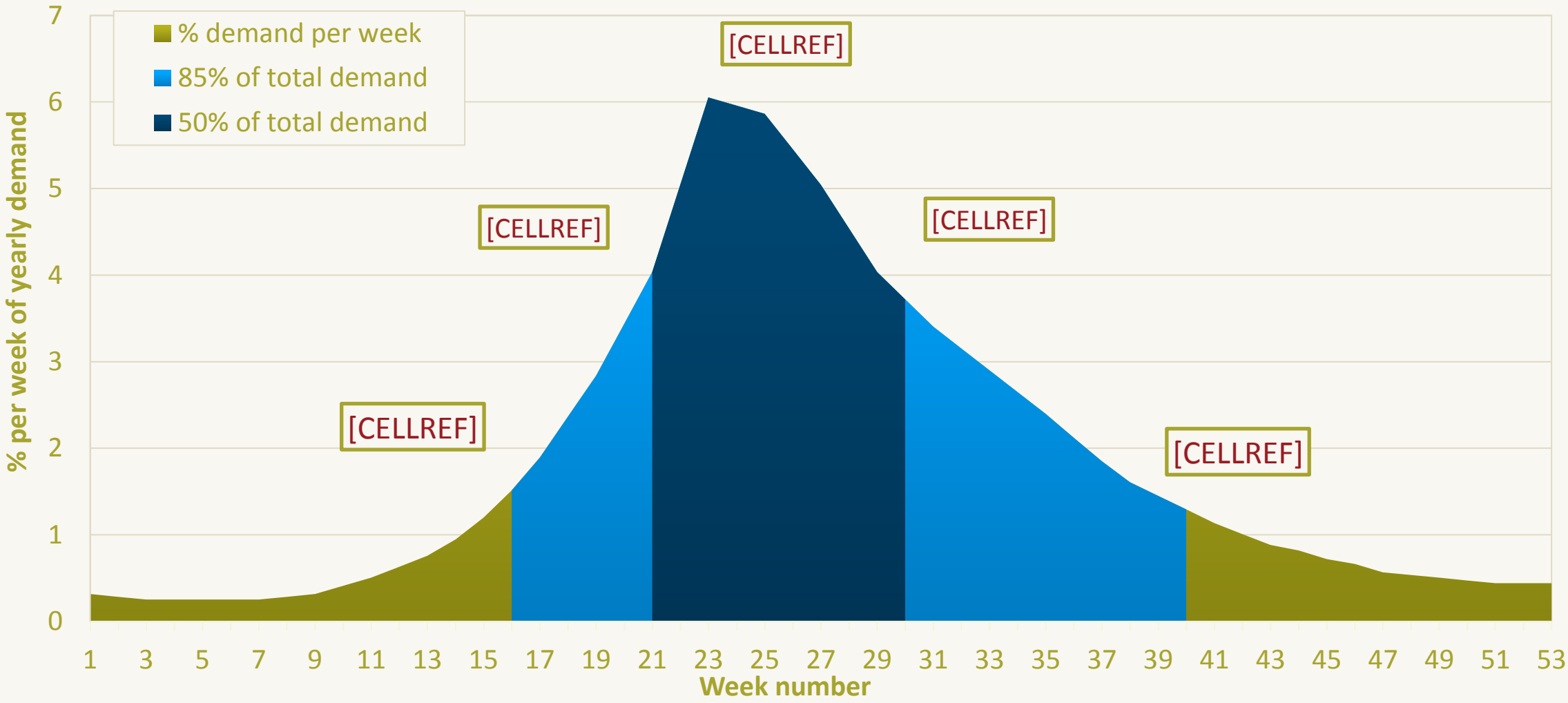
Demand Curve for a supermarket



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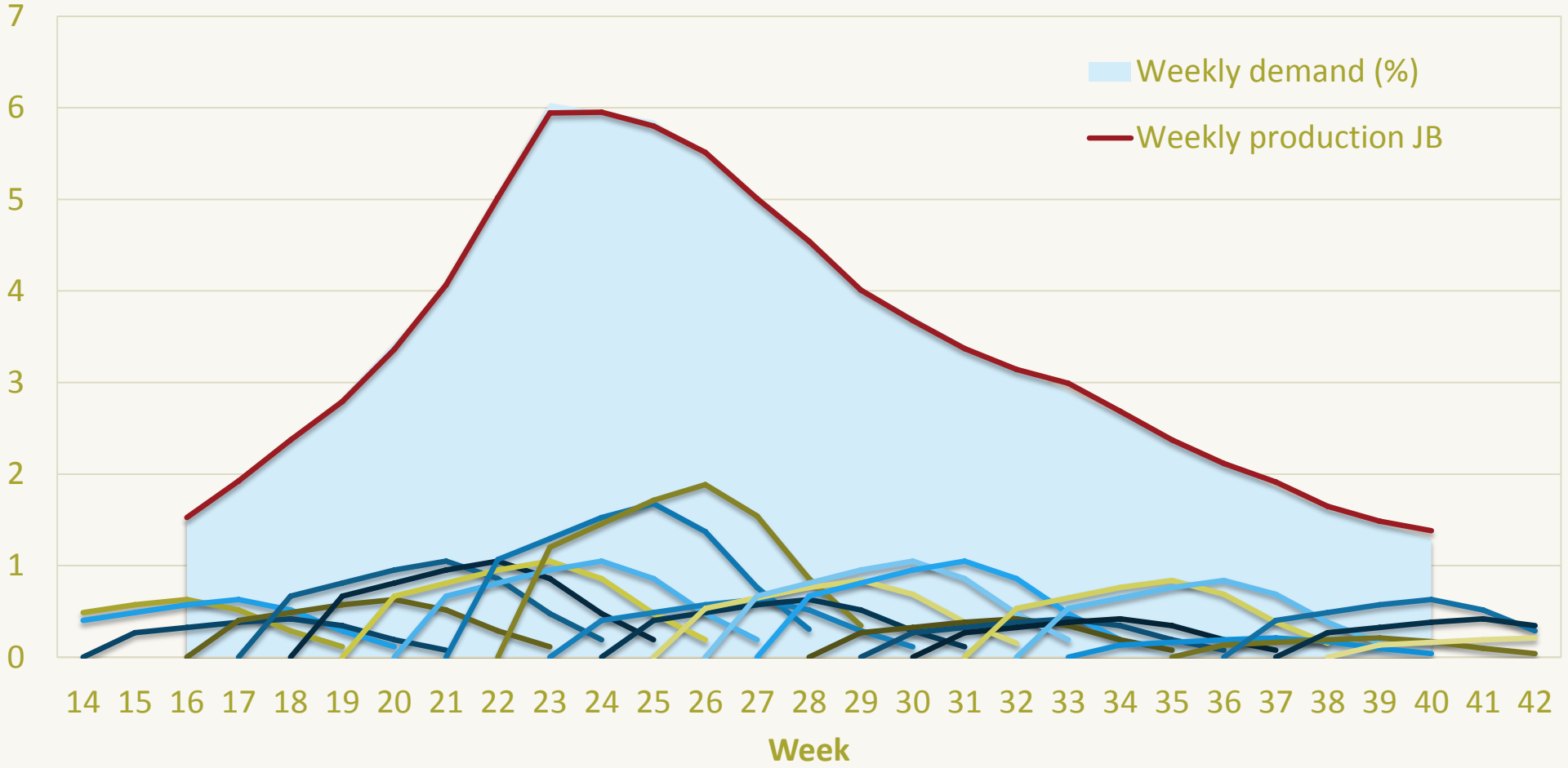
With a June-bearer



- Flower mapping → production potential
- Consecutive plantings of cold-stored plants
- Combining growing systems

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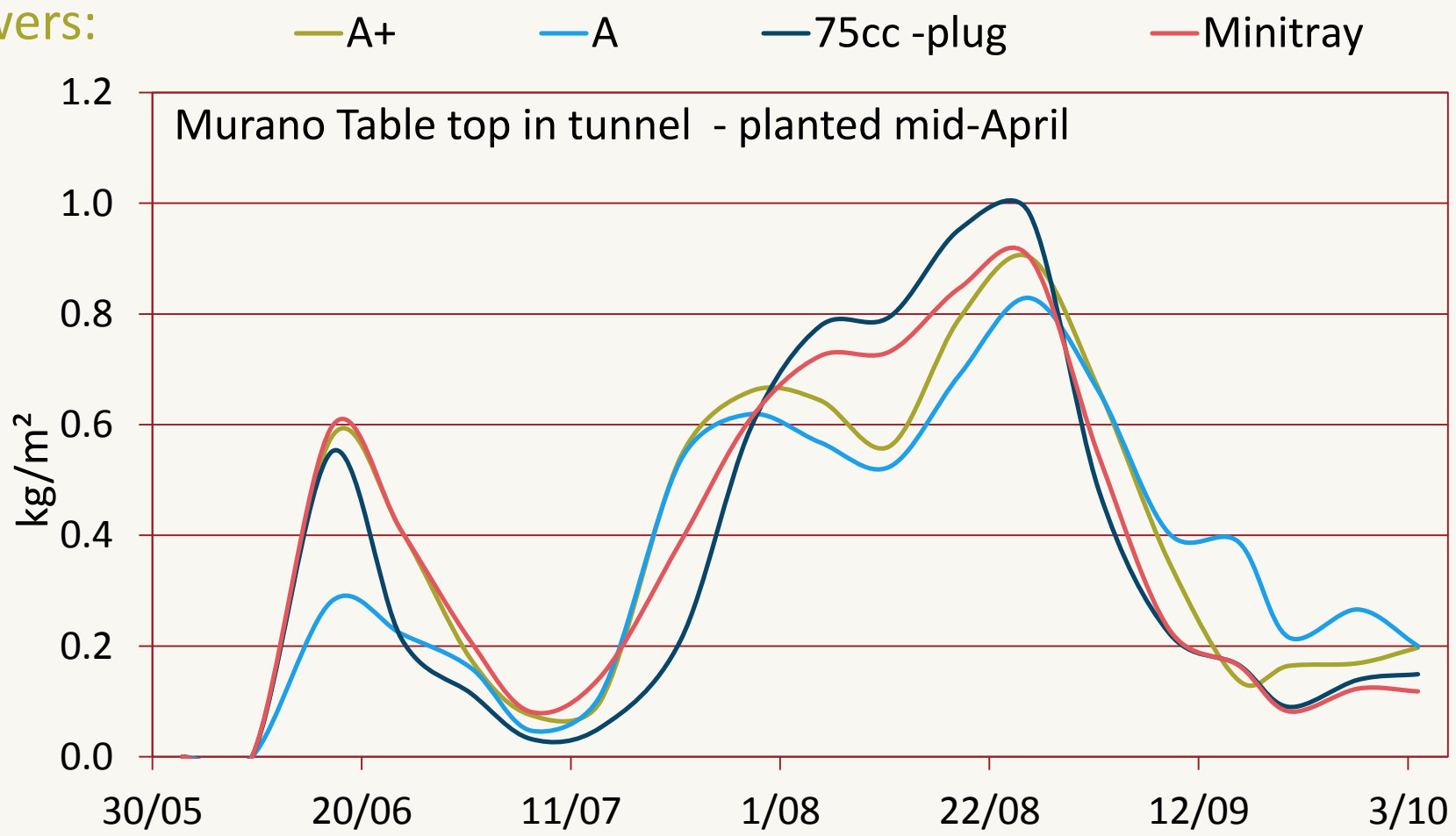
With an everbearer – more complex

- Flower mapping:
  Only 1st peak is ± known
- Development new flowers:
  soon after planting
- Influencing factors:
  Fertigation
  Water supply
  Temperature
  Light
  Plant load
  …



Source: PCH 2016

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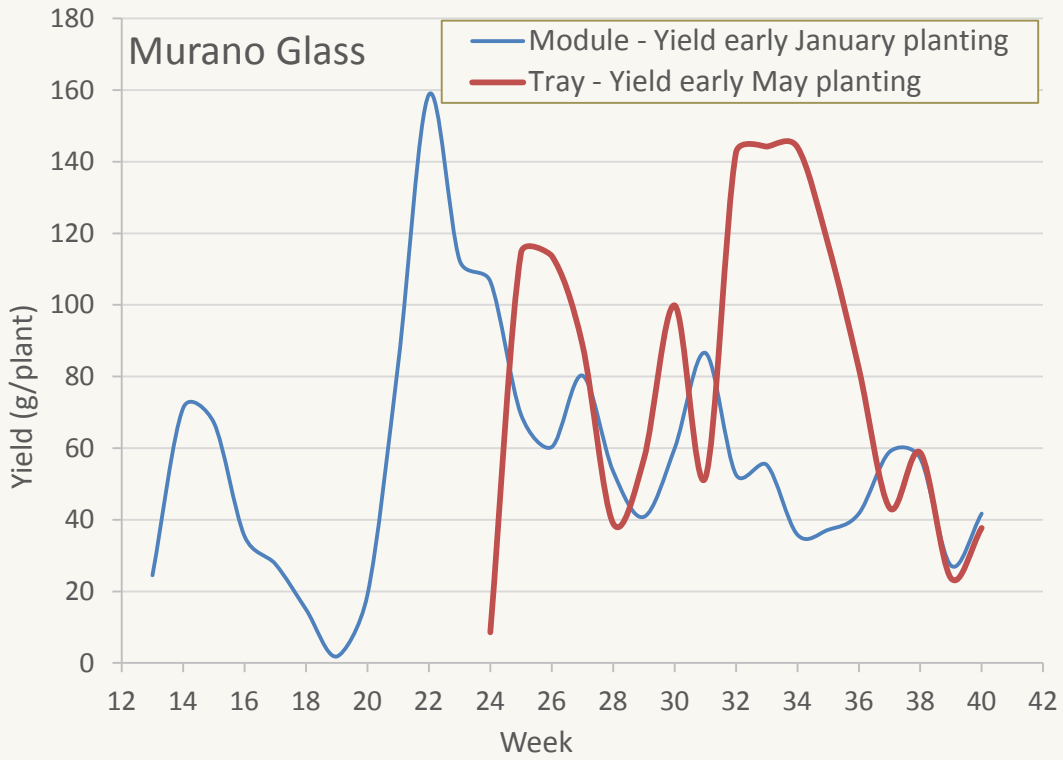
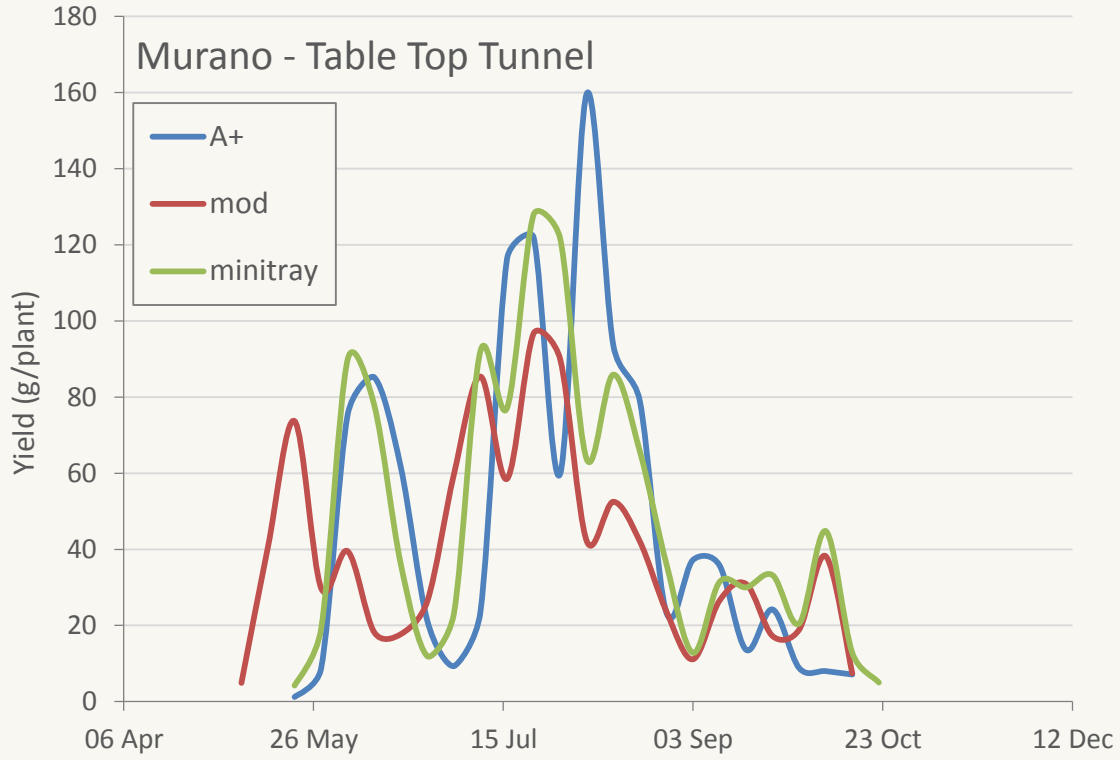
Cropping profiles: Idris data base

- Cropping data of Murano: from growers and research centers
- In different growing systems, different growing conditions
- Compare data based on growing degree hours (GDH)





Filling up the demand curve – example NL

- Minitray
- Multiple planting dates
- Different growing systems:
  - table top (cool)
  - (heated) glasshouse

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Some problems

- **Shortage in May**
- **Over-production in August**
- **Shortage in September**

- **Plant earlier?**

Plant earlier?

- Outdoor: how much earlier? a shift of 1 week in production is not achieved with a shift of 1 week in planting
- Assuming 12500 GDH between planting (st. 6) and first picking

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Manipulating GDH

- Fleece
- Tunnels
- Glasshouse
- Heating
- Ventilation


Tunnel


Fleece in tunnel


Cravo tunnel


Heated glass

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Some problems

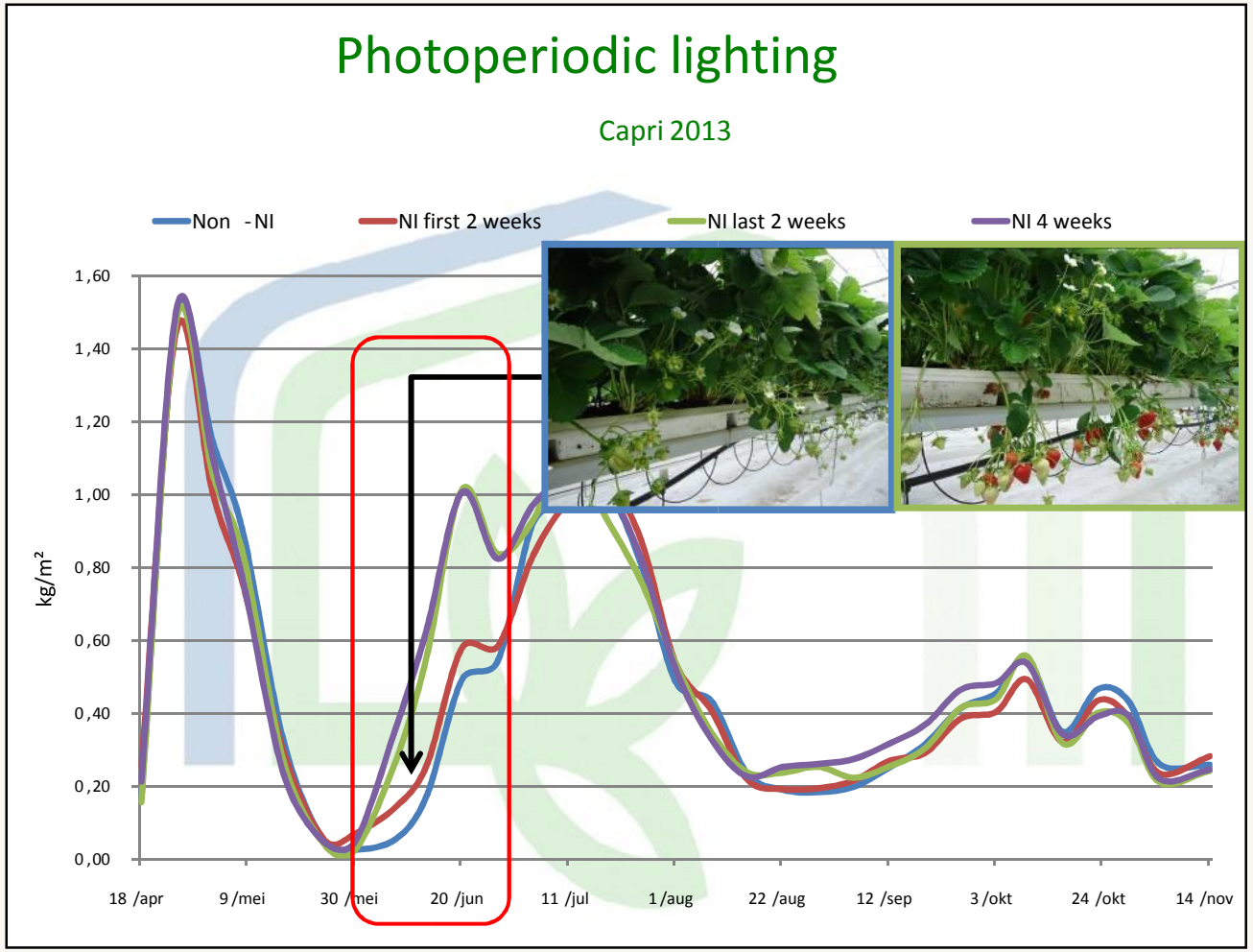
- Shortage in May
- Over-production in August
- Shortage in September

- Plant earlier?
- Use a lighting strategy?

Lighting strategy

- Research PCH
- Pre-harvest night interruption
- Cvs. Charlotte, Portola, Capri
- Starting 3rd week after planting
- Min. 2 weeks
- Early in season - glasshouse

→ 2nd production peak earlier



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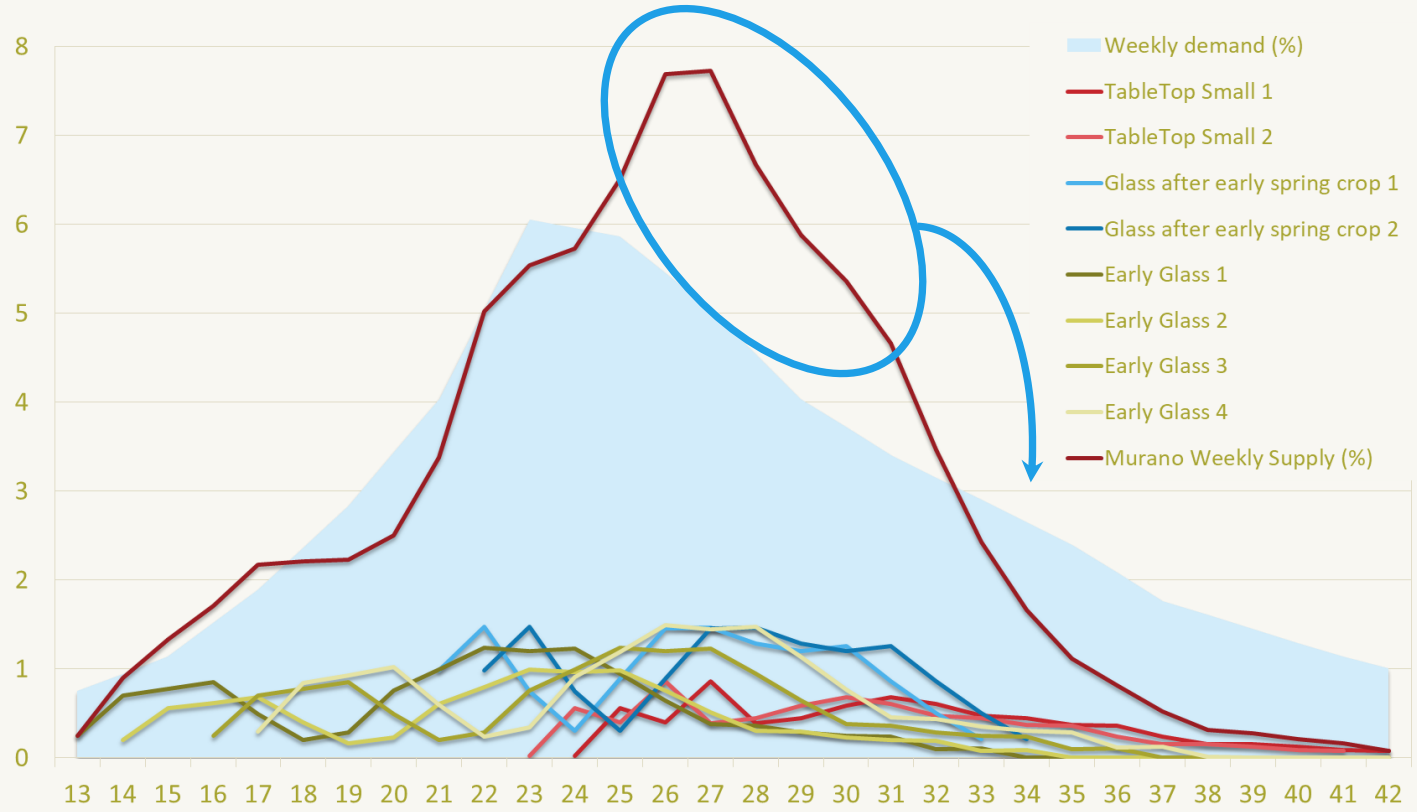
Some problems

- Shortage in May
- Over-production in August
- Shortage in September

- Plant earlier?
- Use a lighting strategy?

- Remove flowers?



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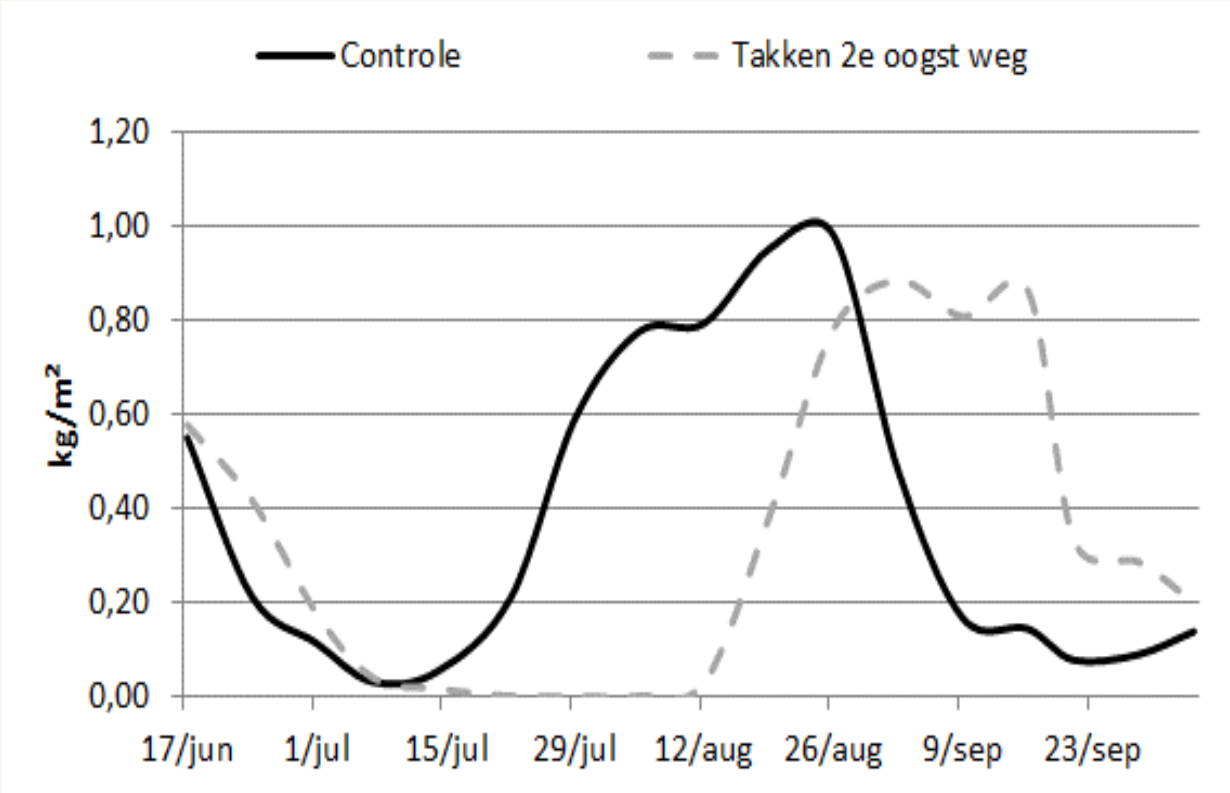
Remove flowers?

- Research PCH
- Murano table top in tunnel 2016
- All flower branches of 2nd peak removed
- Production shift from August to September
- Little loss of yield

- What about removing 2 – 3 – 4 … branches?
- Further research!!



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Thank You ,

For Your attention

And for working with

Our Idris Teams

in the challenging 2018

strawberry business.

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