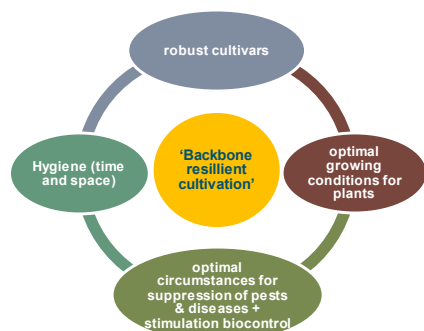


## Resilient cultivation

Ellen Beerling

Wageningen University & Research BU Greenhouse Horticulture



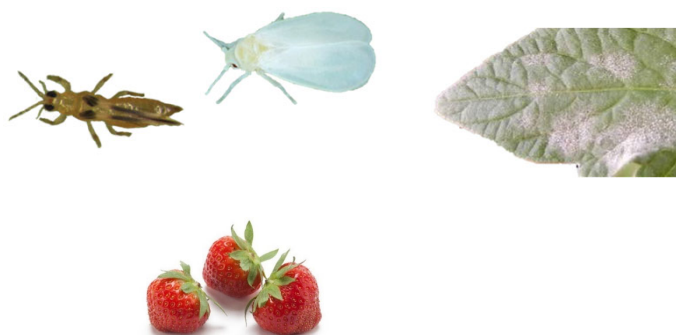
*Plant Resilience Theme evening Semper Florens & KNPV  
February 23 2021*

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## Content

During presentation write questions/comments in **chatbox**

- Resilient cultivation
  - Why & how
- Case: Strawberry
  - Current situation
  - Redesign



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## Resilient cultivation – why?

- Since 1940s: chemical control; huge increase in (food) production
- 60/70s: awareness of downside

→ Integrated Pest Management (IPM): replace chemical products (PPP) by cultural, physical and biological measures

- Development of biocontrol means
- But also: further restrictions of PPP use

→ Integrated use of PPP and biocontrol is not sufficient anymore;  
IPM 2.0 is needed

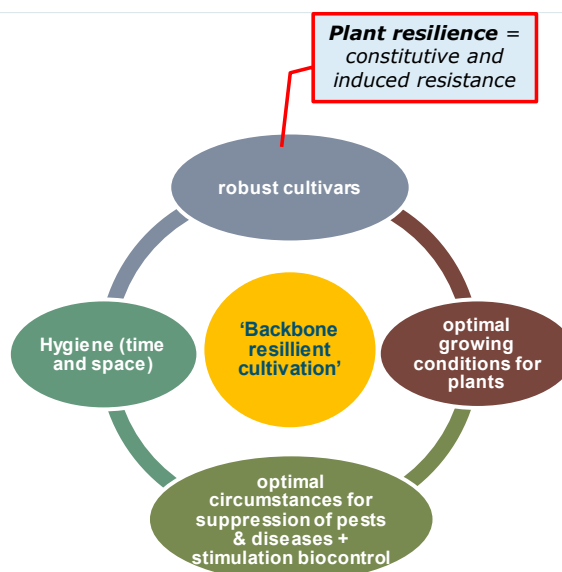


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## Resilient cultivation – the concept

- Prevention strategy
- Holistic approach of crop protection & plant growth
- Chemical PPP only as back-up
- 4 pillars of resilient cultivation

→



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## The case: Strawberry cultivation system



### Increasing societal demands for sustainability:

- Relative high use of PPP
- Residues of PPP on fruits
- Leaching of PPP and nutrients to the environment



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## Current cultivation system

1. High PPP use in tray plants (outside)
2. PPP residues and pests/diseases from propagation → tray field → greenhouse
3. Vulnerable cuttings/plants due to handling and cold storage



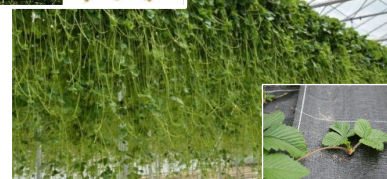
Plant production (tray field)



Strawberry production

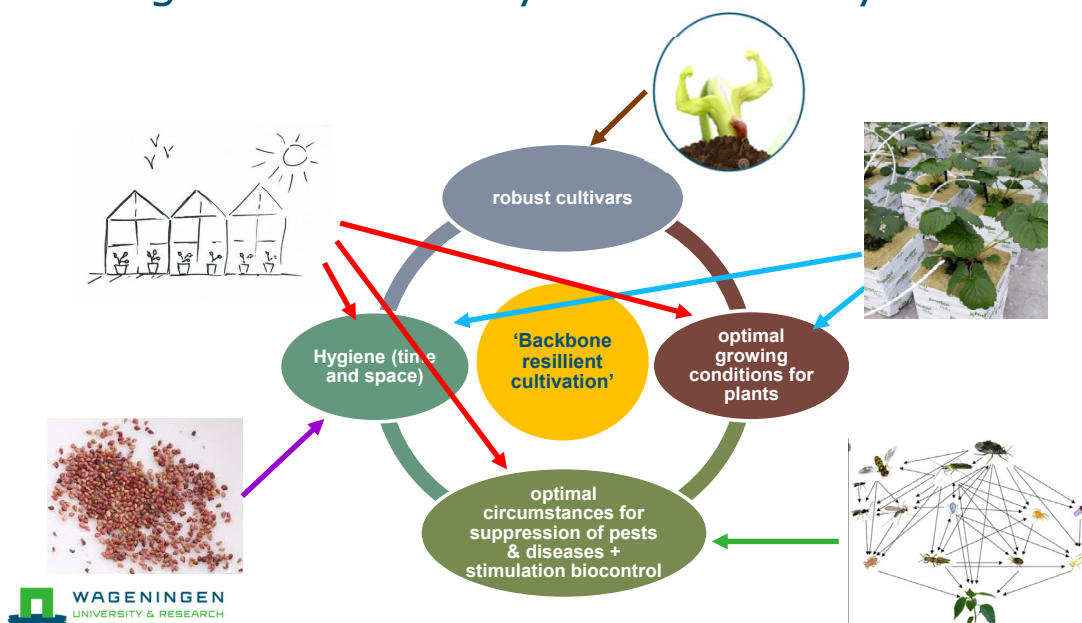


Propagation (cuttings)



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## Redesign of Strawberry Cultivation System



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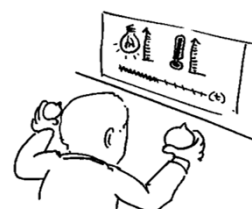
### 1. All stages in greenhouse

#### Advantages

- **Optimal growing conditions possible**
- **Better control**
- Better tuning to market
- **Decreased exposure to pests & diseases**
- **More IPM options**

#### NB:

- *Cooling and light needed for good quality planting material*
- *Costs*
- *Mildew*



"Better control"

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## 2. Starting material: seed

### Advantages

- **Clean start**
- Priming for uniformity
- Coating (nutrients, microorganisms, elicitors)
- Shorter cultivation cycles, quicker to production

### NB:

- *Development of new/better cultivars is needed (only Day-neutral cultivars available)*



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## 3. Substrate: stonewool

### Advantages

- **Optimal control of nutrition and irrigation (optimal growth)**
- More sustainable than peat + coco coir
  - easier to reuse all drain water
  - recyclable

### NB:

*Lacking knowledge on colonisation of micro-organisms/antagonists in stonewool*



Stonewool



coconut coir

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## 4. Robust cultivars & induced resistance

- Choose resistant or less susceptible cultivars
- When not available: **Induce resistance** at critical moments
- Against pests and diseases



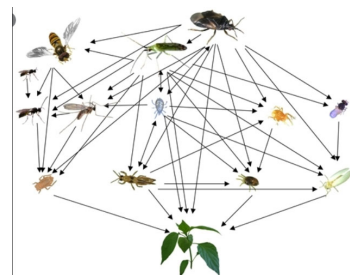
**NB:**

*Development of new/better cultivars is needed  
Induced resistance comes with costs (production)*

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## 5. Standing army

- Preventive introduction of natural enemies
  - Support with extra food, shelter etc.
- Conservation bio control
- Adjusting with curative introductions



**NB:**

- *Lower cultivation temperatures difficult for biocontrol*
- *More successes on less susceptible cultivars*



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## Questions?



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