

System development for outdoor soilless production of leek



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Introduction

- Open field vegetables
 - grown on sand
 - PPPs and NO₃ in groundwater
- EU Water Framework Directive (2000)
 - Sound surface and ground water by 2015
- Nitrate Directive (2002)



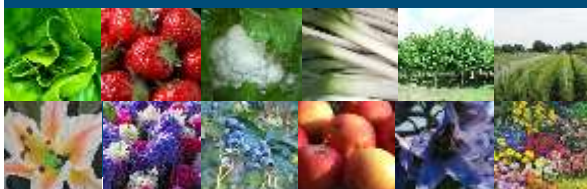
Additional

- Better adaptation to market
- Solving cultivation problems
- Solving labour problems



Goals research programme

- Development and application of new growing systems
 - Reducing emissions
 - Market oriented
 - Improved value for growers



Aim of the research for leek

- System development
 - No emission: recirculation
 - Soilless methods
 - Outside: rain, wind, frost
- Better quality
 - Clean: no sand
 - White: >14 cm
 - Thickness: 2 – 3 cm
- Economical
 - More yield: higher plant density, more crop cycles
 - Less costs: harvest, cleaning
 - Other marketing concept



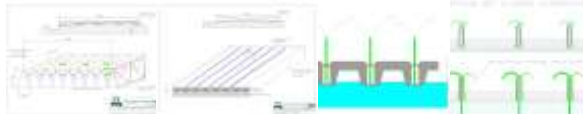
Present cultivation of leek

- Area NL: 3000 ha
- Production: 35 ton/ha
- Value: € 40 million; € 0.4/kg
- Period:
 - Planting: early April – end of July
 - Harvest: July - May
- Diseases: Nematodes, Rust, Fusarium, leaf fungi
- Plagues: Thrips, aphid, leek moth, onion fly
- Supply: 300 kg N; 100 kg K; P little → on sandy soils
- Labour: 675 h/ha of which 85% harvesting & cleaning



System development

- Brainstorm among specialists
 - Technicians and plant specialists
- Tests
 - 2008: orientation
 - 2009: wide range of system variables
 - 2010: limited systems for cultivation (yield & quality)
 - 2011: upscaling and practical application
 - 2012: commercial grower



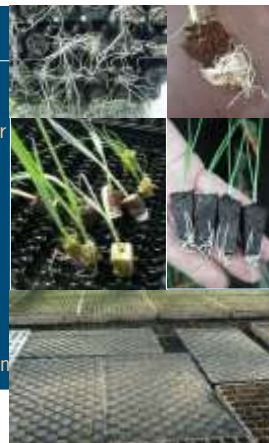
System variables for leek

- Plant raising
 - Fixing the plant
 - Substrate or hydroponics
 - Watering method
 - Plant density
 - Number of crop cycles, yield
 - Varieties
 - Waste
- Experimental station Vredepeel
→ 5 tables, 1 pond, 6x1.5m



Plant raising

- Traditional: loose plant
 - Cheap, no change for grower
 - Rerooting after transplanting
 - Plug
 - Stone wool
 - Coconut fibre plug
- loose plant was best
● Plug needed for mechanization



Substrate during cropping (1)

- Substrate
 - In pots
 - Full field
 - Length of white
 - Waste after growing
- Not clean, waste, rain



Substrate during cropping (2)

- NFT
 - How to fix plants: plug or loose
- Deep Flow
 - Thickness of water layer
 - How to fix plants?
 - How white part?



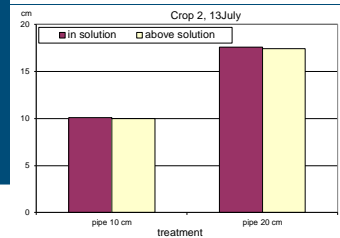
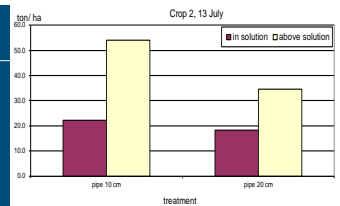
Results: duration of cultivation in days;

	Planting date	From sowing to planting	From planting to harvest
Crop 1 2009	April 21	82	49
Crop 2 2009	July 21	74	34
Crop 1 2010	March 24	100	61
Crop 2 2010	May 31	91	43
Crop 3 2010	July 20	84	49
Crop 4 2010	Sept 17	84	125



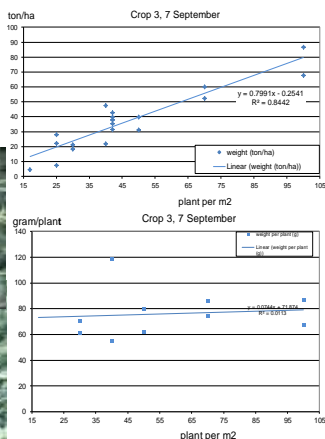
Floating panel

- in solution
 - above solution
- Yield (ton/ha)
Length white (cm)



Plant density

- Normal: 17, 25 pl/m²
- Now: up to 100 pl/m²



Outlook

- Upscaling
 - Pond with Deep Flow Technique
- Mechanisation
- No disinfection
- No emission
- Commercial grower(s)



Conclusions

- Leek: soilless growing method found
 - System development from wide to narrow
 - Participation of growers and other stake-holders
 - New marketing concept
- Deep Flow technique
 - Floating panels; 3cm water layer
 - 20cm pipe for white length
 - No disinfection, no control
- Cultivation:
 - 4 crops/year; up to 80-100 pl/m²
 - Yield up to 300 ton/ha



Thank you for your attention

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Innovations for and with the greenhouse industry



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