

Efficient Use of inputs in Protected HORTiculture (EUPHOROS)

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Aim of the project

To reduce the use of:

- non-renewable Energy
- water and fertilisers
- plant protection chemicals
- land-filling of substrates

in the European greenhouse production
→ while maintaining productivity



Partners: research institutions

- Wageningen UR Greenhouse Horticulture (NL)
- Estación Experimental de la Fundación Cajamar (ES)
- IRTA – Barcelona (ES)
- Università di Pisa (IT)
- University of Warwick (UK)



Partners: businesses

- HortiMax (NL)
- Ciba (CH)
- GroGlass (LV)
- Perlite (IT)
- Terra Humana (HU)
- Morakert production cooperative (HU)



Expected impact:

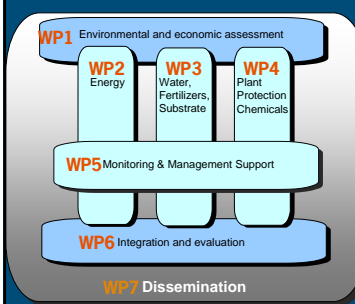
Our task according to the EU work program




- The project will increase market competitiveness of the European protected horticultural and/or ornamental sector by reducing the running costs of systems/infrastructures and optimising the use and recycling of both the growth media and the external inputs.

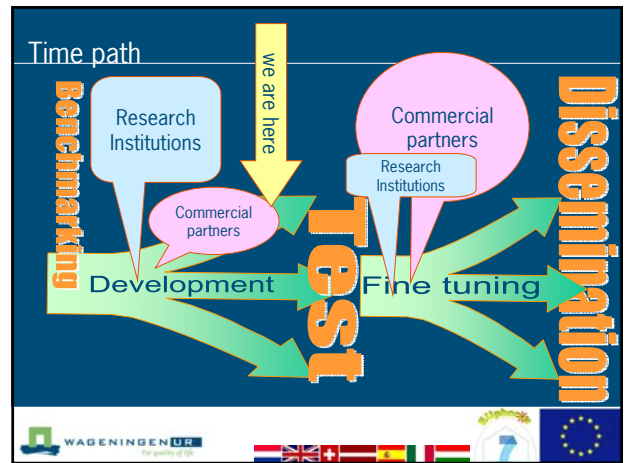
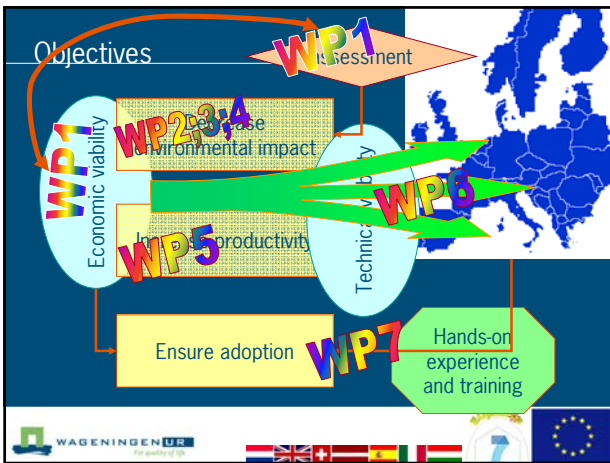


The structure of the project



- Benchmarking
- Decrease reliance on inputs:
 - Energy
 - Water
 - Plant protection chemicals
- Tools to increase efficiency of resource use
- Proof of principle
- Market acceptance



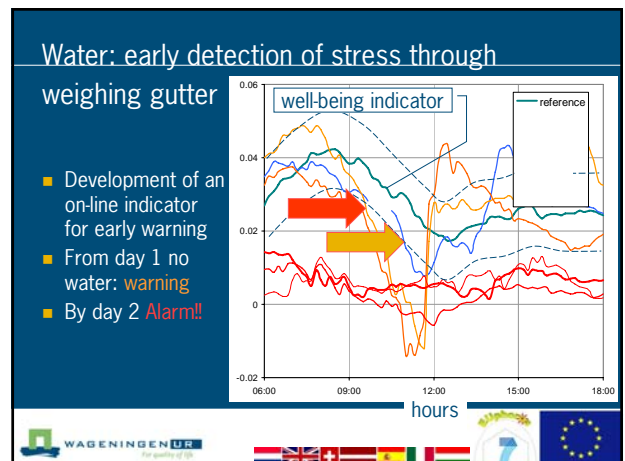
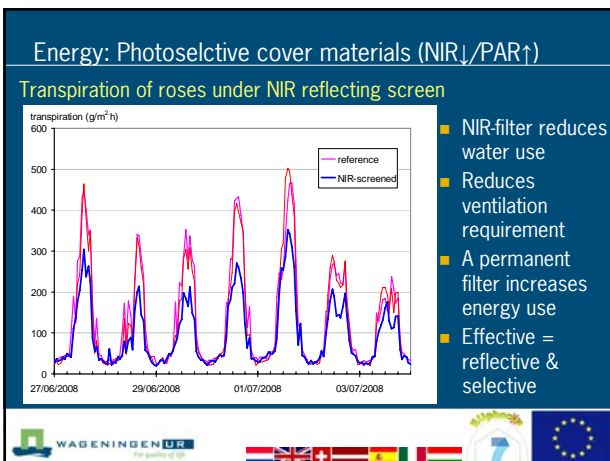
Benchmarking: scope for improvement of environmental impact: example tomato

Holland, Venlo				Spain, multitunnel			
Process	Could improve	Need improve	Should improve	Could improve	Need improve	Should improve	
Structure	✓			✓			
Heating			✓			✓	
Fertilizers	✓				✓		
Irrigation equipment							
Substrate		✓					
Pesticides							
Transport							
Plastic waste							
Biomass waste	✓						

Hungary, Venlo			
Process	Could improve	Need improve	Should improve
Structure	✓		
Heating			✓
Fertilizers			✓
Irrigation equipment			
Substrate		✓	
Pesticides			
Transport		✓	
Plastic waste			
Biomass waste			

Benchmarking: scope for improving the "bottom line"

Most relevant cost components	The Netherlands		Hungary
	Tomato %	Rose %	Tomato %
Equipment	23	22	27
Labour	26	22	17
Plant material	3	3	9
Energy	31	36	11
Fertilizers	2	1	19
Pesticides	1	3	3

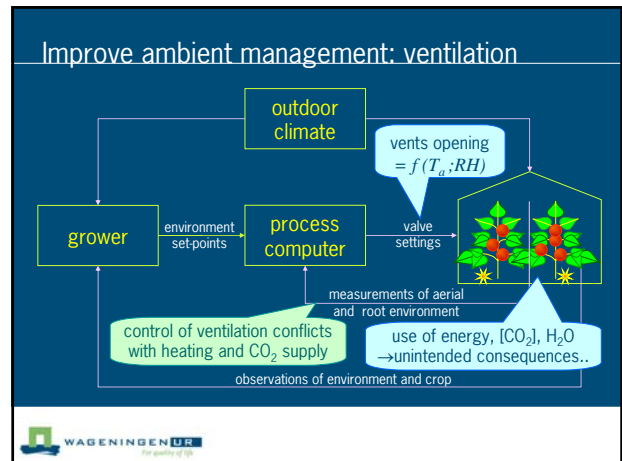


pest & bio-control under photo-selective cover

- Mini-polytunnels (CIBA plastic)
- Two treatments per plastic:
 - *T. urticae*
 - *T. urticae* and *P. persimilis*
- 400 plants in 40 polytunnels
- 5 sample dates over 2 months




WARWICK


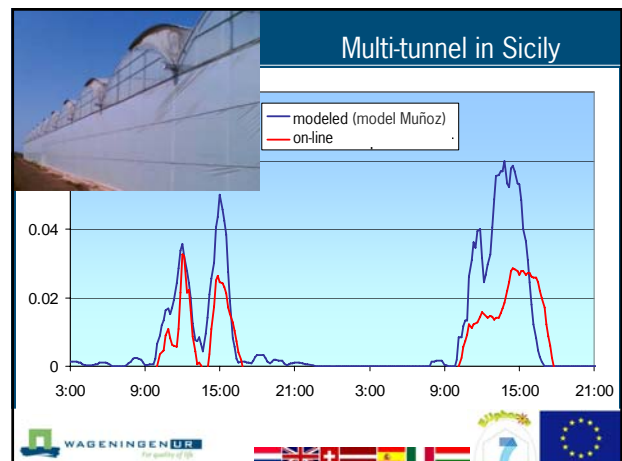
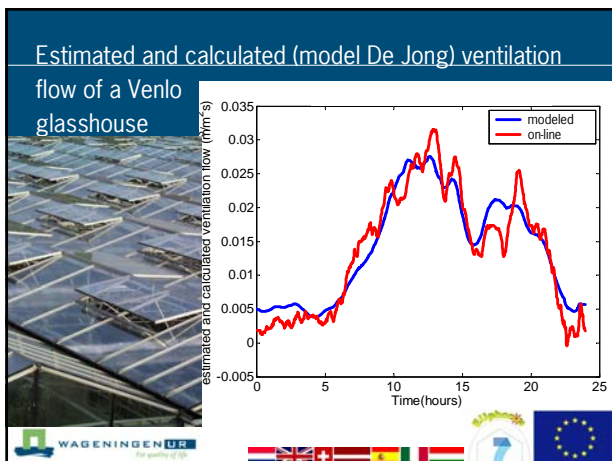
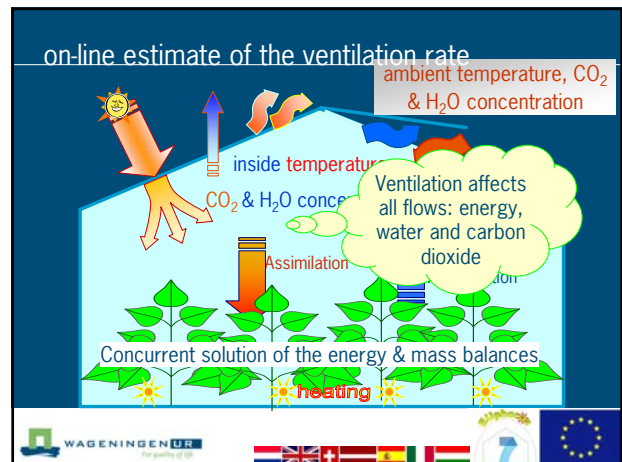



Need for an on-line estimate of the ventilation rate


...that can be implemented in existing climate control computers

- Current ventilation models require many parameters specific to the greenhouse and the ventilators
- Given the “chaotic” nature of the process no model is always accurate
- Not easy to calibrate with data from the greenhouse
- Need for a holistic approach
- ➔ Concurrent solution of the energy & mass balances


WAGNINGEN UR

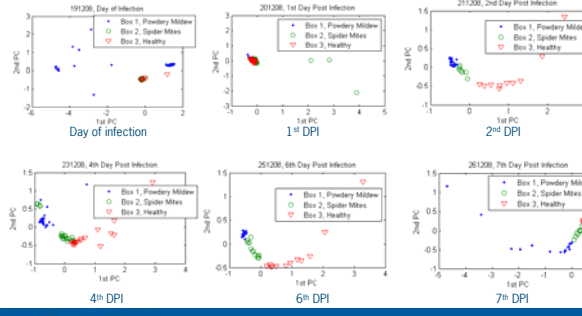

**Early warning of Disease Development:
Powdery Mildew (days 1-7)**



Day of infection 3 DPI 7 DPI



FAIMS: preliminary results
Data on different plants became separable since the 2nd DPI

HortiMax
governing solutions

Soft Sensors, Alerts and Soft Controllers will be delivered by partners as a DLL with defined in- and output

HortiMax will develop the interfacing of the DLL with the Inter Controller Bus, management software and interface with Synopta, their management computer

