Research Institute of Organic Agriculture

Crop protection strategies in European organic viticulture

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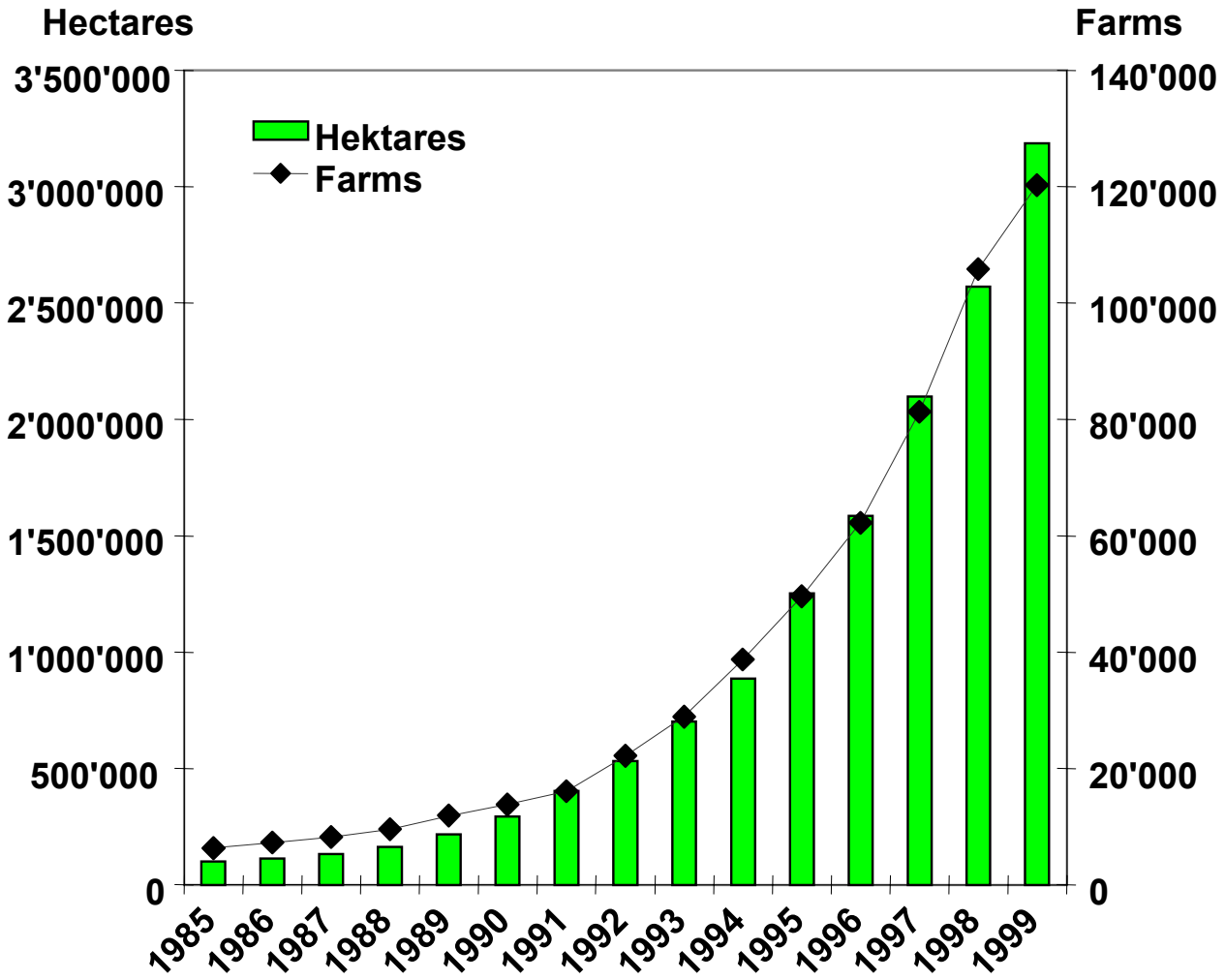
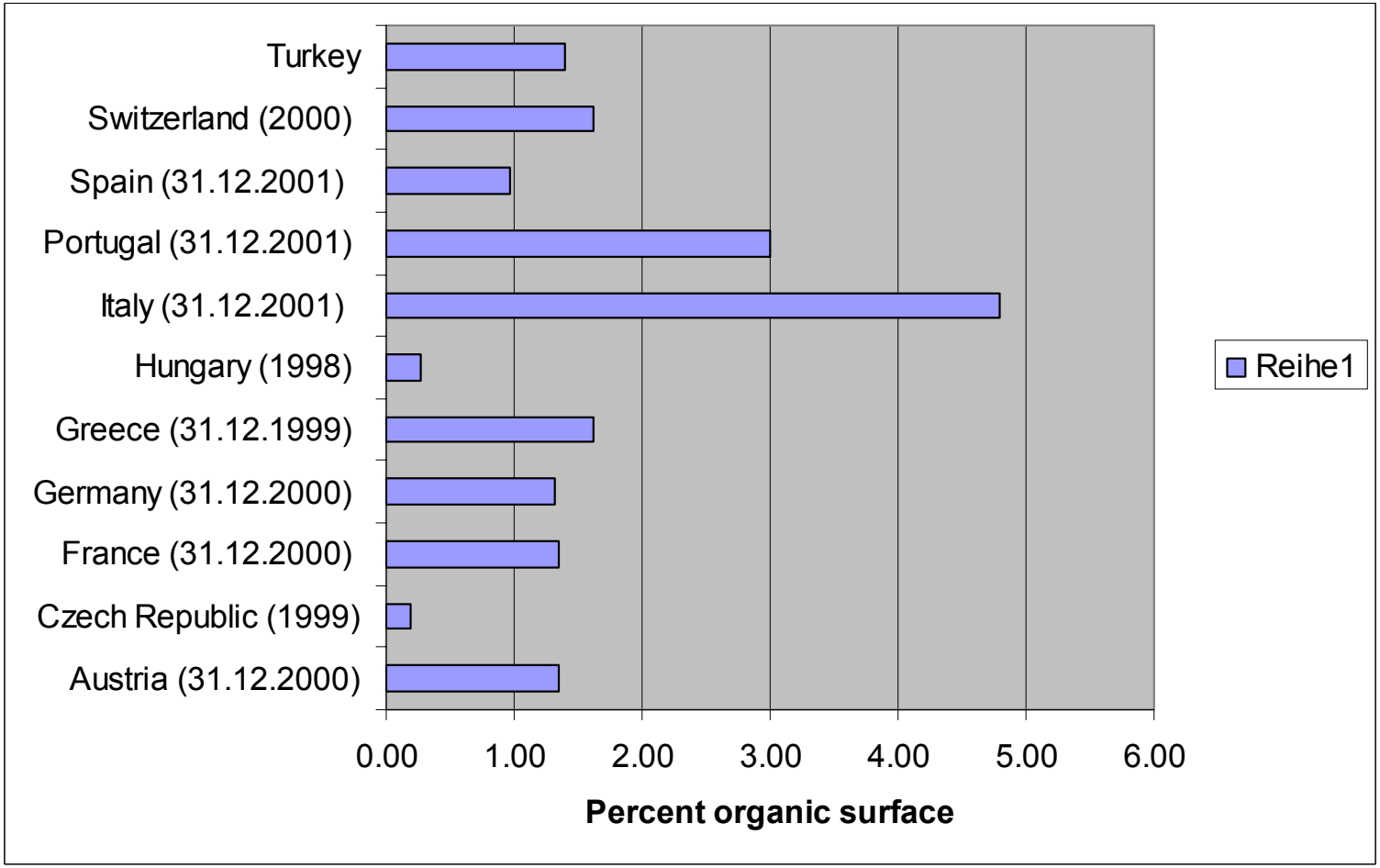
- Organic viticulture in Europe
- Major bottlenecks and solutions
- Crop protection strategies in humid climates
- Novel trends in disease control

Development of organic farming world-wide



(source: Kilcher et al., 2000)

Organic viticulture in Europe



Major diseases

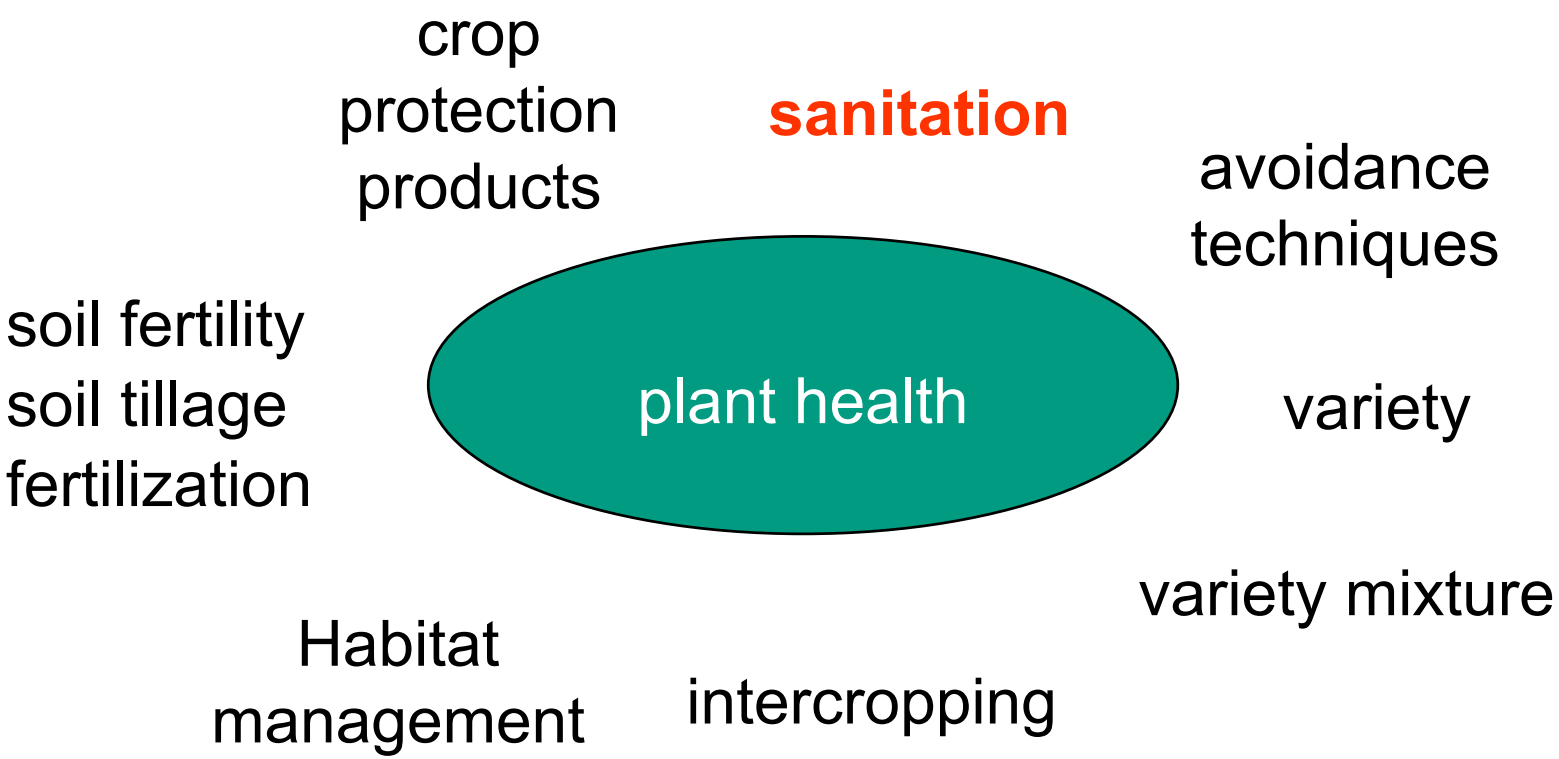
Problem	importance	solution	efficacy	losses
Downy mildew (Plasmopara viticola)	****	acidified clays, copper	***	*-****
Powdery mildew (Uncinula necator)	****	sulphur, other products	****	*-***
Phomopsis viticola	*-**	sulphur	***	*
Pseudopeziza tracheiphila	local	acidified clays	***	*-**
Grey rot (Botrytis cinerea)	**-***	copper	**	*-**
Flavescence d.	local	?	?	****

Major pests

Problem	importance	solution	efficacy	losses
Eupoecilia ambiguella and Lobesia botrana	**	mating disruption, B.t.	***	**
Red spider mite	*	soaps	****	**
Spider mite	local	sulphur	***	*
Phylloxera	*	sulphur	***	*
Thrips	*	sulphur	***	*
Lygus	*			
Empoasca	*			
Lepidopterae	local	pyrethrin, spinosad	***	*

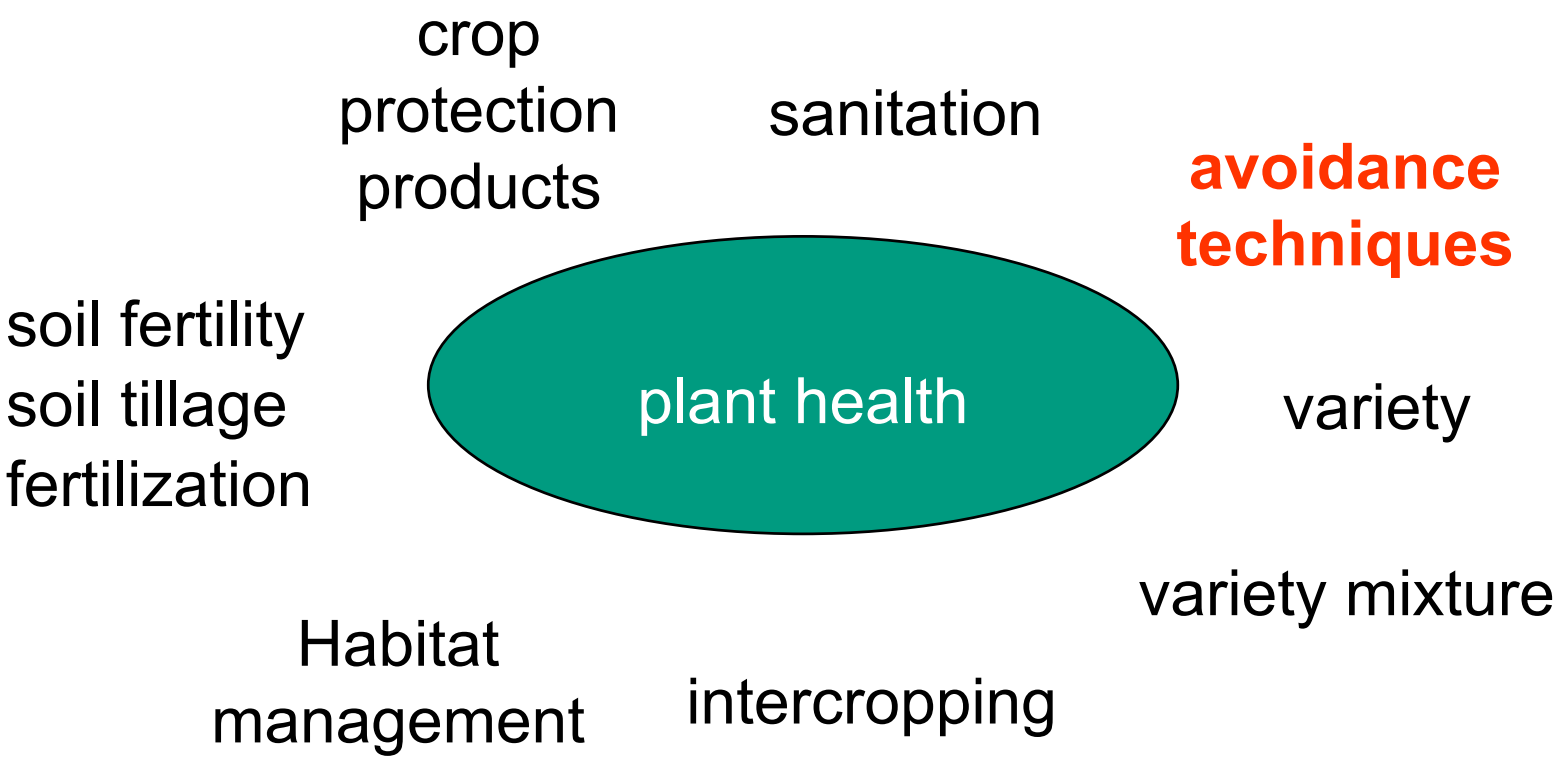
Major bottlenecks:

Crop protection on organic viticulture



Sanitation

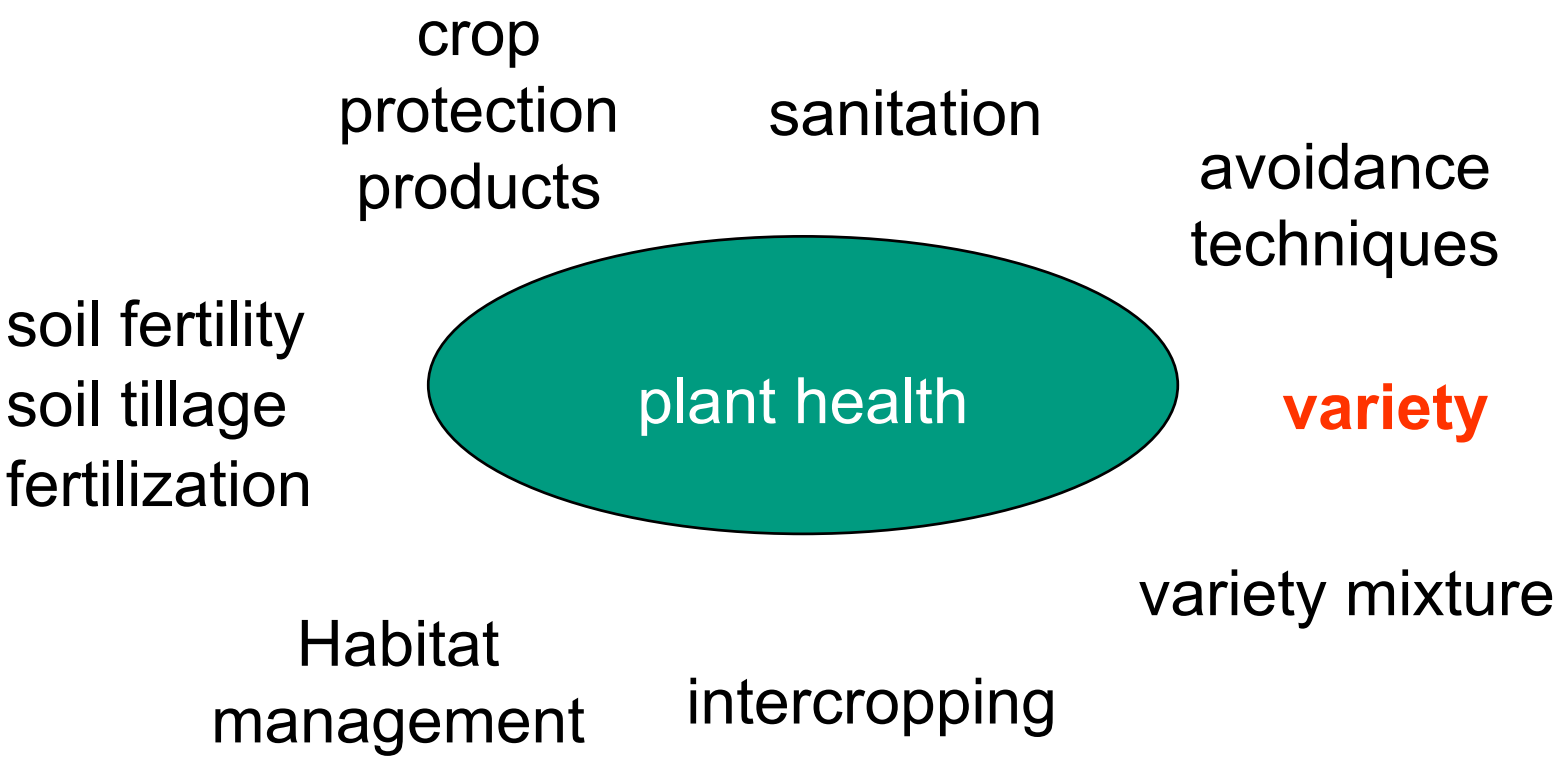
Crop protection on organic viticulture



Avoidance techniques: wasps

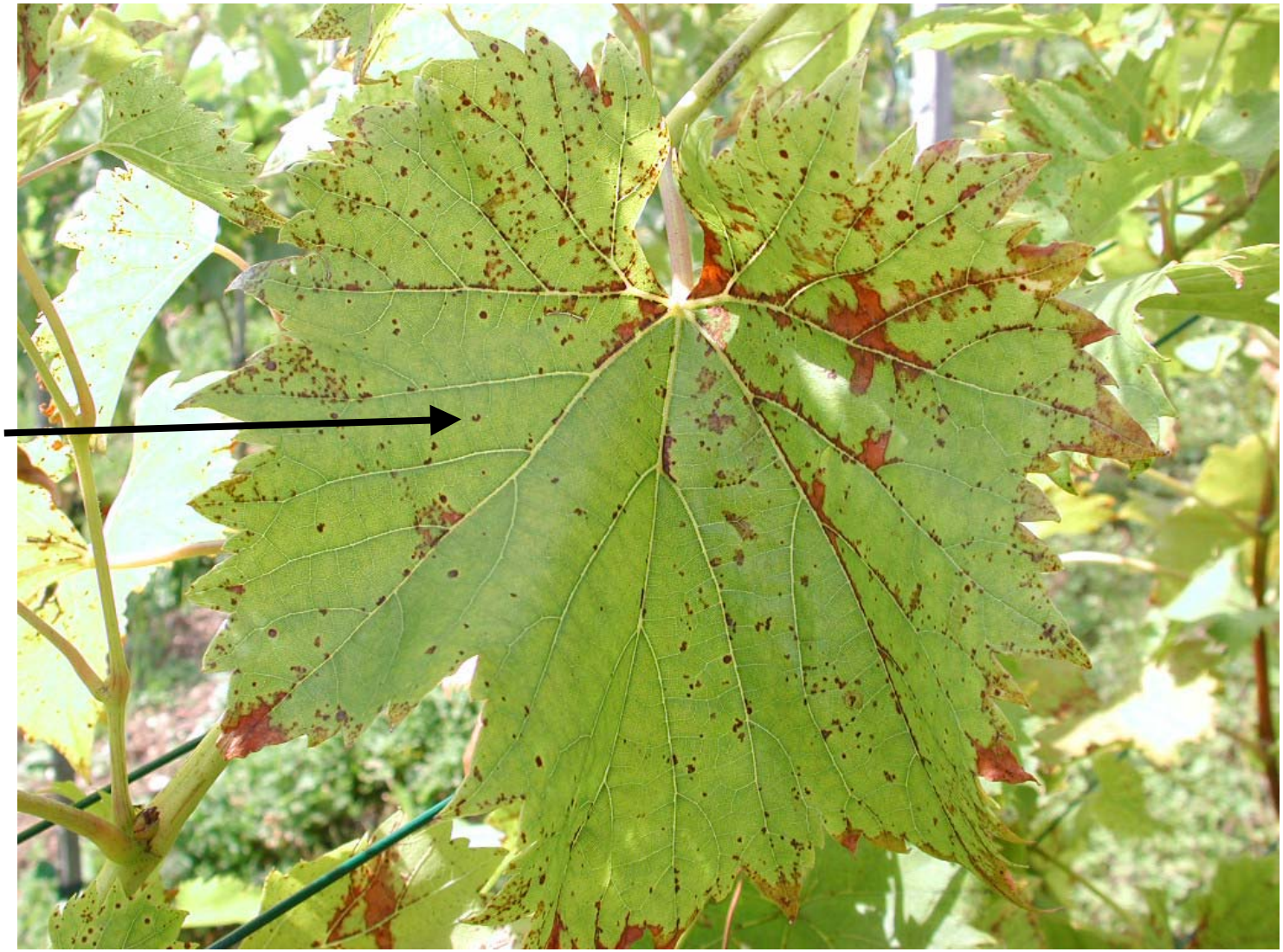
Avoidance techniques: Birds

Crop protection on organic viticulture



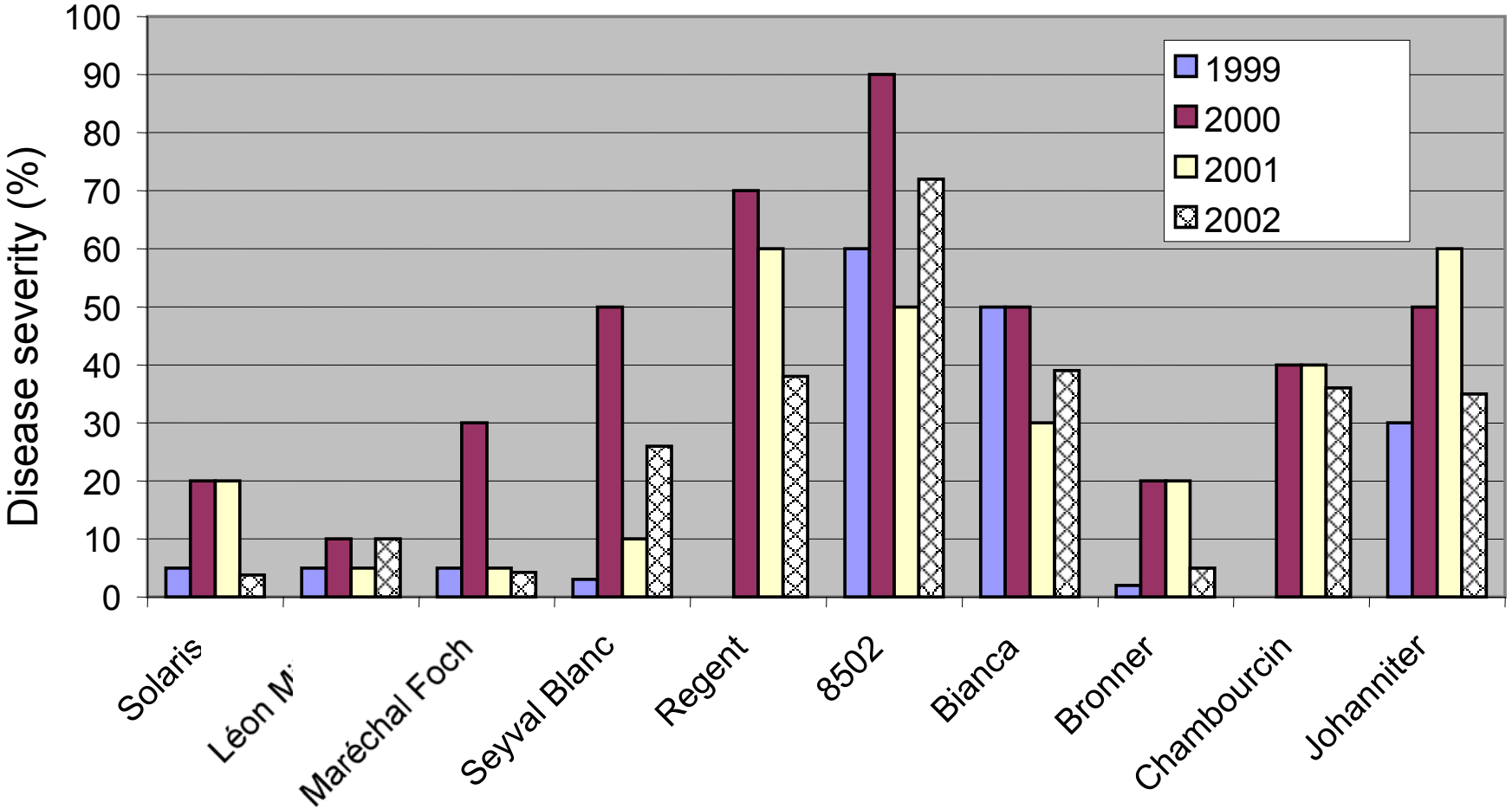
Resistant varieties

Partial resistance

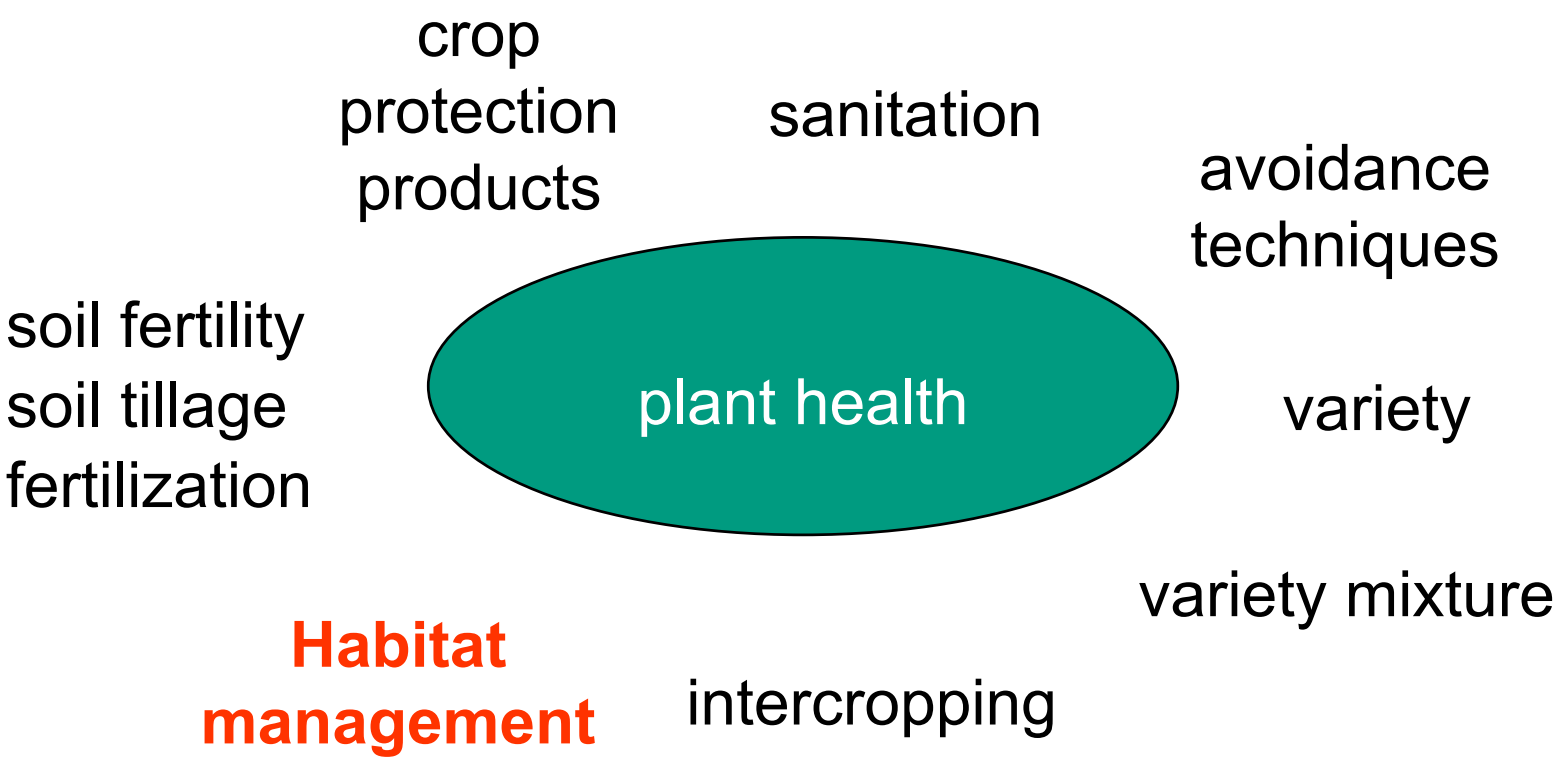


Partial resistance?

Downy mildew on interspecific hybrids



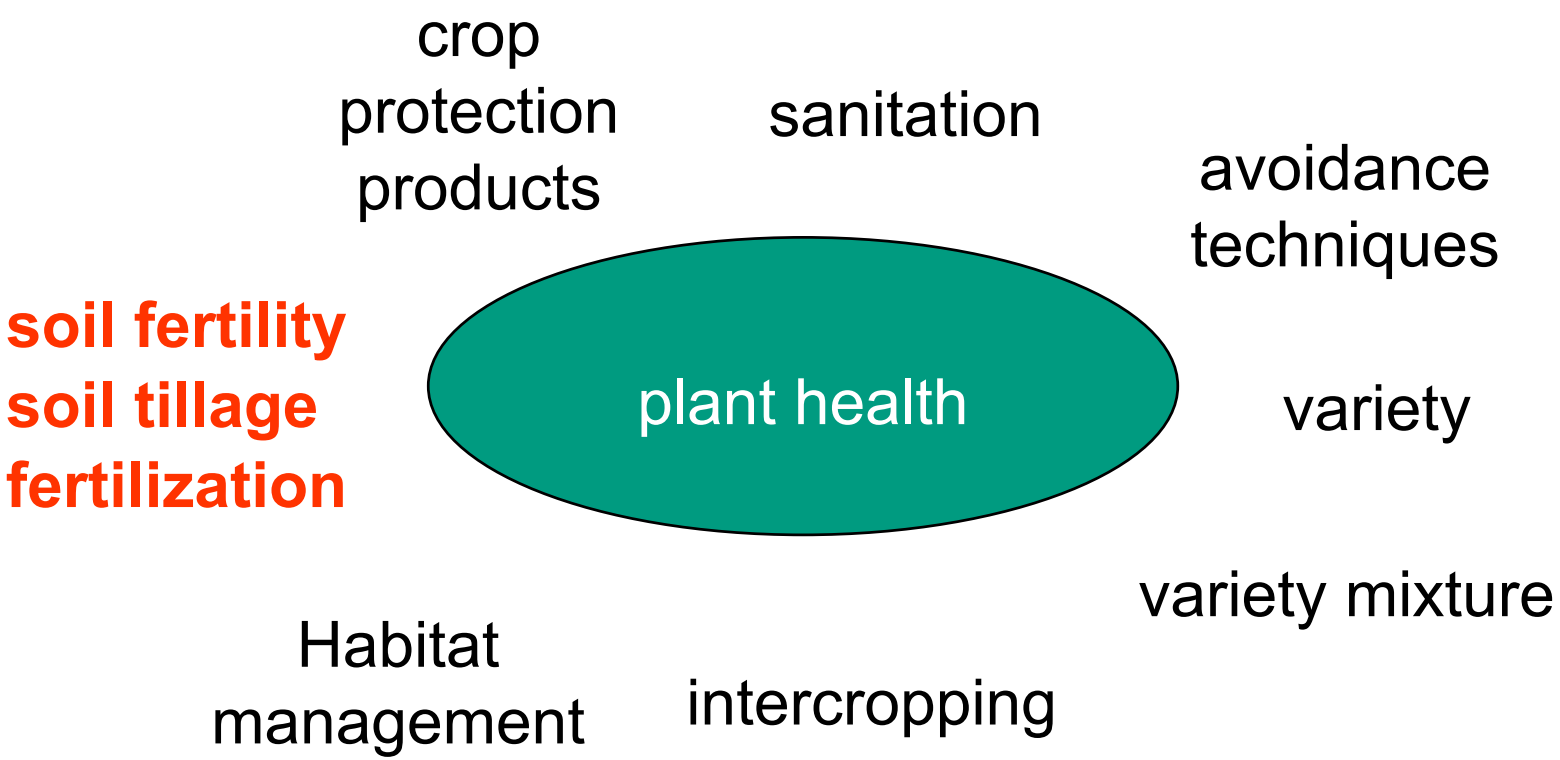
Crop protection strategies



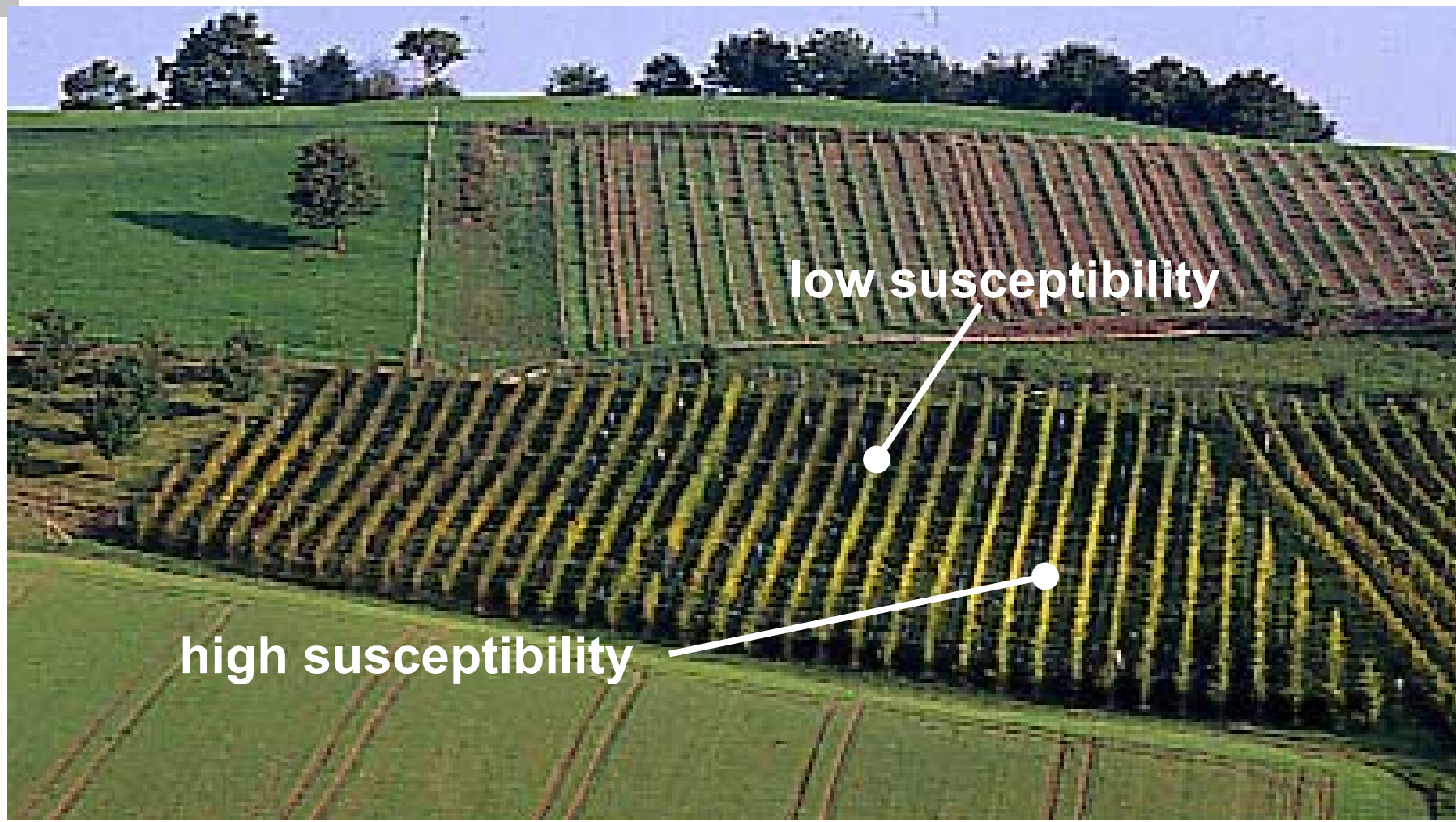
Habitat management: wild flower strips

Alicante (Spain): added value

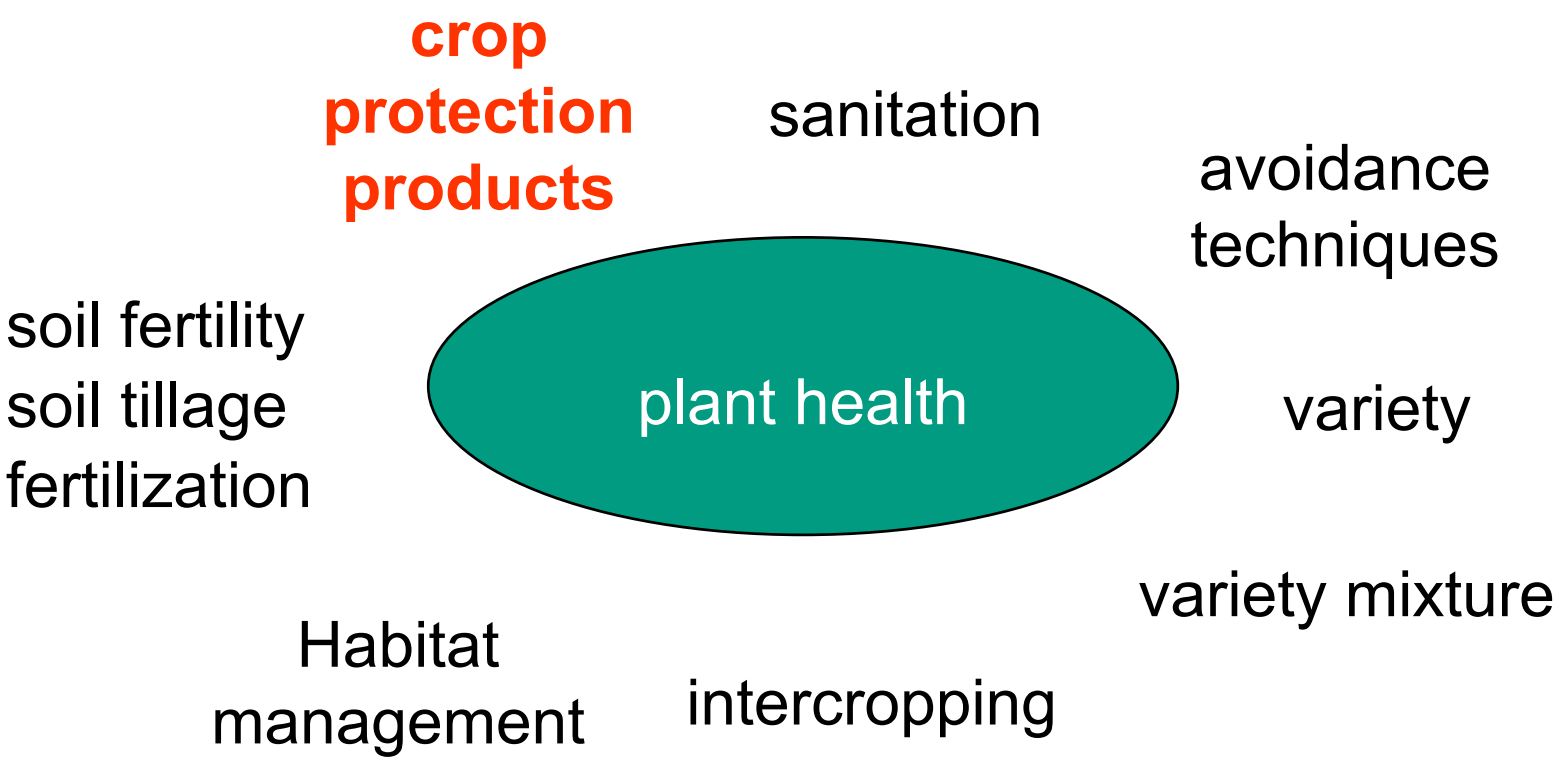
Crop protection strategies



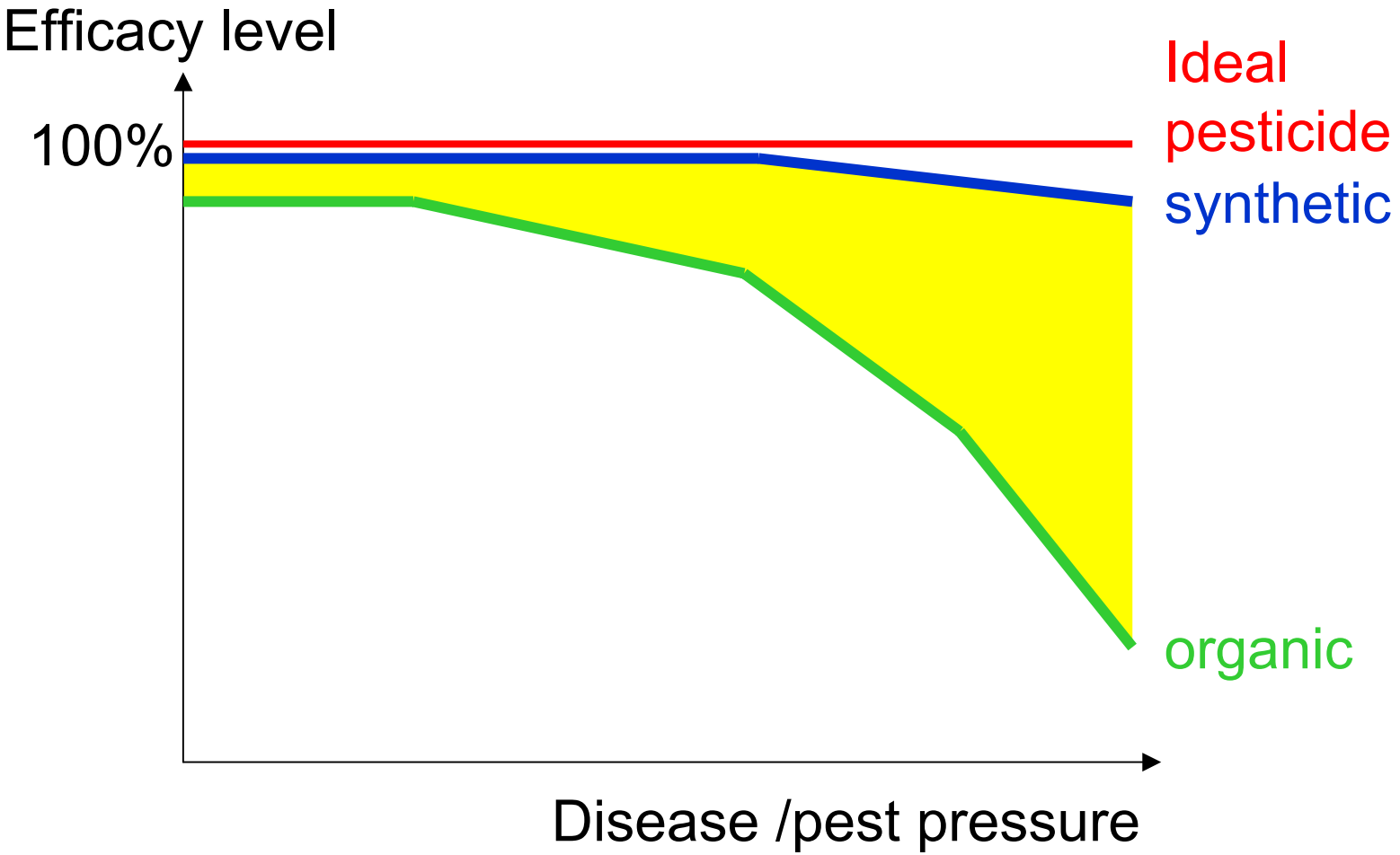
Plant nutrition and field resistance?



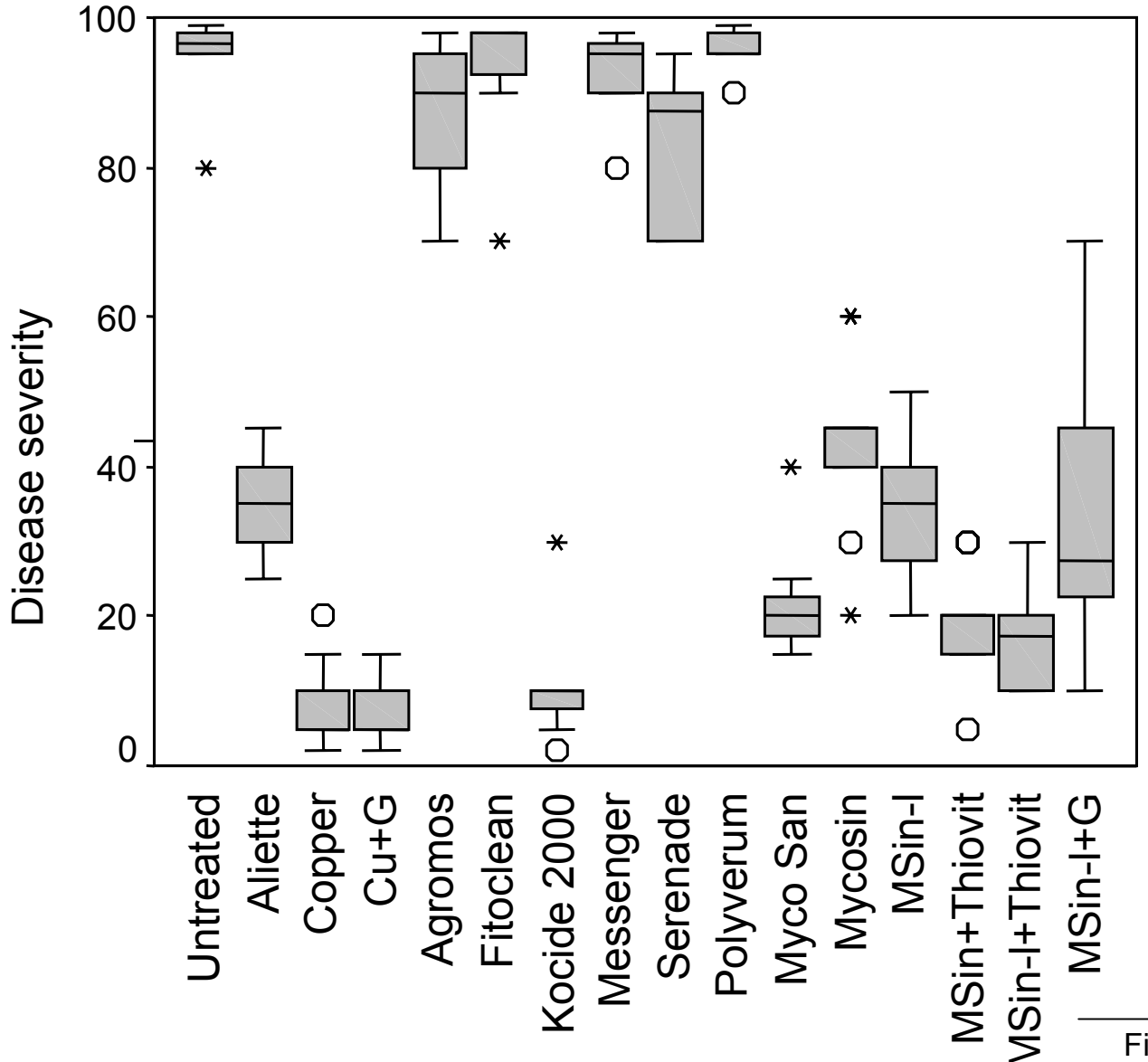
Crop protection strategies



Efficacy gap of pesticides in OF

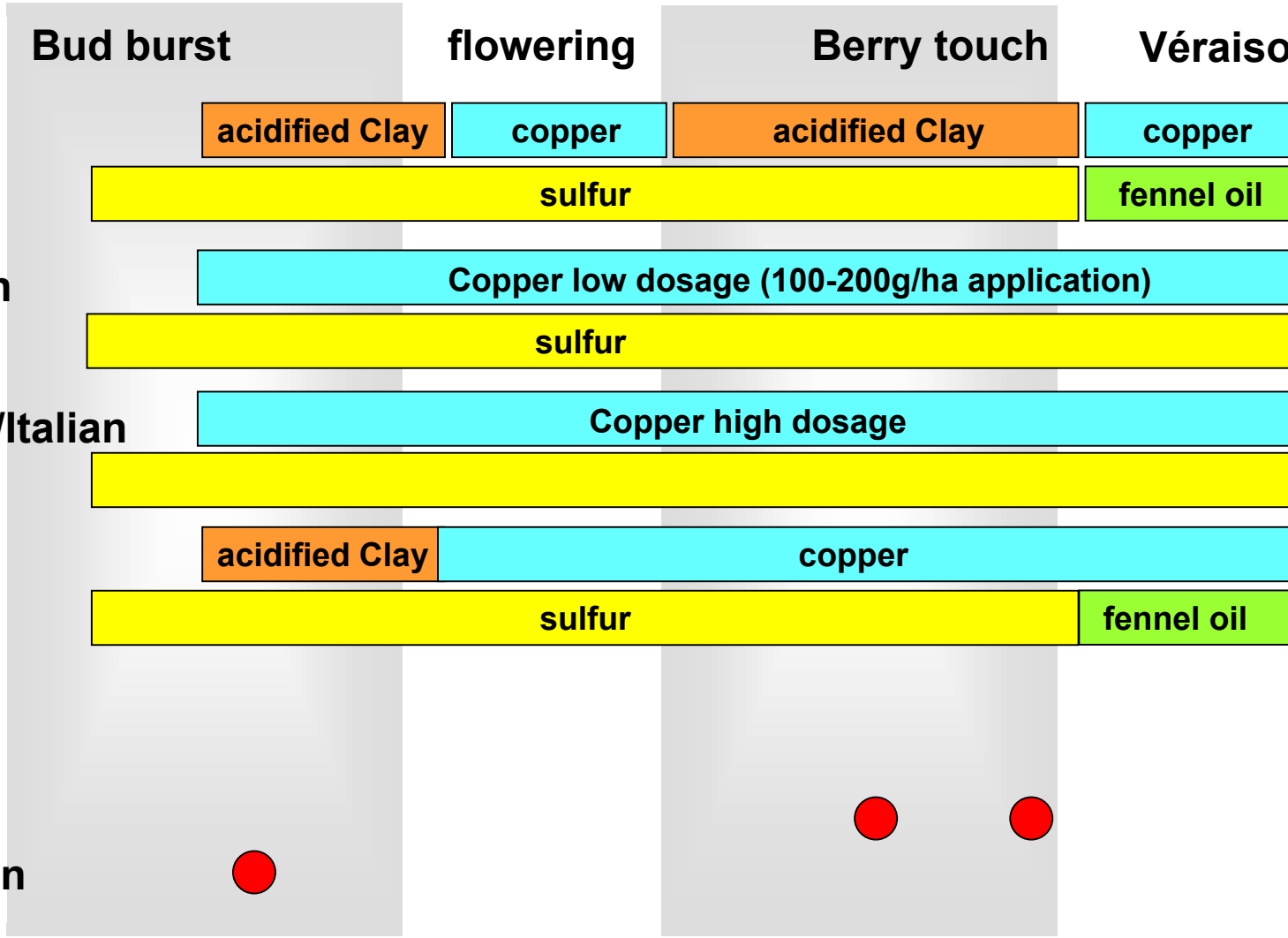


Downy mildew control: Frick, 11.9. 2002

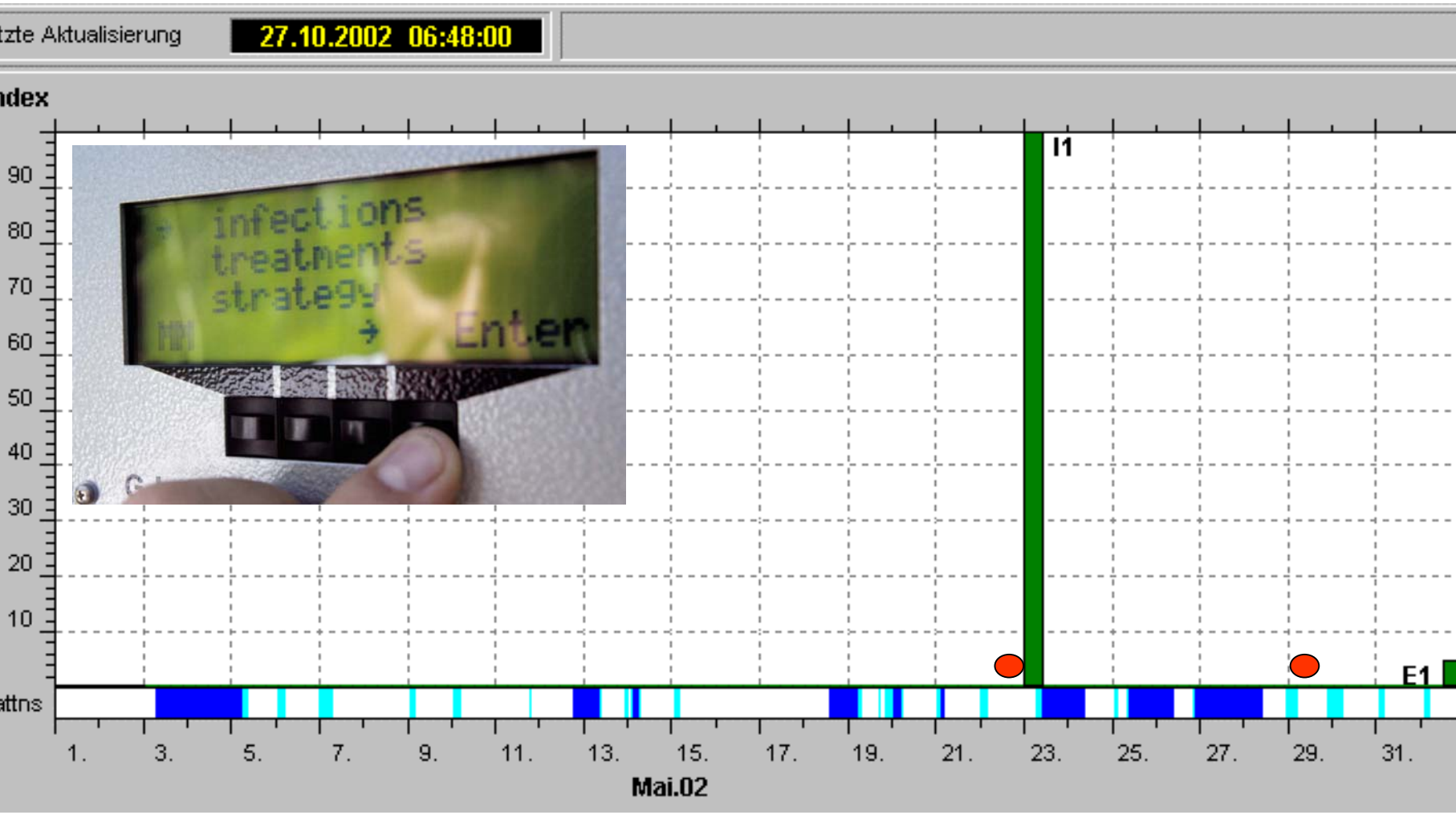


Application and timing of sprays are crucial

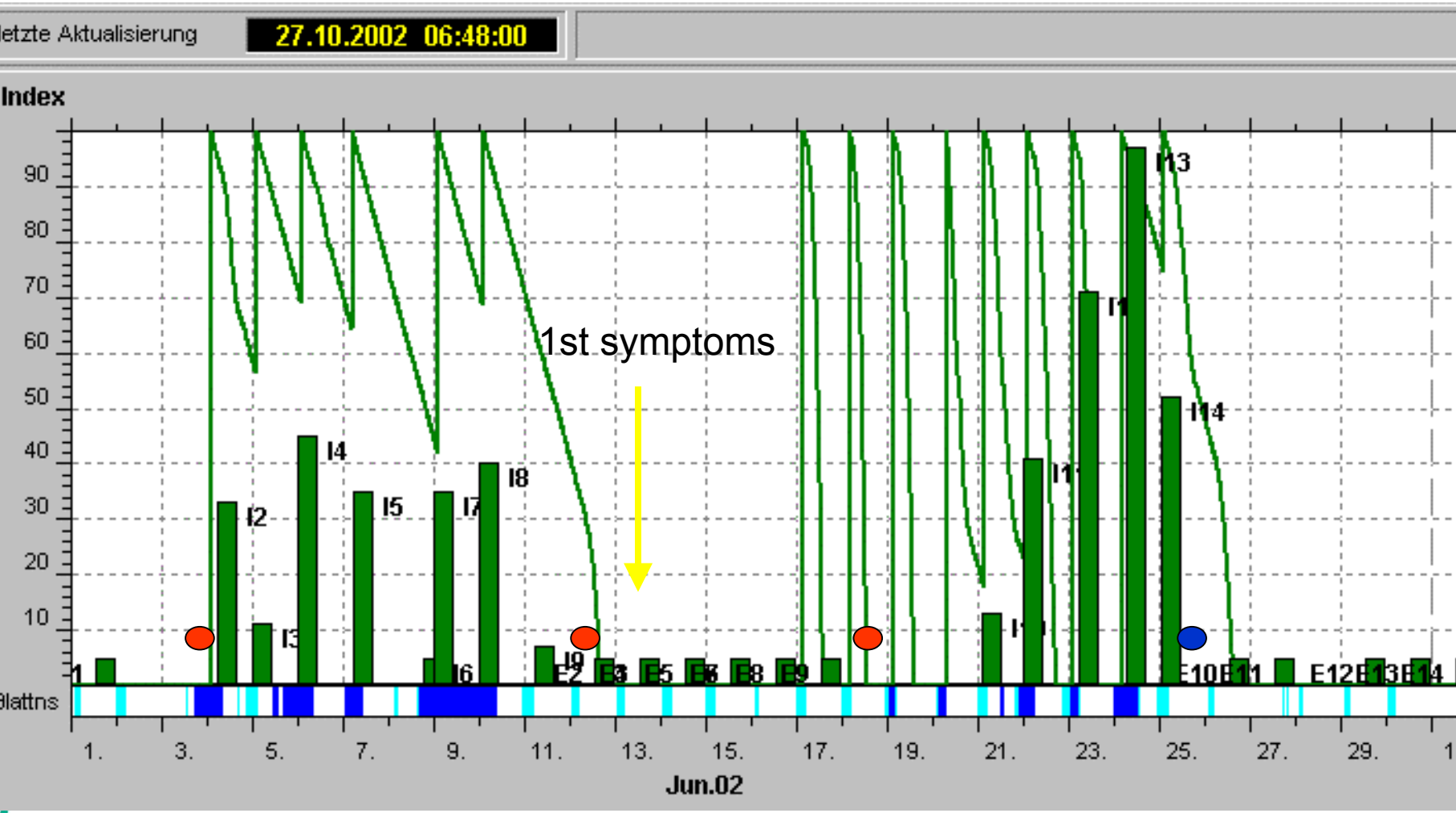
Crop protection strategies in humid climates



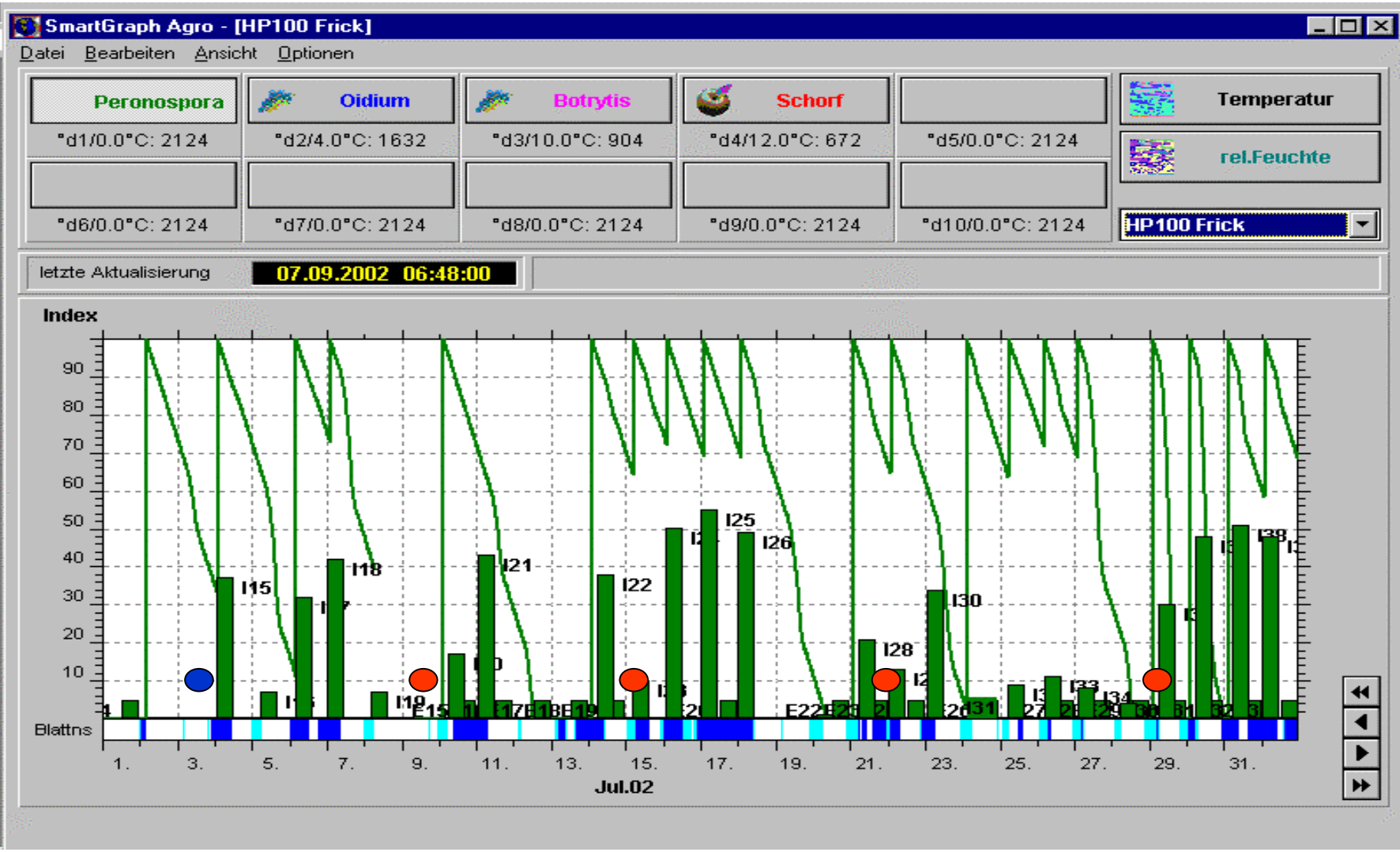
Crop protection in Frick, May 2002



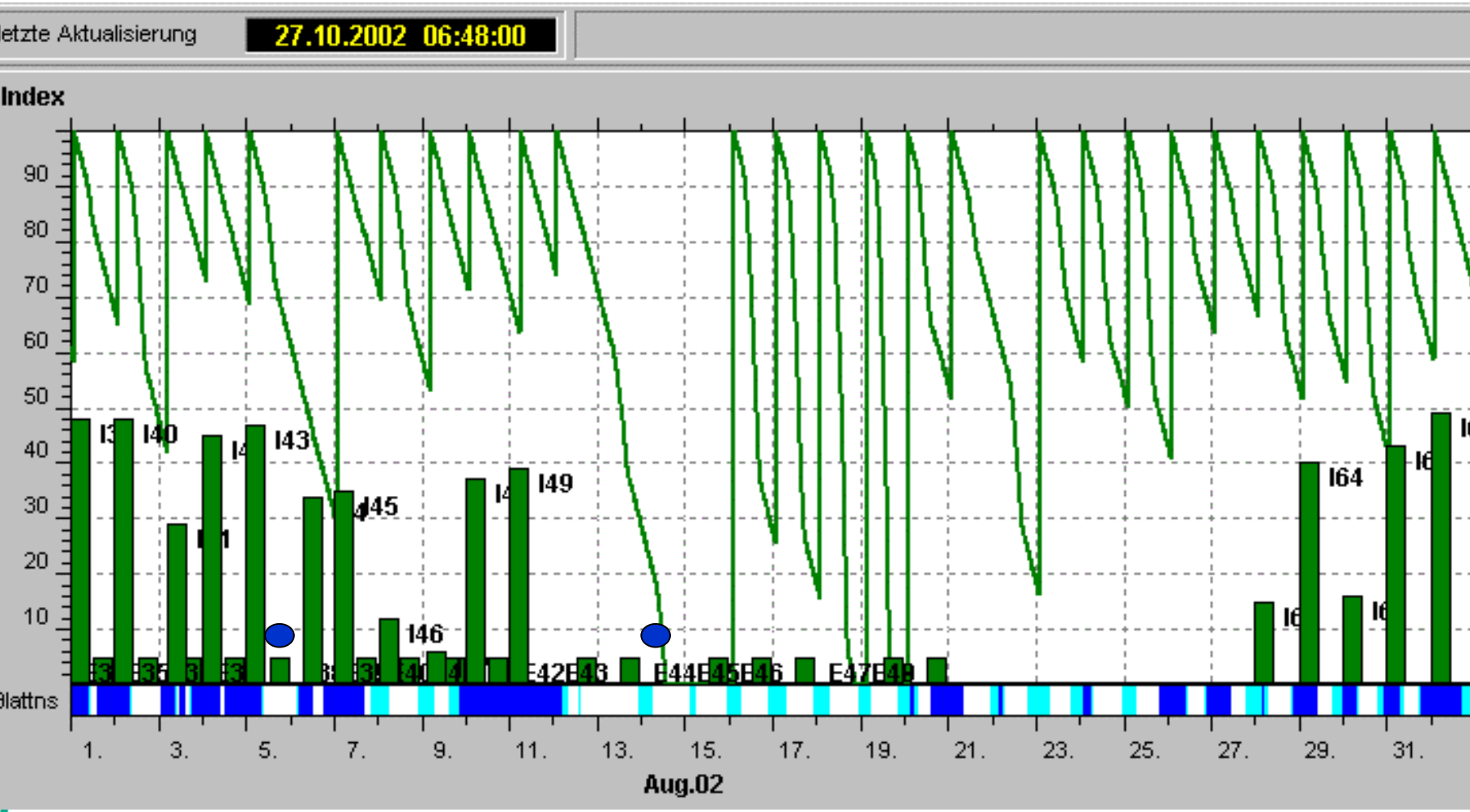
Crop protection in Frick, June 2002



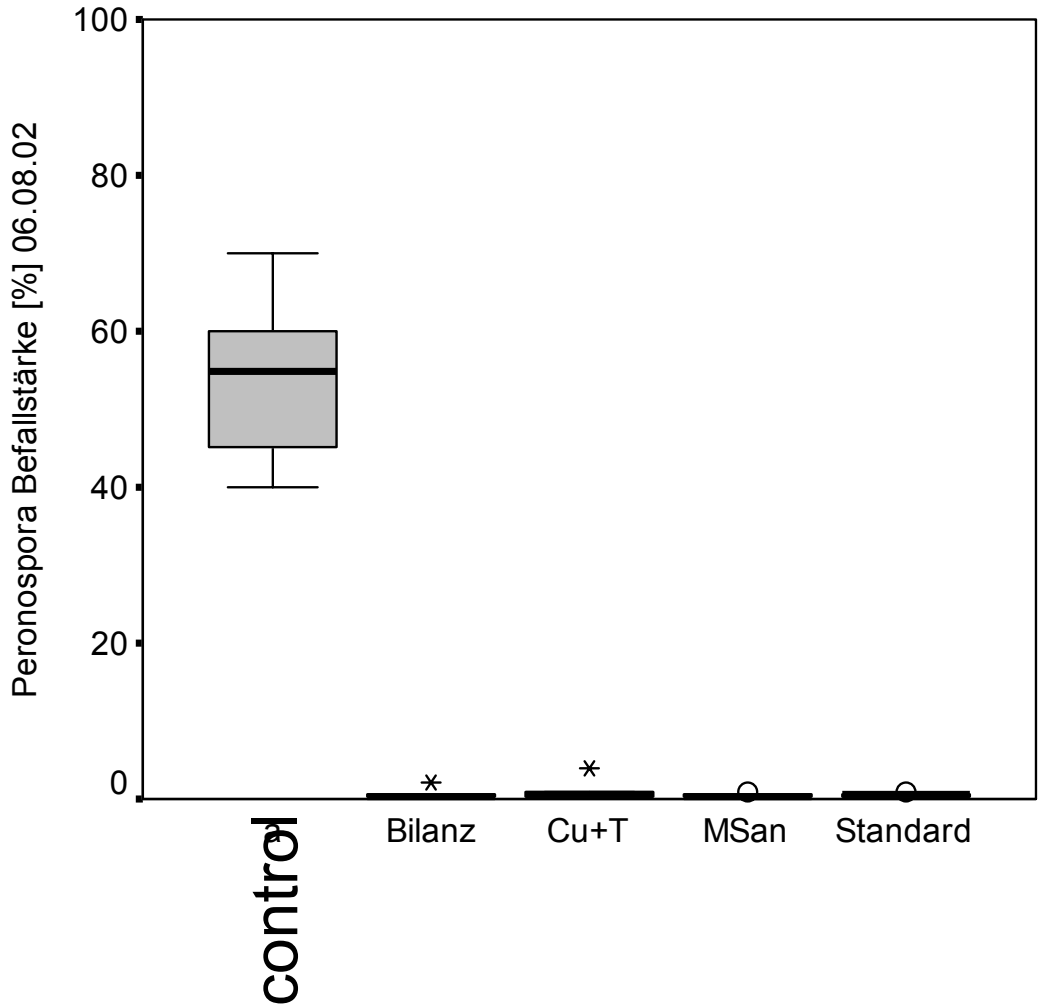
Crop protection in Frick, July 2002



Crop protection in Frick, August 2002



Frick 2002


Peronospora Befallstärke [%] 06.08.02
100
80
60
40
20
0
control
Bilanz
Cu+T
MSan
Standard

Standard compounds

untreated

copper

Myco-San

Acidified clay preparations:

- **Myco San: acidified clay + wettable sulfur;**
- **Myco Sin: acidified clay**

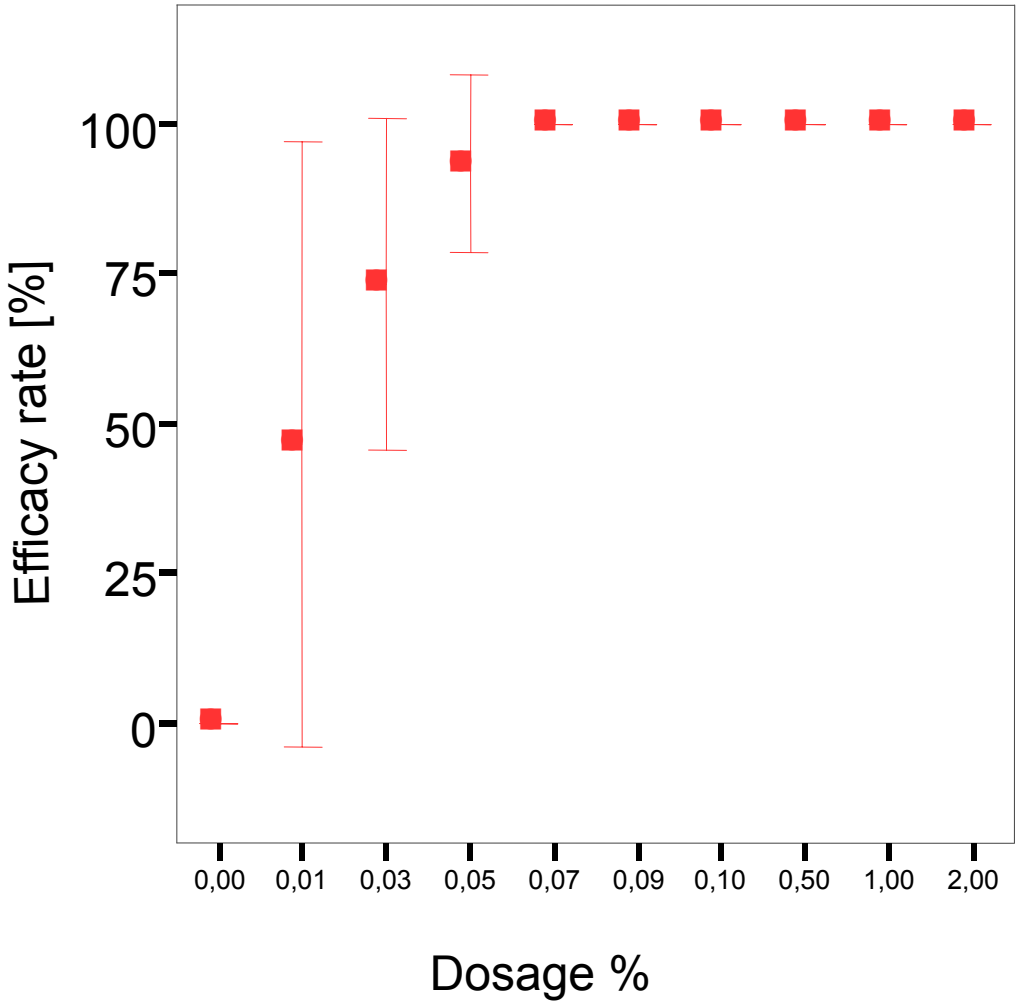
  Manufacturer: Schaette GmbH, Germany
- **Ulmasud: acidified clay**

  Manufacturer: Biofa GmbH, Germany

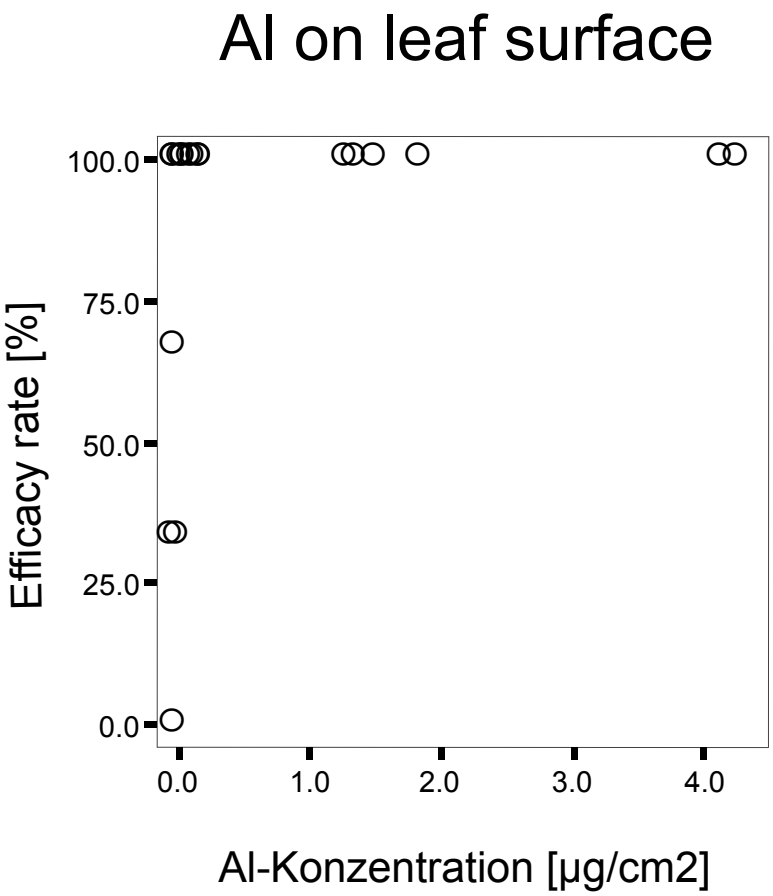
Putative active principles:

- **Al-Ion toxicity to sporangia/zoospores**
- **Resistance induction**

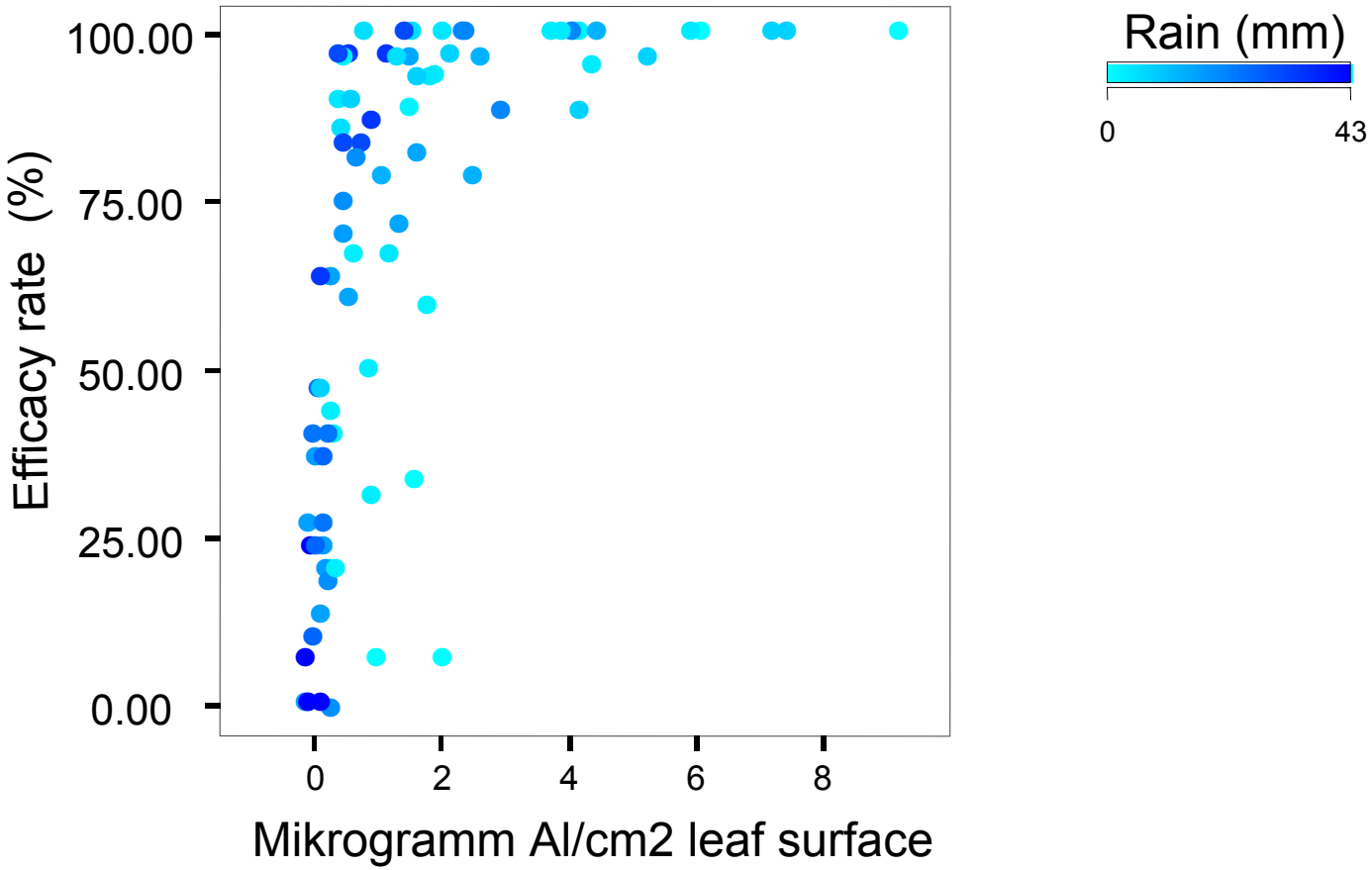
Dose-response of Myco Sin



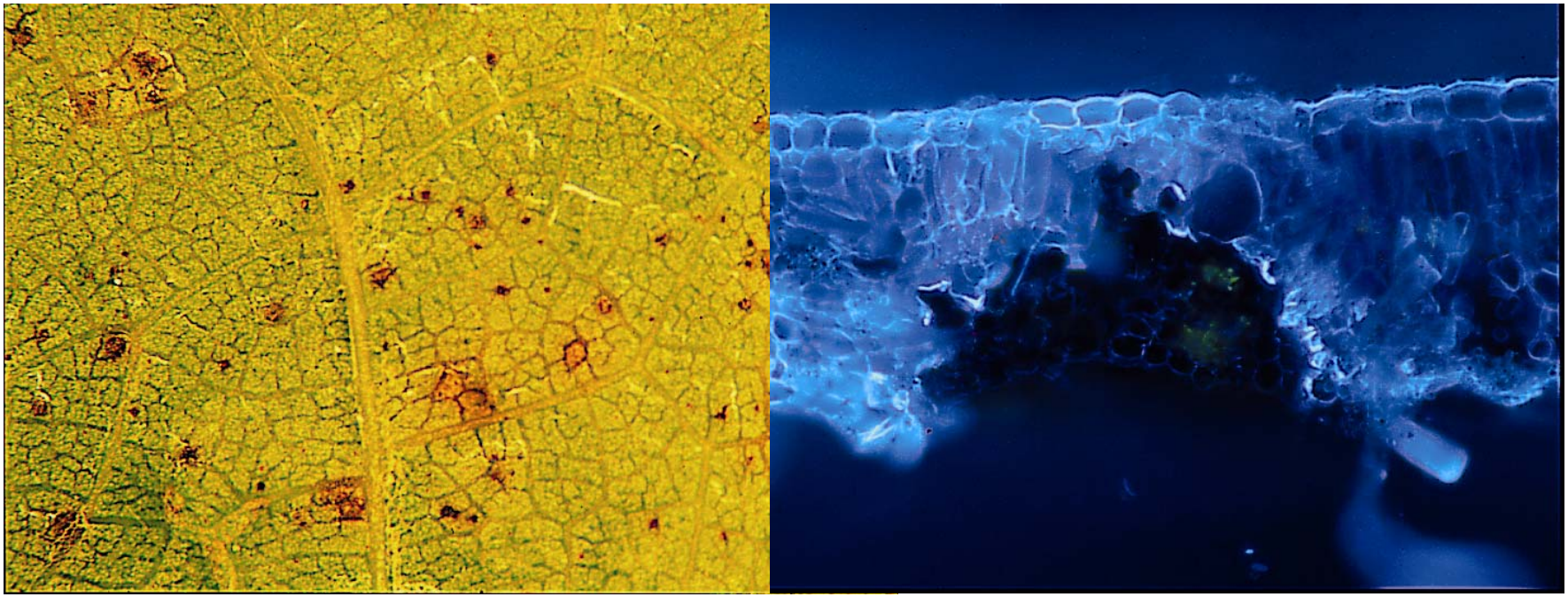
Dosis-response of Al-Ions (controlled conditions



Dose-response of AI-Ions (outdoors)



Phytotoxicity effects in combination with copper



Symptoms of makroskopically visible toxicity on leaves

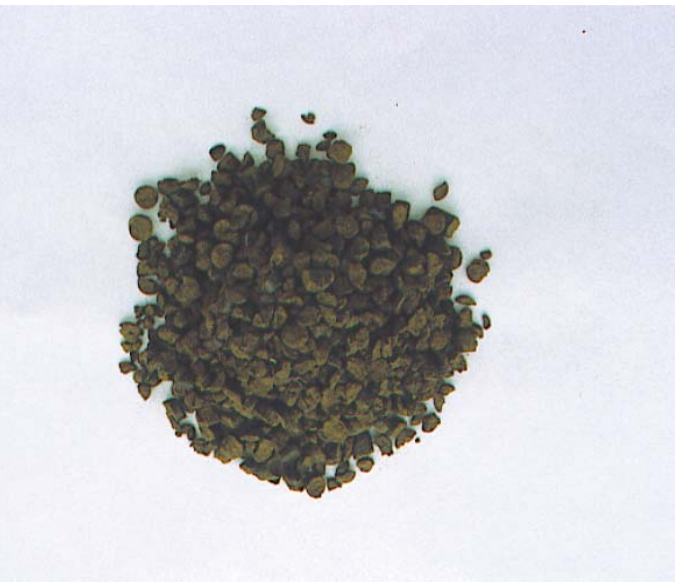
Properties of acidified clays

- fungicidal activity
- Slightly less efficient than copper
- May cause phytotoxicity

PEN-a novel elicitor?

Penicillium chrysogenum

Dry mycelium



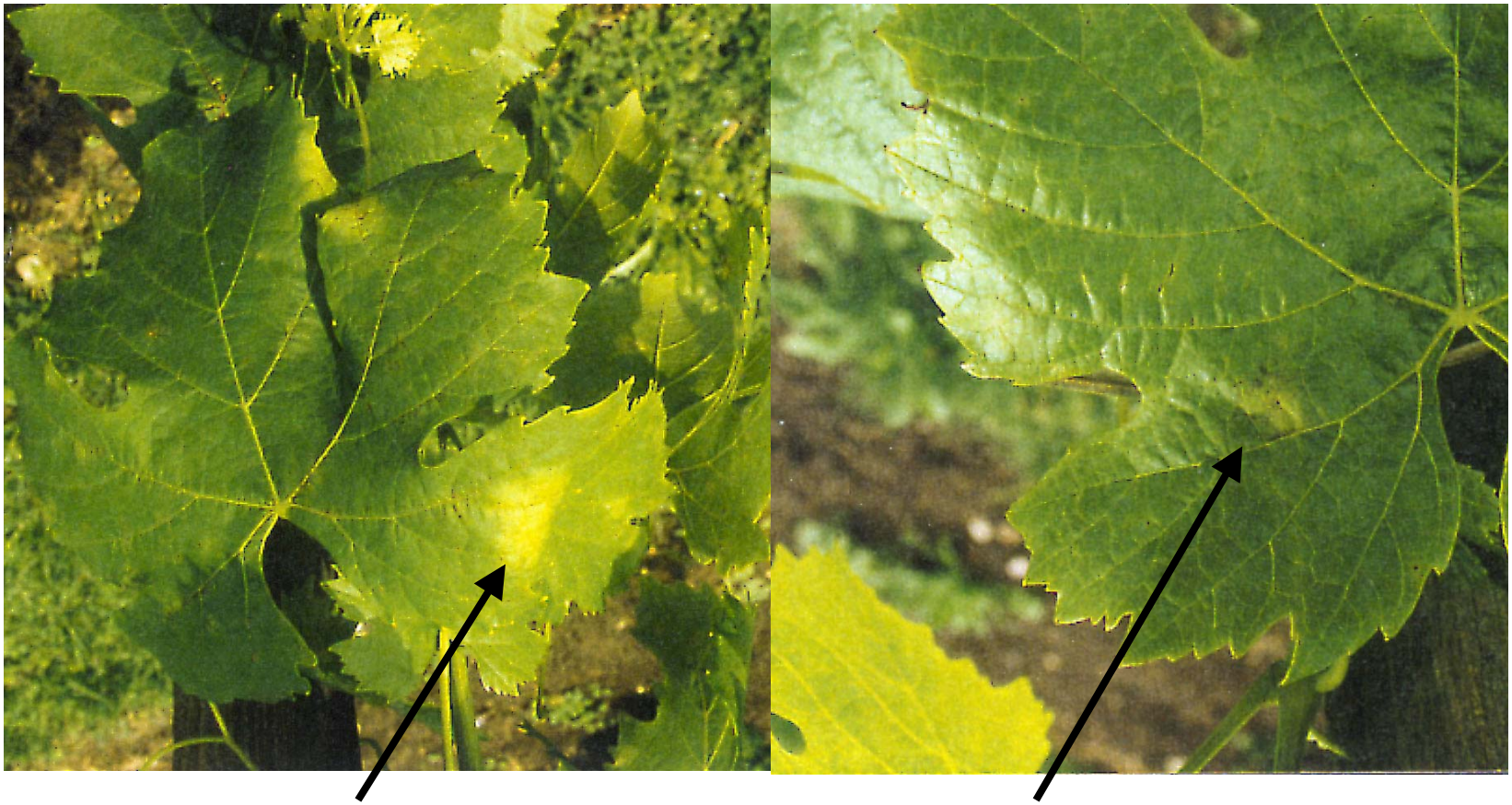
'Agro Biosol'

Biochemie GmbH, A-Kunc

PEN on grapevine-P. viticola

Control

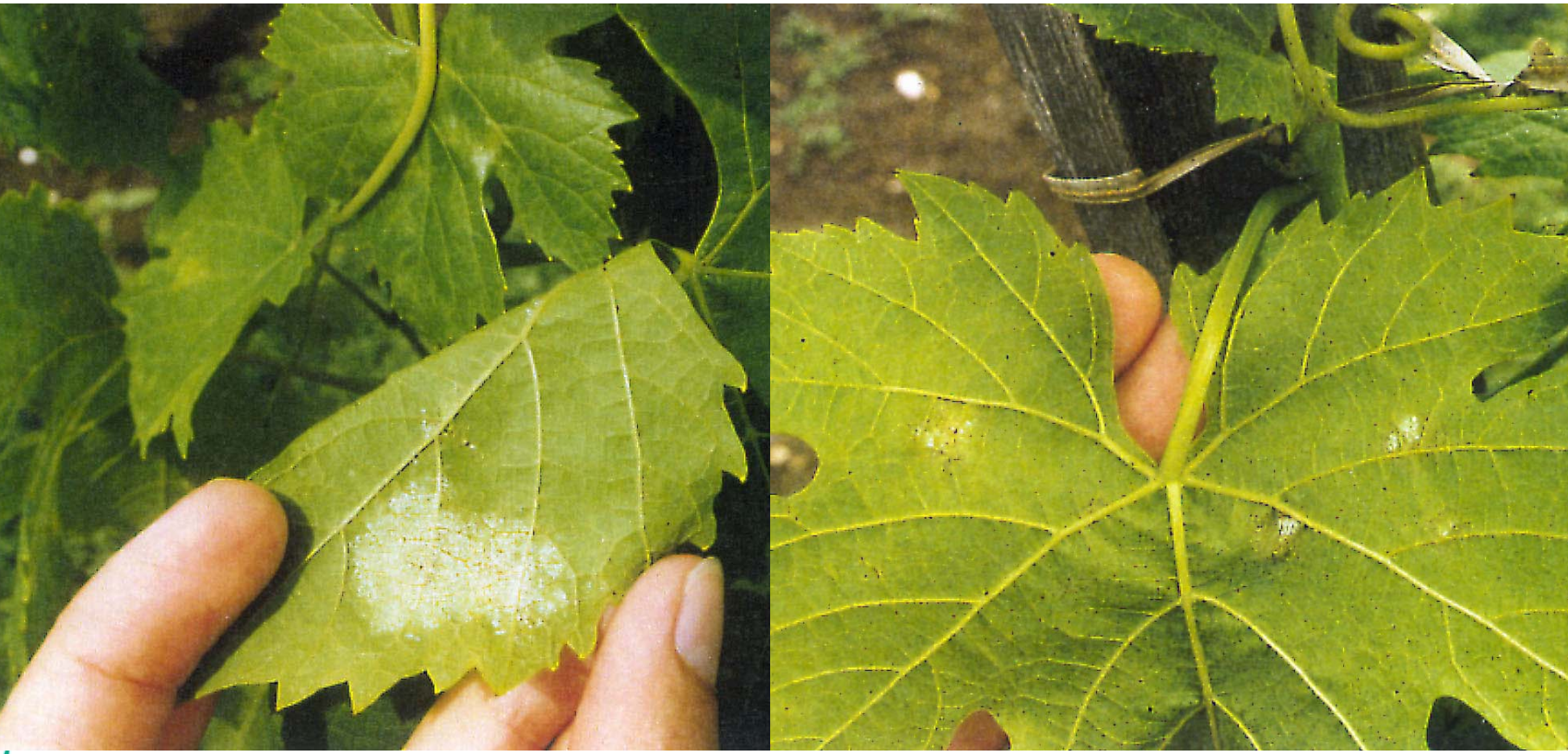
PEN



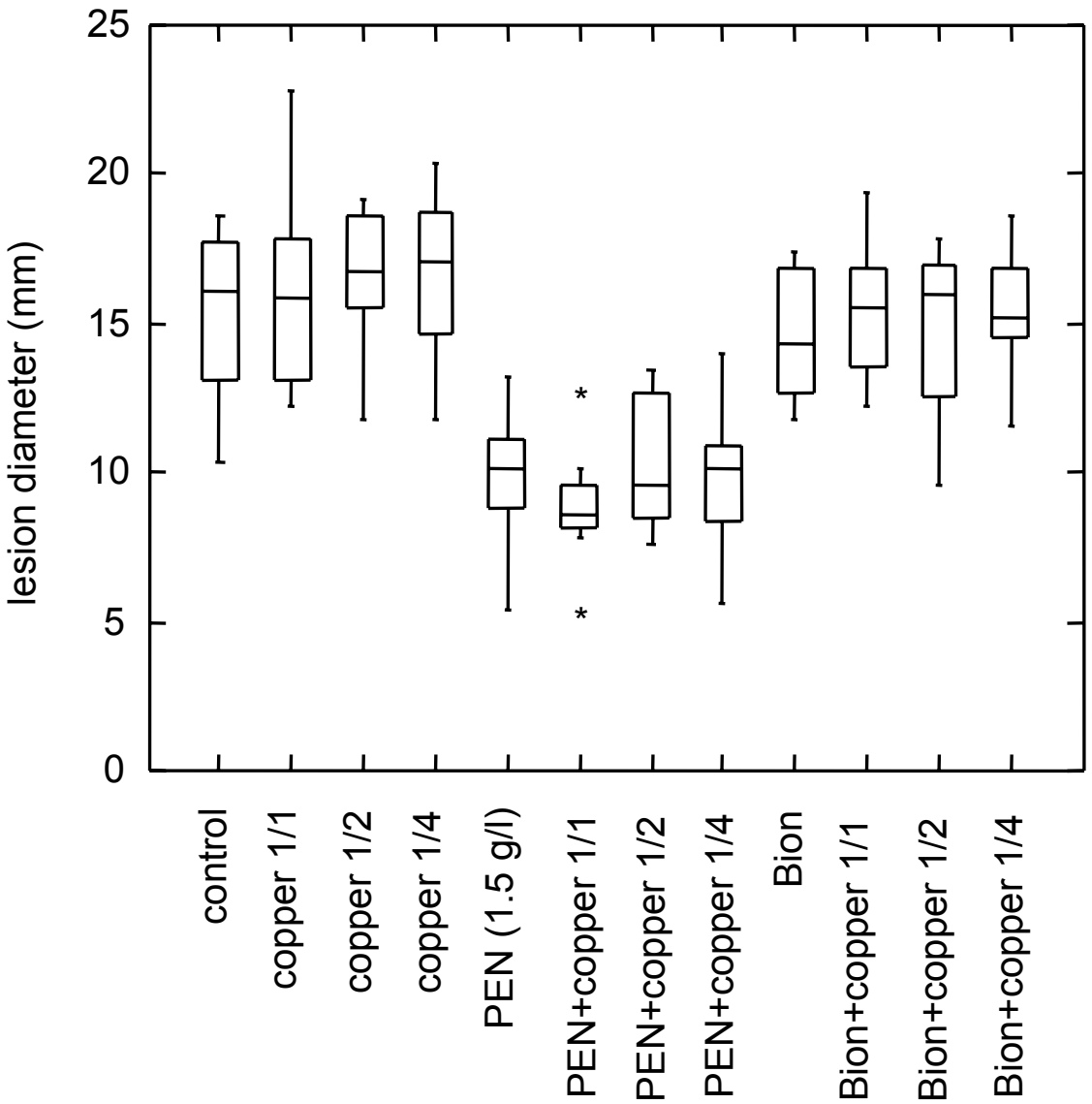
PEN on grapevine-P. viticola

Control

PEN

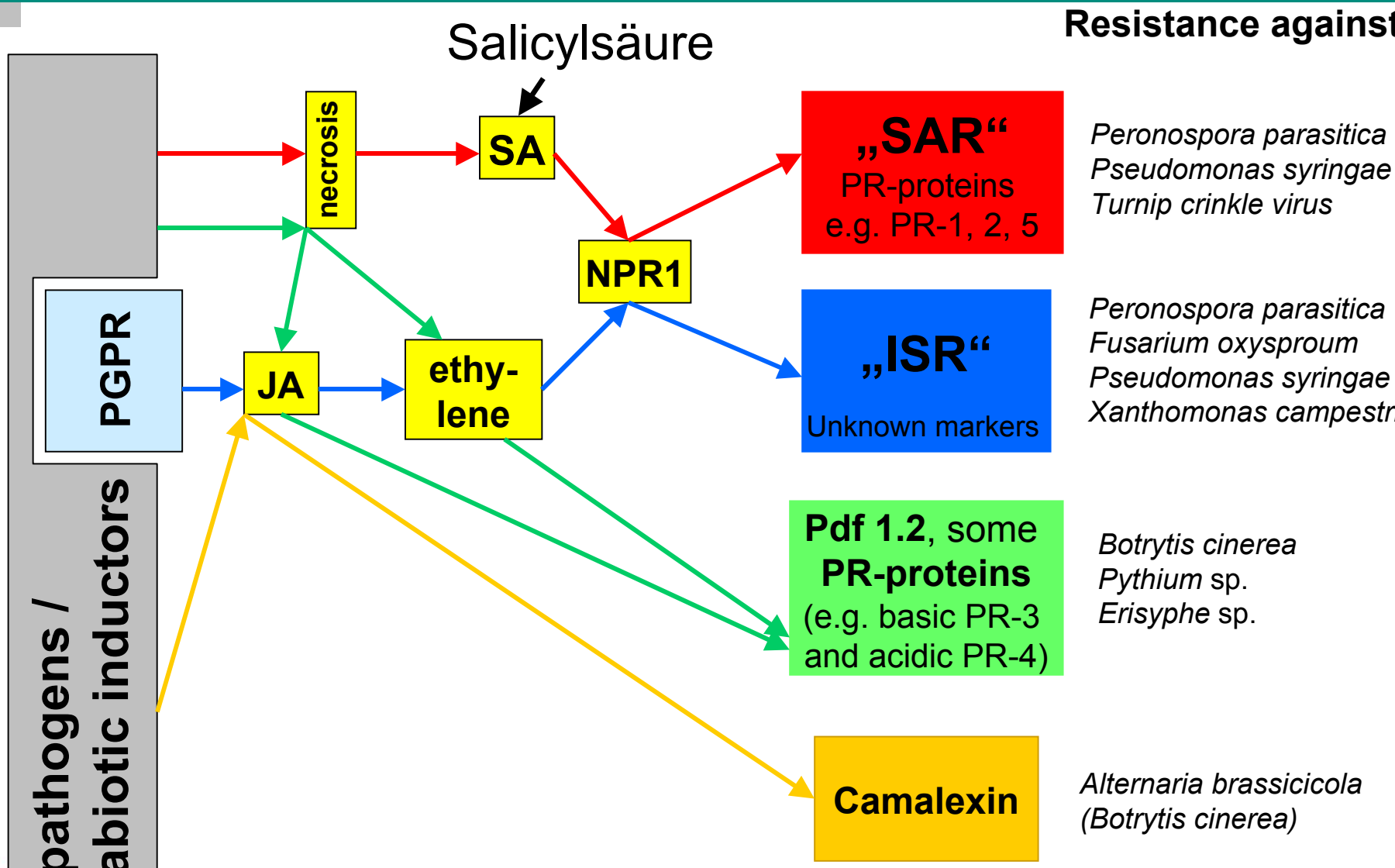


P. viticola: Lesion diameter 1997



Rentsch, 1997

Signal pathways and pathosystems



Properties of PEN

- Elicitor activity on grapevine
- May cause phytotoxicity
- Probably ready to use in 3-5 years

Available commercial products

Downy mildew

- Copper
- Acidified clays
- Phosphoric acid

Powdery mildew

- Sulphur
- Soybean lezithin
- Fennel oil
- Potassium permanganate
- Ampelomyces quisqualis
- Sodium bicarbonate
- Reynoutria sachaliensis

Trends in crop protection strategies

Novel technology	target organism	expected efficacy	introduction on farm			
			2003	2005	2010	later
Use of DSS	Plasmopara viticola	***				
Improved DSS	Plasmopara viticola, Uncinula necator, Botrytis cinerea	***				
Plant extracts	Plasmopara viticola	*-****				
Biocontrol agents	Uncinula necator, Botrytis cinerea	*-**				
Elicitors	Plasmopara viticola, Uncinula necator	***				
Resistant varieties	Plasmopara viticola, Uncinula necator	*-***				

Crew & support

- Dominique Lévite
- Andy Häseli
- Thomas Amsler
- Barbara Thürig
- Sonia Jiménez
- Christina Rentsch
- Urs Guyer
- Roland Mühletaler
- Thomas Boller
- Andres Binder
- Jürg Felix