Ampelomyces application on grapevines

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Life cycle – *Erysiphe necator*

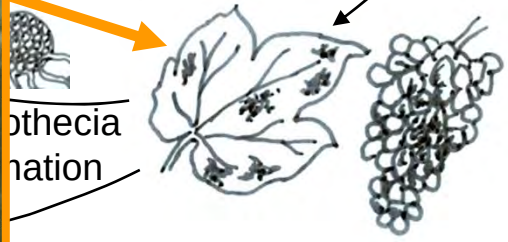
dia

dispe

ascospo

asci

discharge

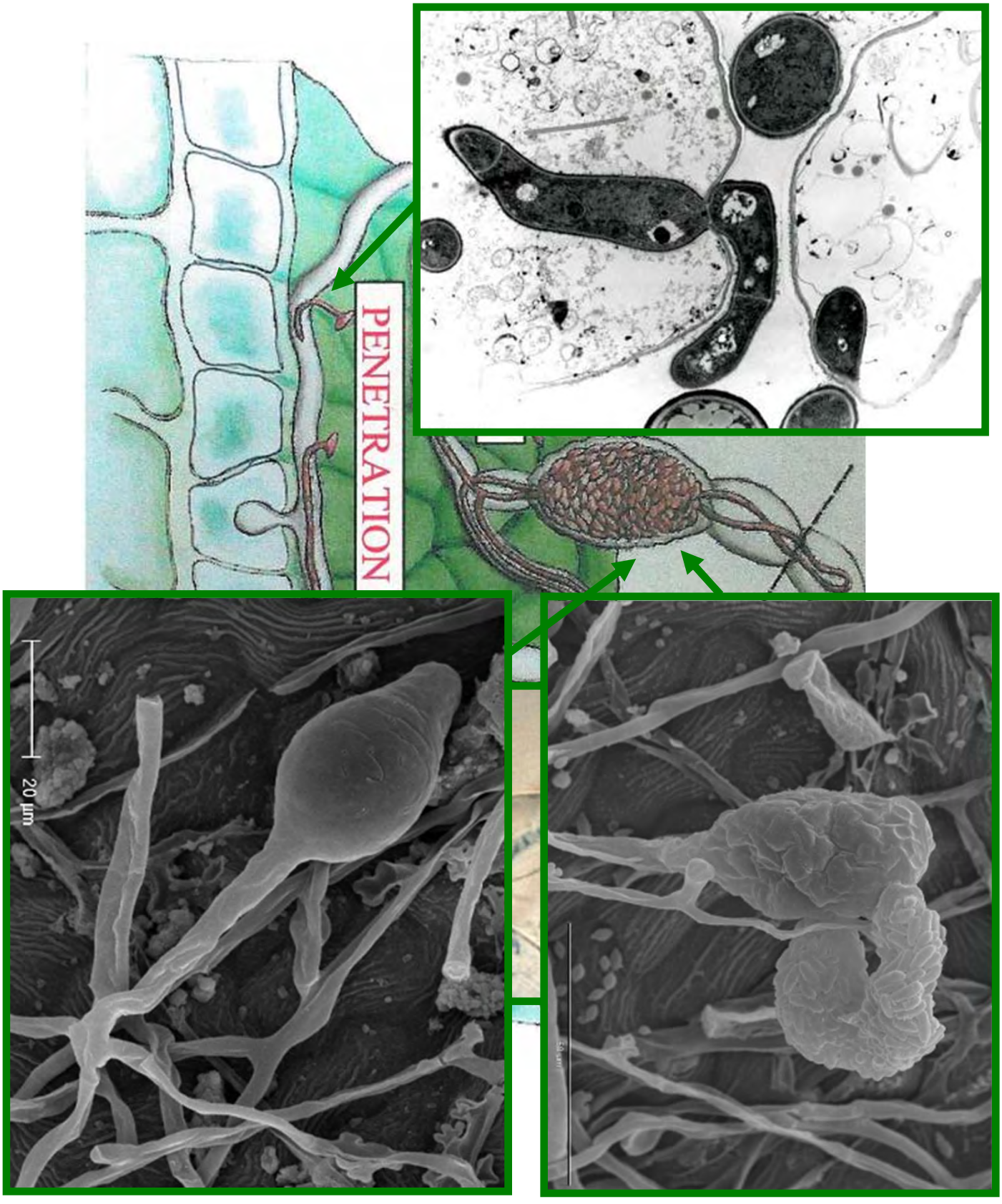


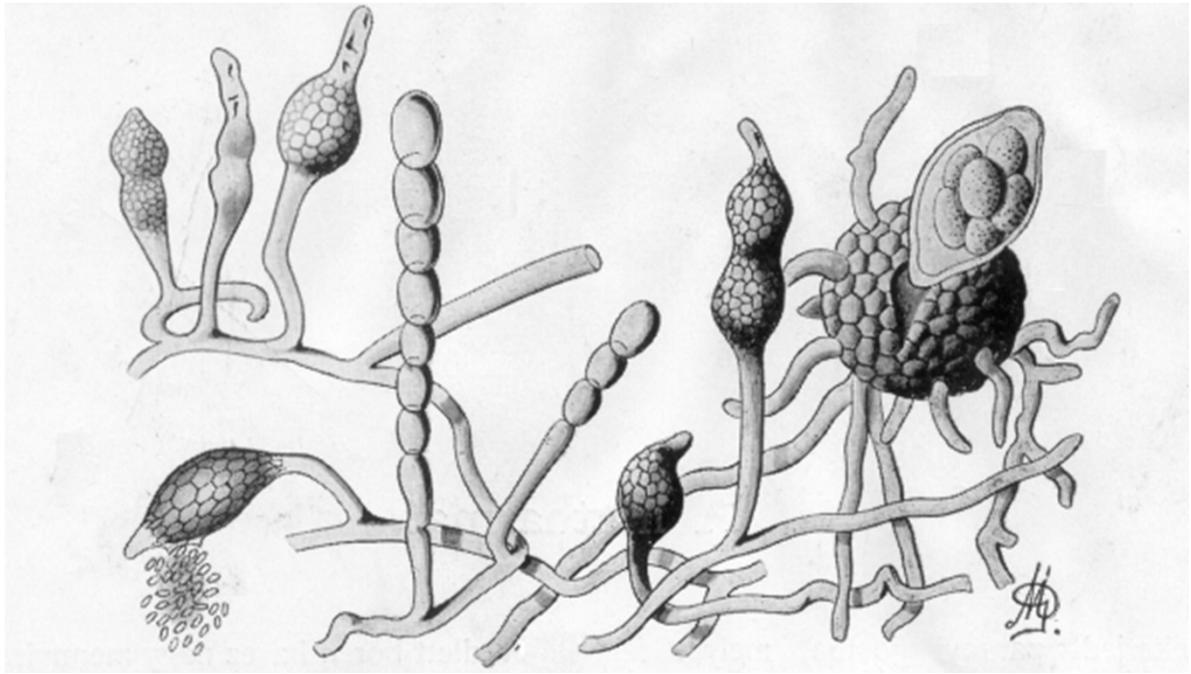
othecia

nation

symptoms on leaves, clusters, and shoots

Life cycle - *Ampelomyces*





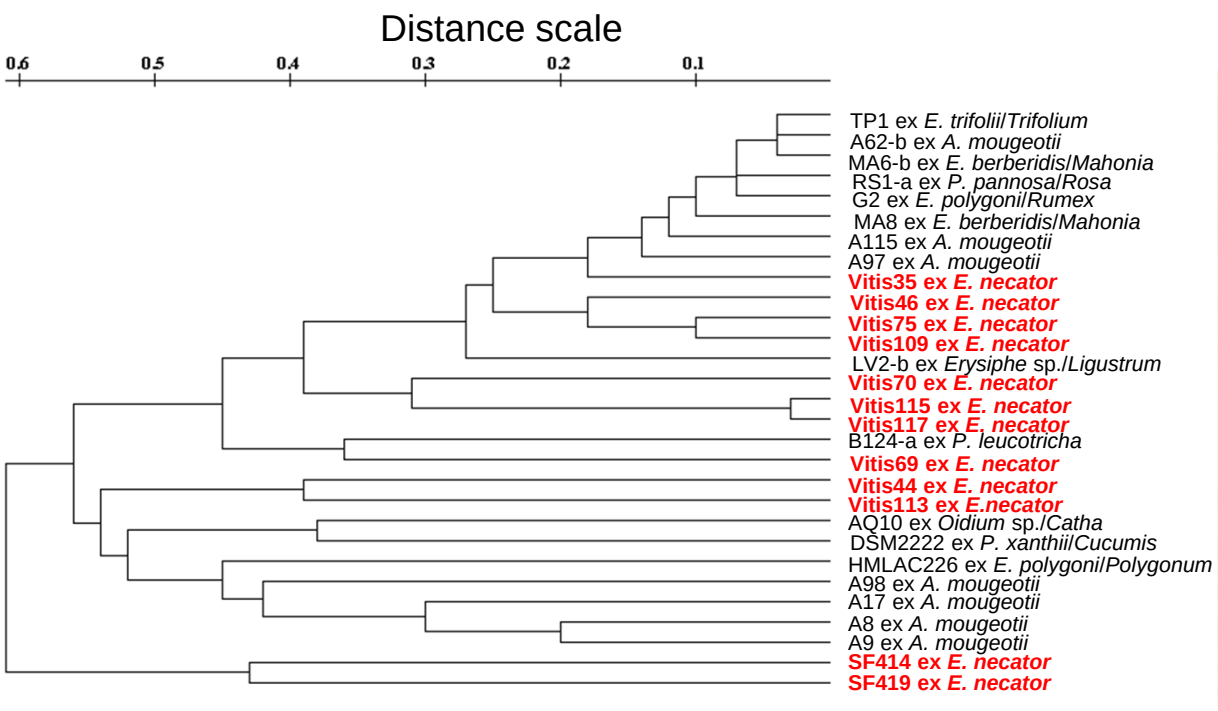
Drawing of Tulasne (IXX century)

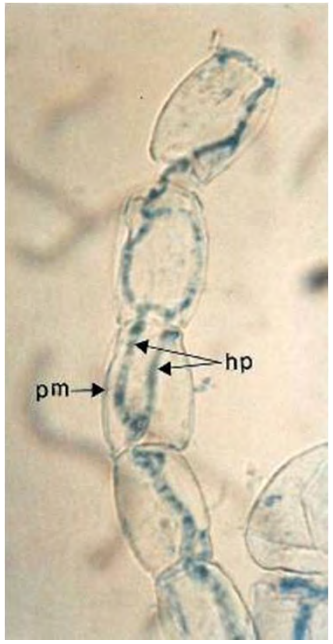
Life cycle - *Ampelomyces*

Ampelomyces spp. are widespread mycoparasites of all powdery mildew species worldwide and present a high genetic diversity.

No Indication of Strict Host Associations in a Widespread Mycoparasite: Grapevine Powdery Mildew (*Erysiphe necator*) is Attacked by Phylogenetically Diverse *Ampelomyces* Strains in the Field

Pintye et al., in press



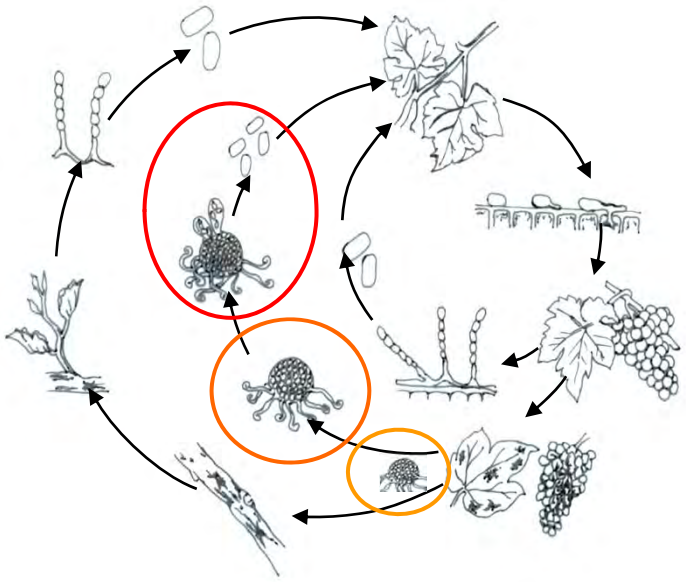


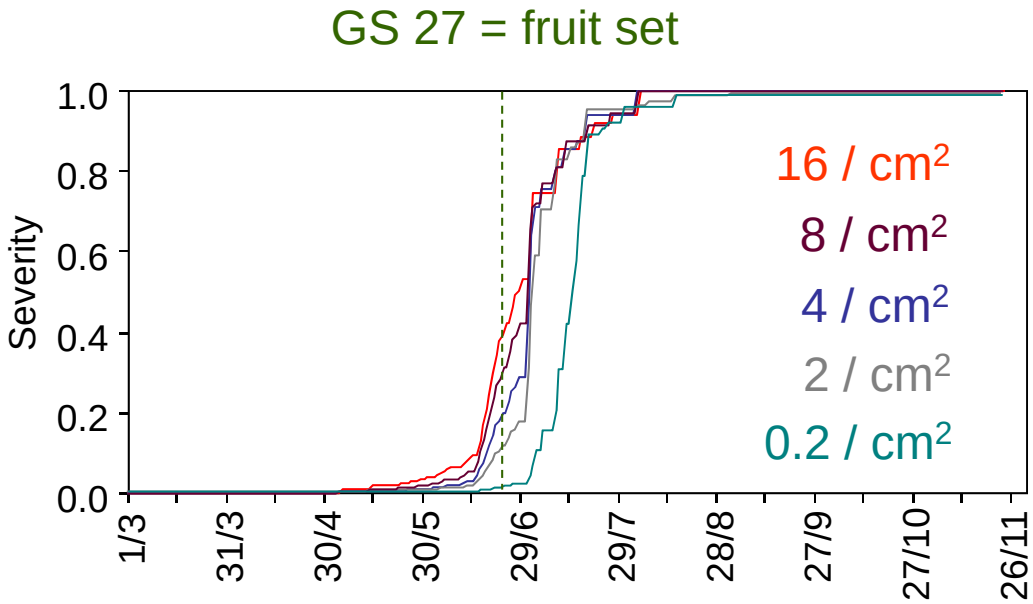
Some strains have already been developed as commercial biocontrol agents (BCAs); one BCA is registered in some EU countries for grapevine powdery mildew, the “AQ10 Biofungicide”.
Some literature exists on the effect of other strains …

Mycohost association

SANITATION, WHY?

- “epi-season” and legacy/heritage of chasmothecia (Magarey, 2010)
- severity at pea-size delayed and lowered (ontogenic res.; Gadoury et al., 2003)
- sanitation can delay the “disease explosion” (Carisse et al., 2010)





Aim of this study:

- Evaluate the efficacy of different plant protection products against the sexual stage of *E. necator*

APPLICATION OF PPP IN CONTROLLED CONDITIONS

APPLICATION OF PPP IN THE VINEYARD

Project funded by Emilia-Romagna Region and chemical companies (2007-2011)

APPLICATION OF PPP IN CONTROLLED CONDITIONS

Controlled conditions

Studies on the efficacy of:

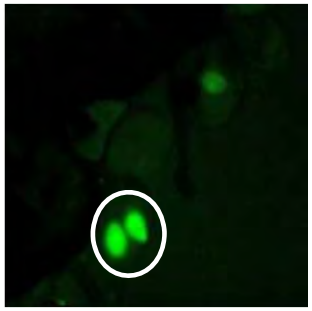
- chemical compounds
- natural products (sulphur and mineral oils)
- microbiological products (hyperparasitic fungus *Ampelomyces*)

in relation to:

- 2 application times:
  - i) first chasmothecium produced,
  - ii) first matured
- different temperature regimes

Efficacy:

- number of chasmothecia produced
- ascospores maturity
- ascospores viability



Controlled conditions

CHASMOTHECIA PRODUCED

Untreated

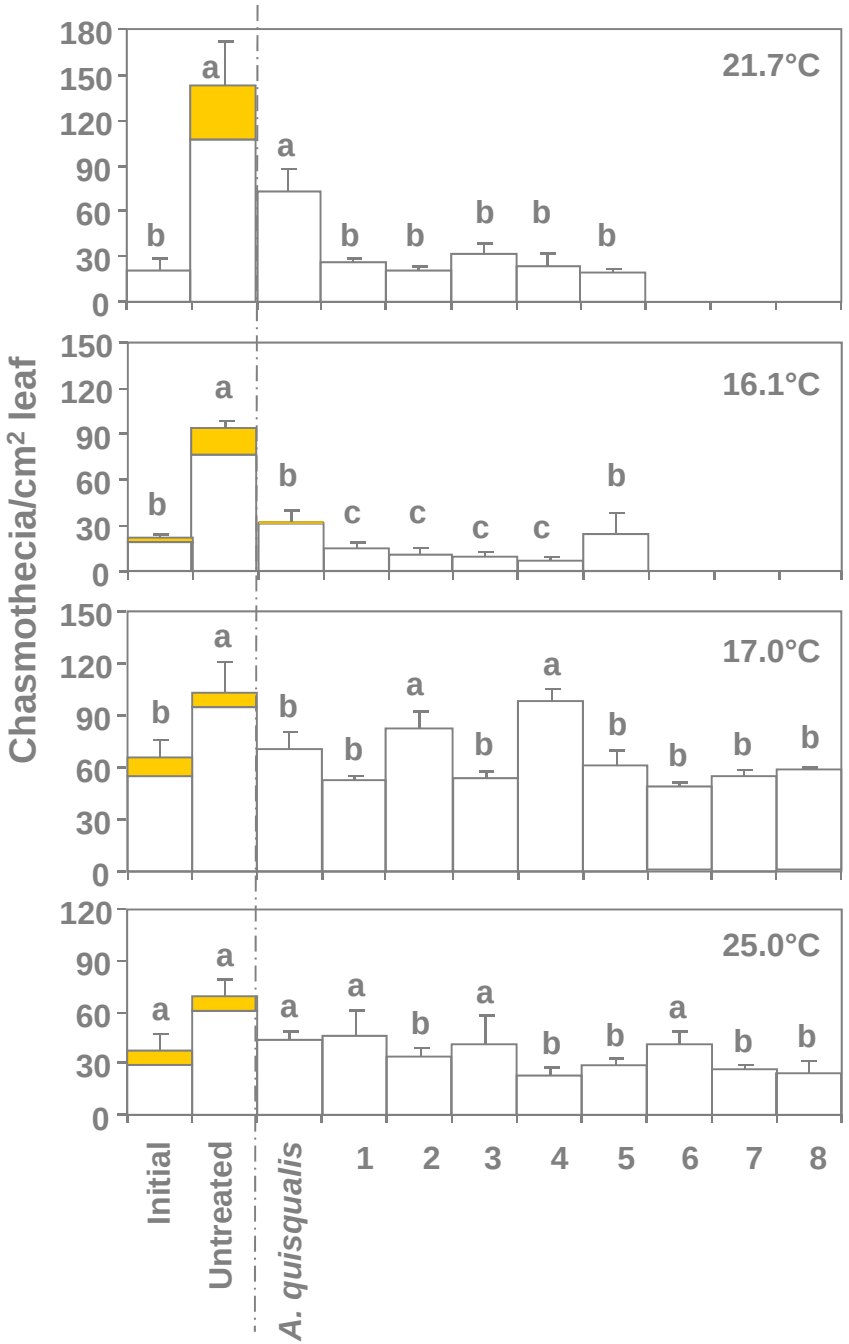
A. quisqualis (AQ10 Intrachem)

6 chemical compounds

1 mineral oil

Before application | After 3 weeks

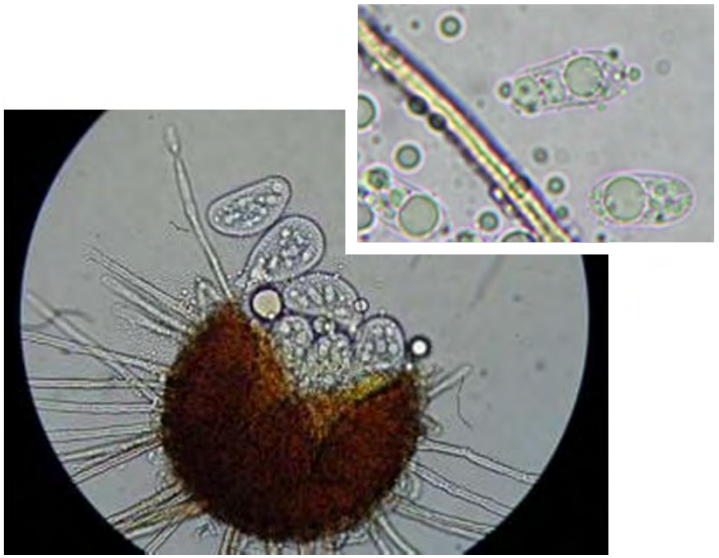
40% avarage efficacy with a max of 60%

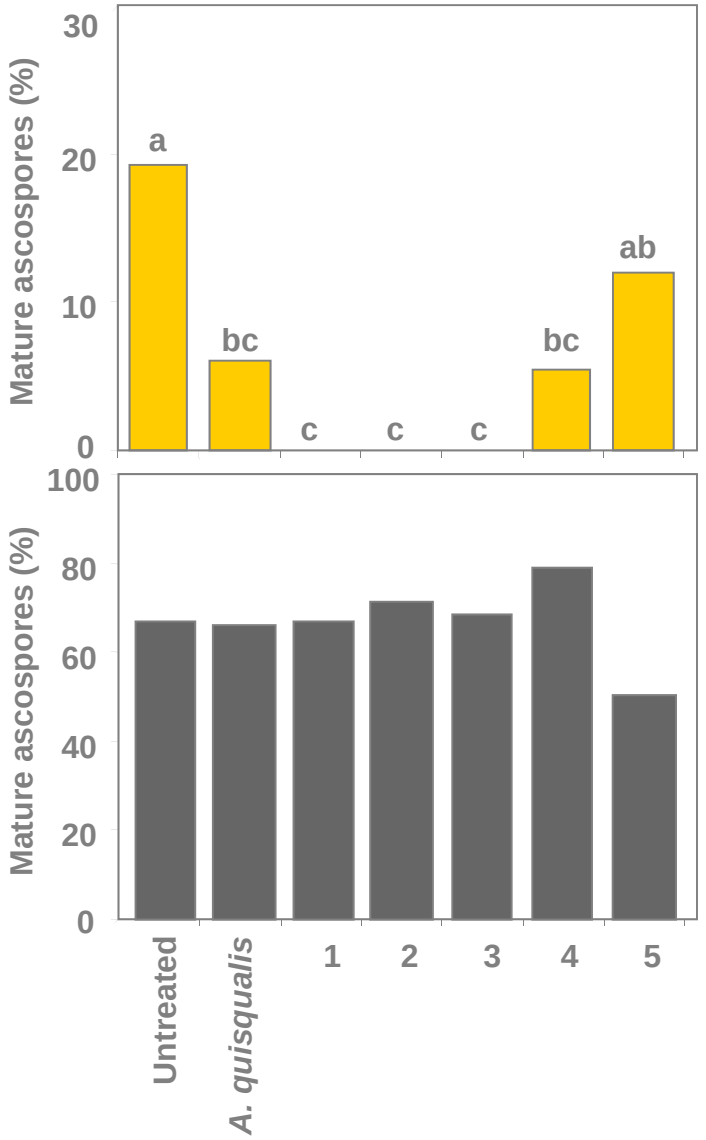


ASCOSPORES MATURITY

Controlled conditions

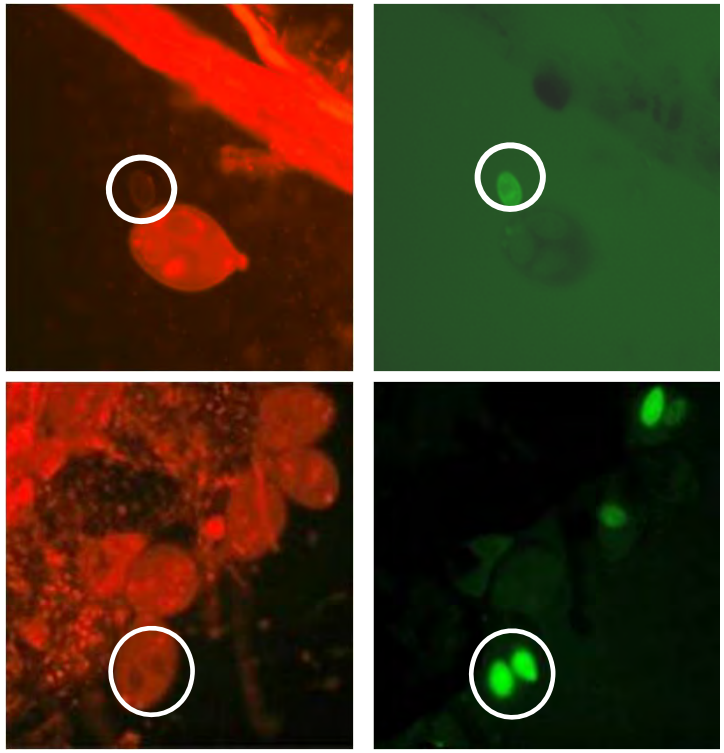
Ascospores morphologically mature within the treated cleistothecia





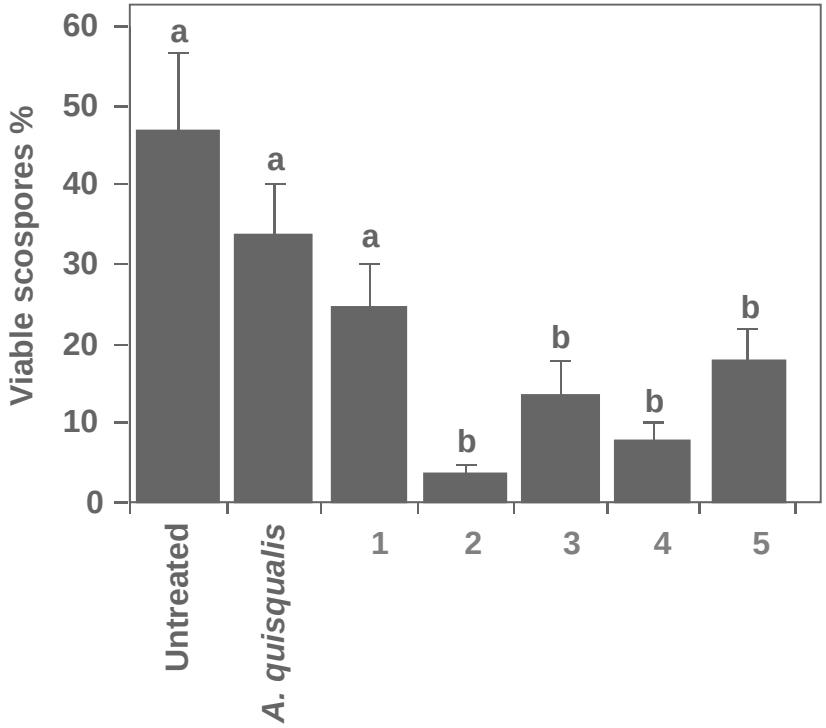
ASCOSPORES VIABILITY

Controlled conditions



Red fluorescence (PI, *Propidium Iodide*) dead ascospores

Green fluorescence (FDA, *Fluorescein DiAcetate*) viable ascospores



APPLICATION OF PPP IN THE VINEYARD

- 6 experimental trials (2007/08 and 2008/09): 2 traces of disease, 2 low disease severity (<30%) and 2 high disease severity (>30%);

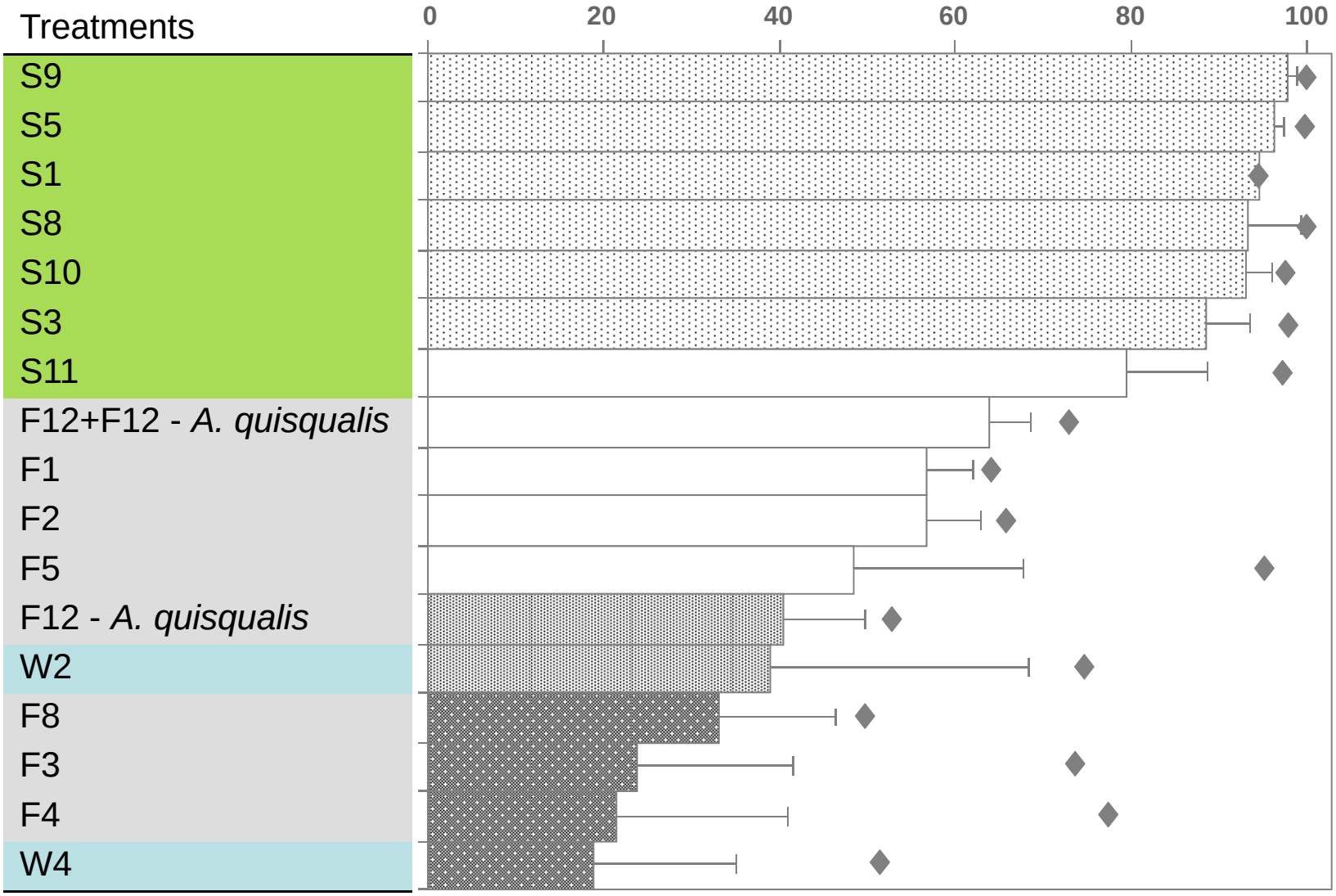
- Randomized block design (4 replicates):

- Untreated control
- Fall treatments: reduction of chasmothecia production
- Winter treatments: reduction of chasmothecia viability
- Spring treatments: reduction of ascosporic infections

Field trials

Field trials

Efficacy on bunches (%) at early berry development



→ Shift in powdery mildew epidemics confirmed

APPLICATION OF PPP IN THE VINEYARD - STRATEGY

- 5 experimental trials (2009/10 and 2010/11): 1 traces of disease, 3 low disease severity (<30%) and 1 high disease severity (>30%);

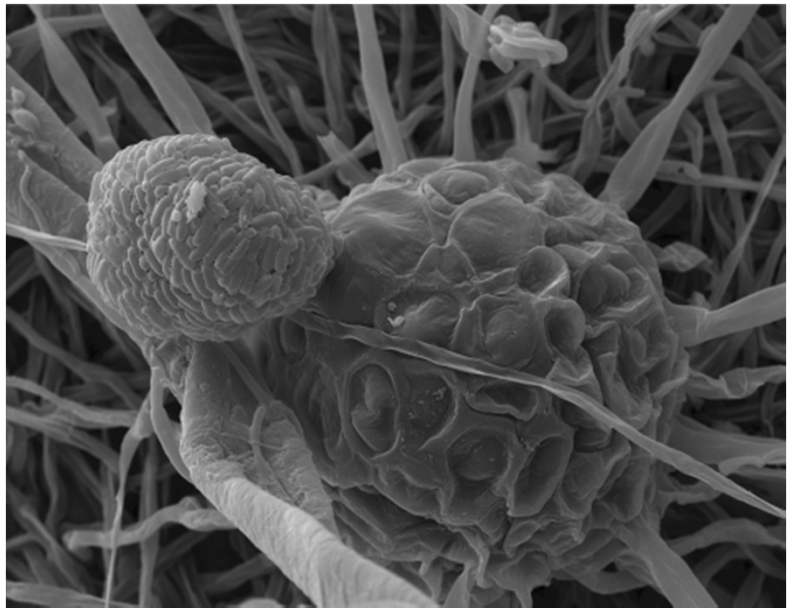
Strategy	Fall (2 applications)	Winter (1 application)	Spring (2-5 applications)
1	AQ10 pre + post	-	Sulphur
2	Chemicals	Chemicals	Chemicals
Untreated	-	-	-

Disease severity (%) on bunches at early berry development

Strategy	Conventello 2009/10	Castel S. Pietro 2009/10	Conventello 2010/11	Castel S. Pietro 2010/11
1	0.04 b	4.0 b	0.00 b	0.03 b
2	0.01 b	0.7 b	0.00 b	0.00 b
Untreated	1.49 a	50.9 a	3.80 a	4.33 a

SANITATION

- Sanitation reduces the dose of overwintering chasmothecia;
- Potential for reducing the number of treatments in early season or using Sulfur effectively
- Possible reduction of pre-bloom bud infection (=> reduction of flag shoots next year)
- Contribution to resistance management (e.g., DMI is maintened in overwintering ascospores, Gubler et al., 1996)



THANK YOU FOR YOUR ATTENTION