

# Selecting a good wound colonizer for life cycle protection of grapevine against *Phaeoacremonium aleophilum* and *Phaeomoniella chlamydospora*

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# ESCA DISEASE IN GRAPEVINE

- Complex disease, no evidence for a single pathogen
- 2 pathogens responsible for vascular disorder related to Esca disease: *Phaeomoniella chlamydospora* (Pch), *Phaeoacremonium aleophilum* (Pal)
- Increasing problem in Europe: increase in affected vineyards over the last 10 years
- No chemical solutions available
- Ways of infection:
  - Pal and Pch produce conidia from early in the season to late summer
  - Conidia are spread via the air (wind, rain)
  - Wounds can be colonized by Pal and Pch
  - Pal and Pch grow in vascular tissue



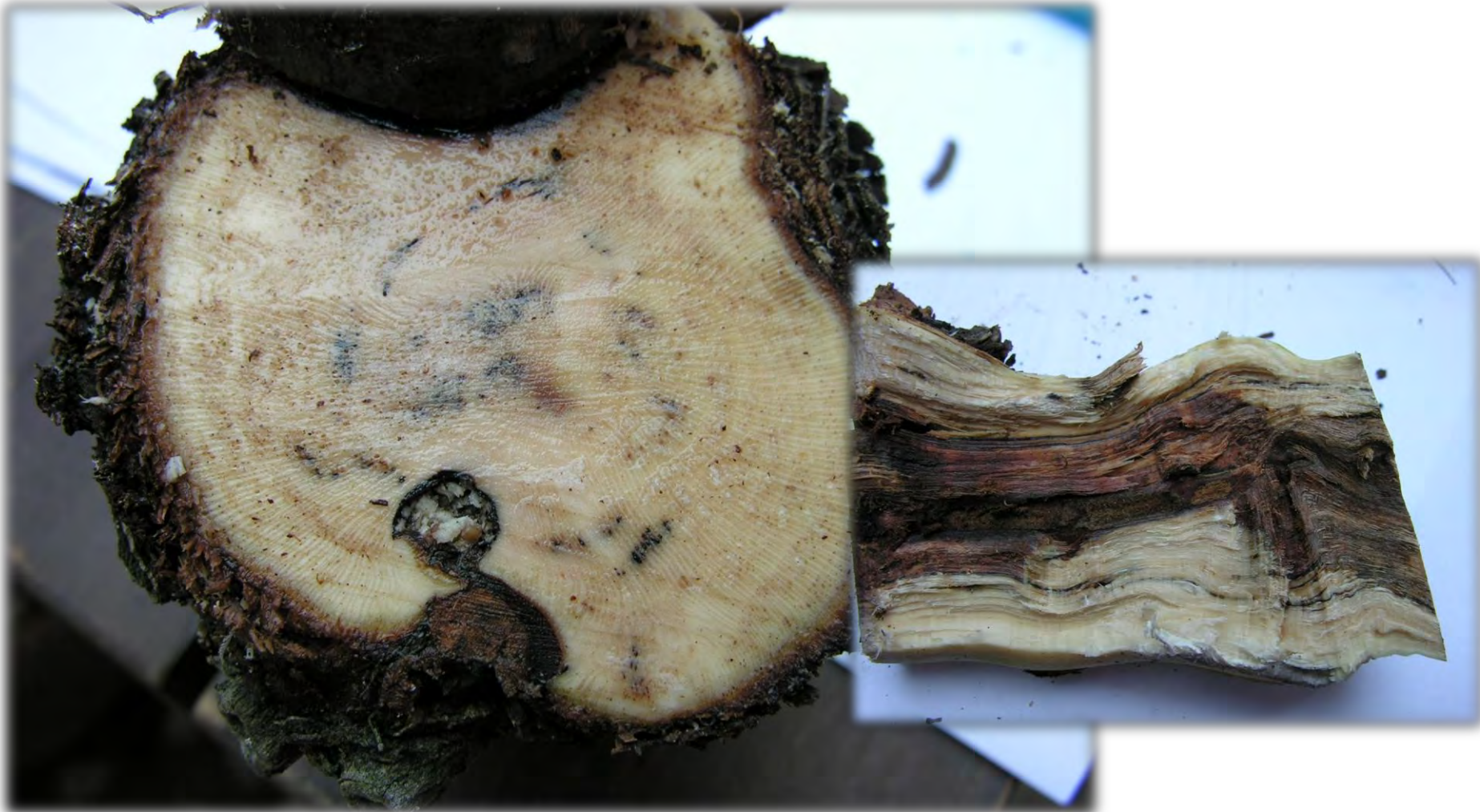


# ESCA DISEASE IN GRAPEVINE





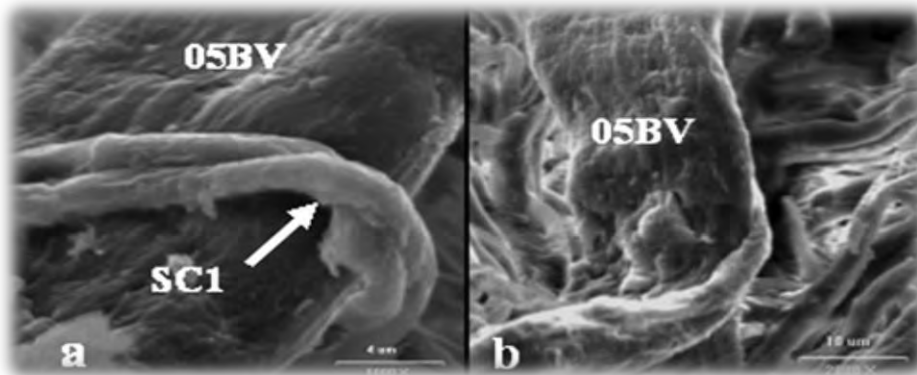
# ESCA DISEASE IN GRAPEVINE





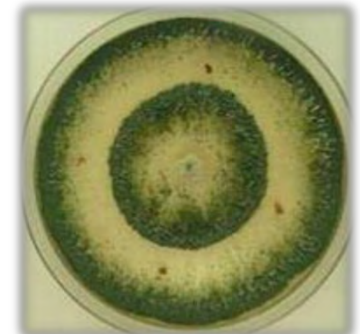
# *T. ATROVIRIDE* SC1 IS A GOOD WOUND COLONIZER

- Fungus isolated from decaying hazelnut wood in Northern Italy
- Selected based on excellent wood colonizing properties
- Antagonist of Pal and Pch:
  - competition for space and nutrients
  - production of lytic enzymes degrade pathogen mycelium and spores
  - mycoparasite

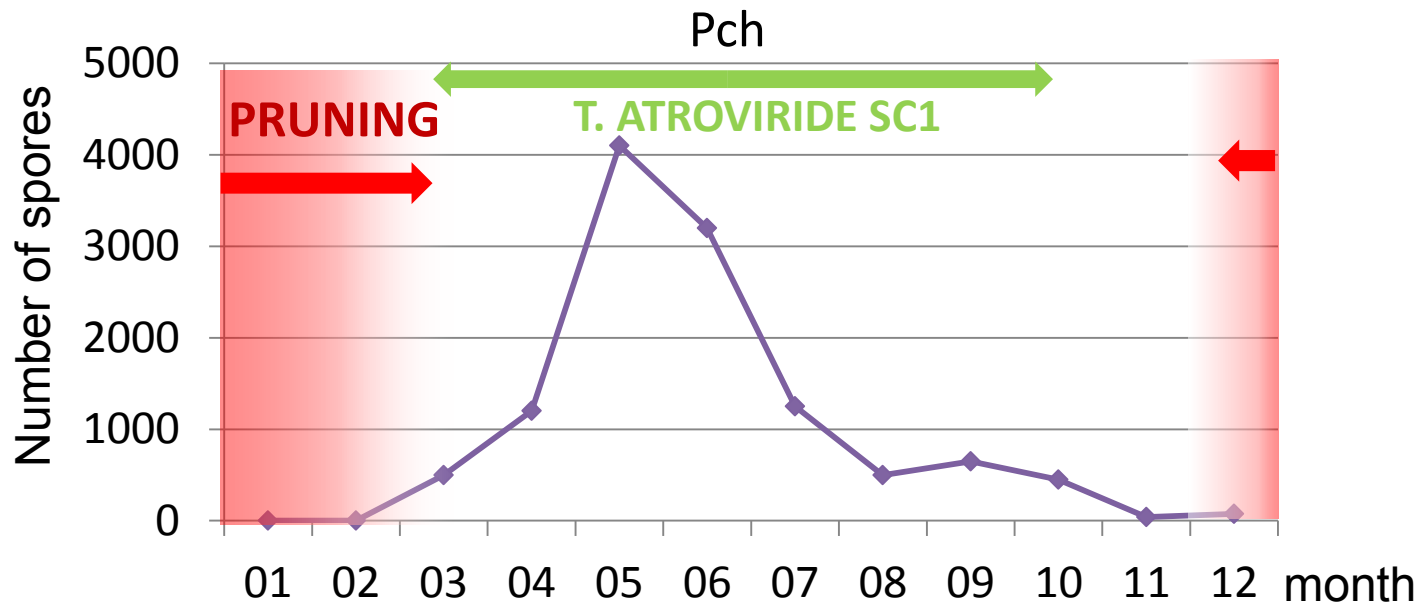
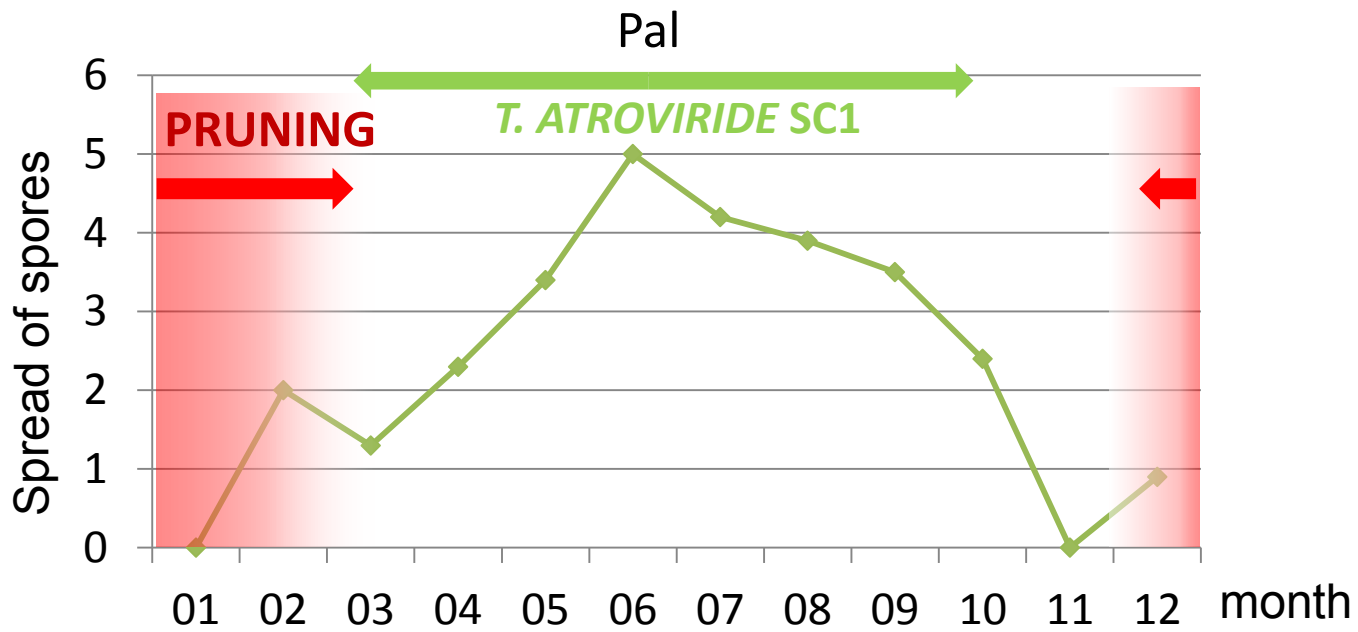


*T. atroviride* SC1  
around *Armillaria  
mellea* 05BV hypha

Untreated  
hypha



*T. atroviride* SC1

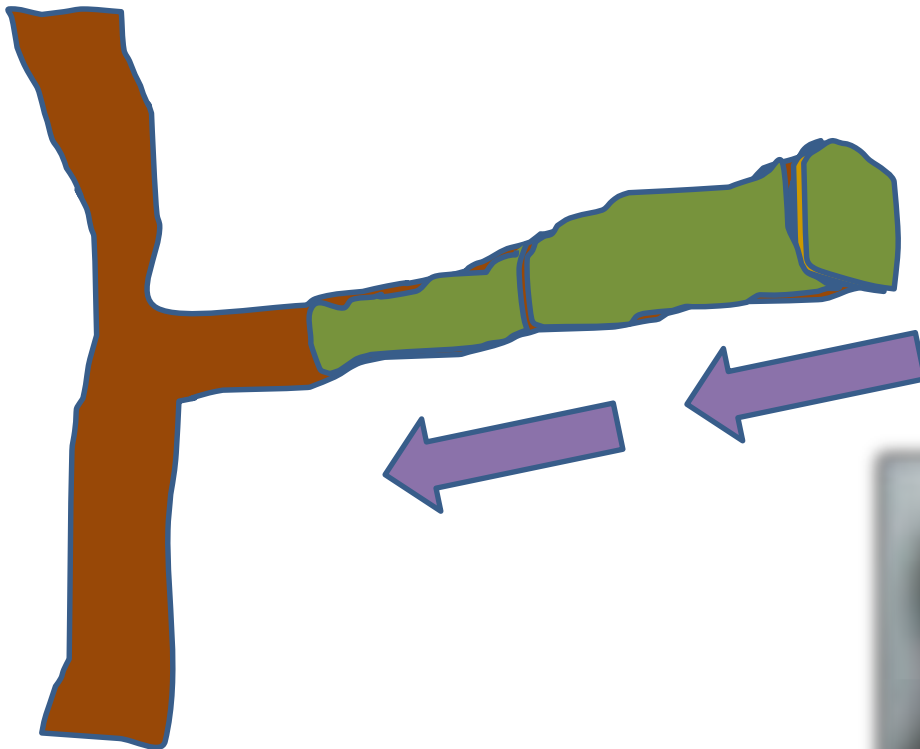


Pal spore pressure in Puglia (2007) and Pch spore pressure in Umbria (2010),  
modified from Frisullo S. *et al.* (2010)



## WAY OF APPLICATION

- Application: by spraying *T. atroviride* conidia on wound
- Applied on wounds after pruning when risk of pathogen infection is high



Treated



Untreated



# EFFICACY TRIALS

- Artificial inoculation of pathogen(s) after application

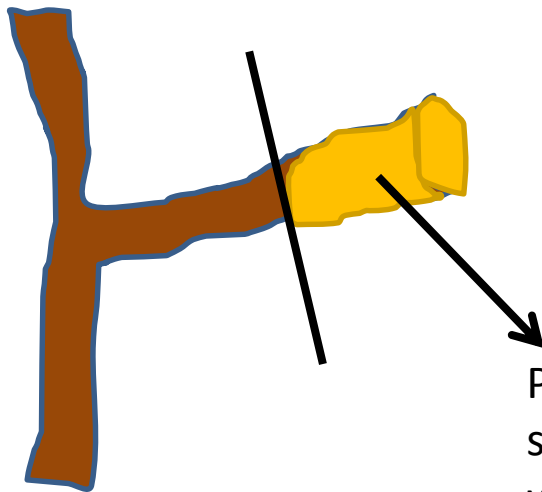
Objects	Application <i>T. atroviride</i> <i>SC1</i>	Inoculation with Pal	Inoculation with Pch
Untreated inoculated Pal	-	x	-
Untreated inoculated Pch	-	-	x
Treated inoculated Pal	x	x	-
Treated inoculated Pch	x	-	x



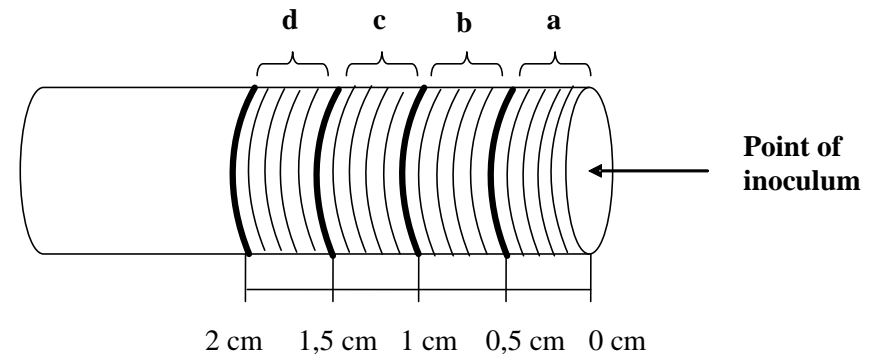


# METHODOLOGY

- Sampling of wood stalks 5-7 months after application
- Microbiological analysis of wood stalk at 5 different distances from pruning wound
- Check for *T. atroviride* SC1, Pal and Pch (PCR-analysis, morphological determination)



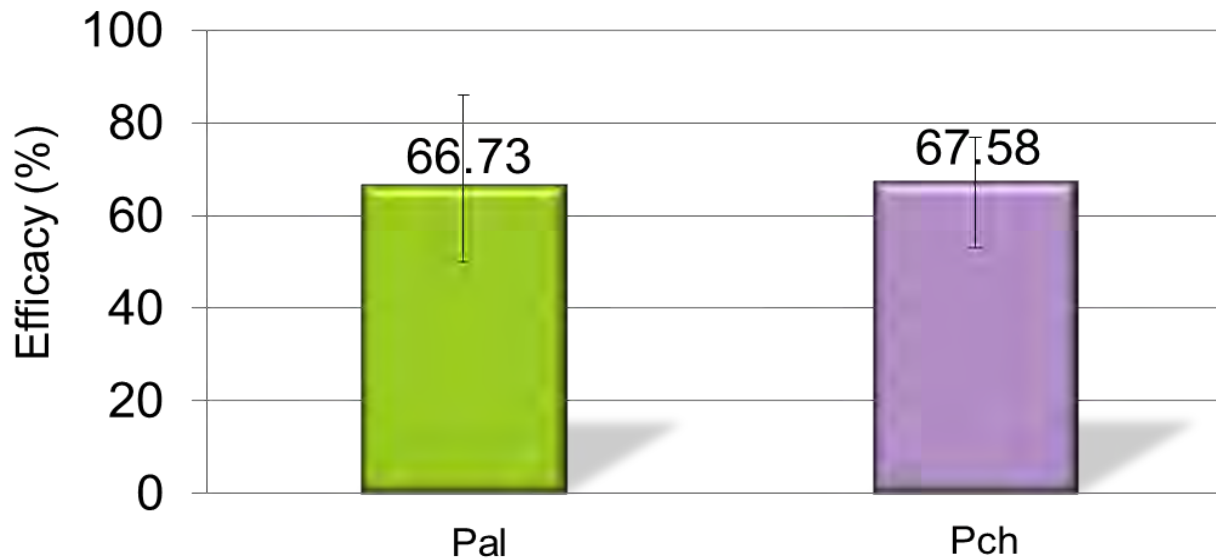
Piece of wood of 2 cm,  
starting at pruning  
wound, is cut





# RESULTS

*T. atroviride* SC1 is able to establish stable populations in pruning wounds ensuring efficient protection against Pal and Pch

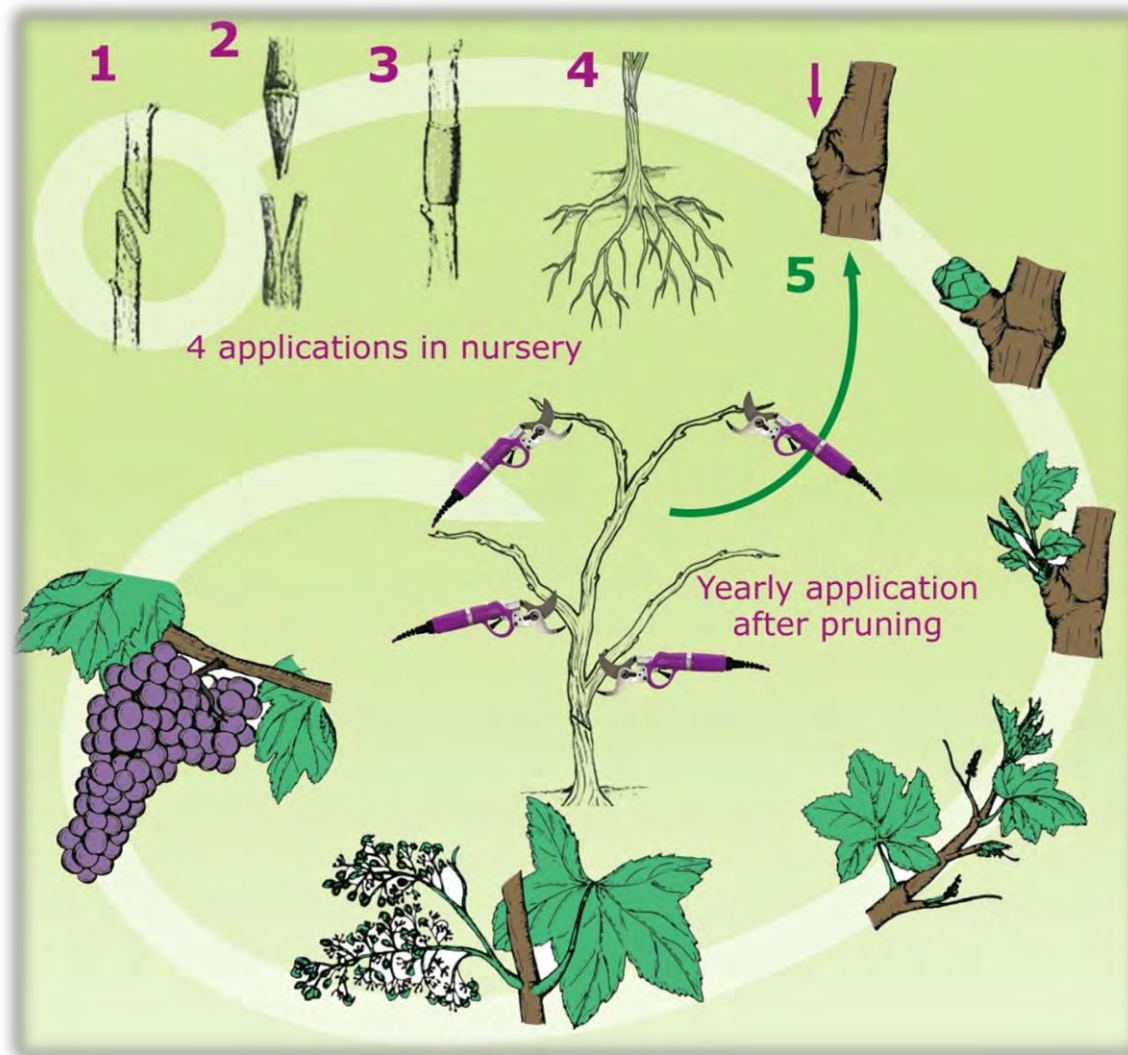


Bars indicate minimum and maximum levels  
Mean incidence on inoculated control:  
39.62 % (Pal) 46.80 % (Pch)

**Summary of 6 trials set up between 2009-2012 (Italy, Germany, France, Spain)**



# LIFE CYCLE PROTECTION



# THANK YOU FOR YOUR ATTENTION



Bi-PA in collaboration with Belchim Crop Protection



**BELCHIM**  
—Crop Protection—