

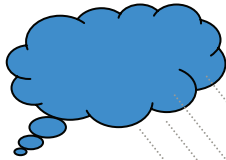


Bologna Potato Workshop May 2-5 2007

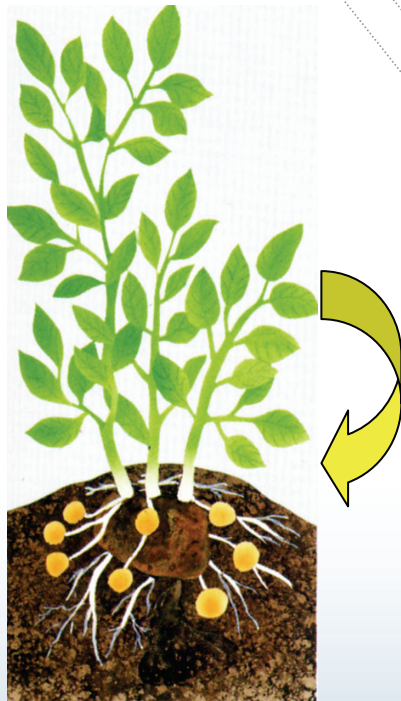
Tuber blight control: effect of foliar applied fungicides such as Infinito on viability of sporangia of *Phytophthora infestans*

Dr. Latorse, M.P., Jarry F., Mercier V., Veloso S.

How to Control Tuber Blight ?



1) Reduction of sporulation



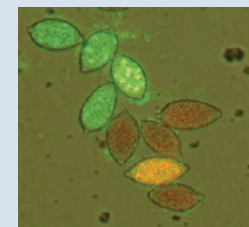
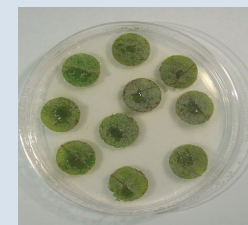
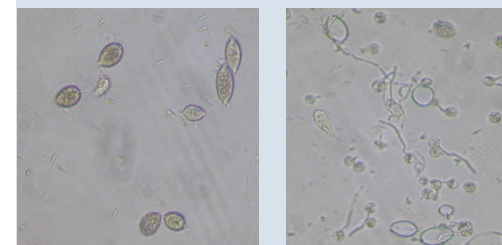
2) Spores + product are washed off together:
direct sporicide effect

3) Newly formed sporangia are
affected in their viability :
inoculum less infectious



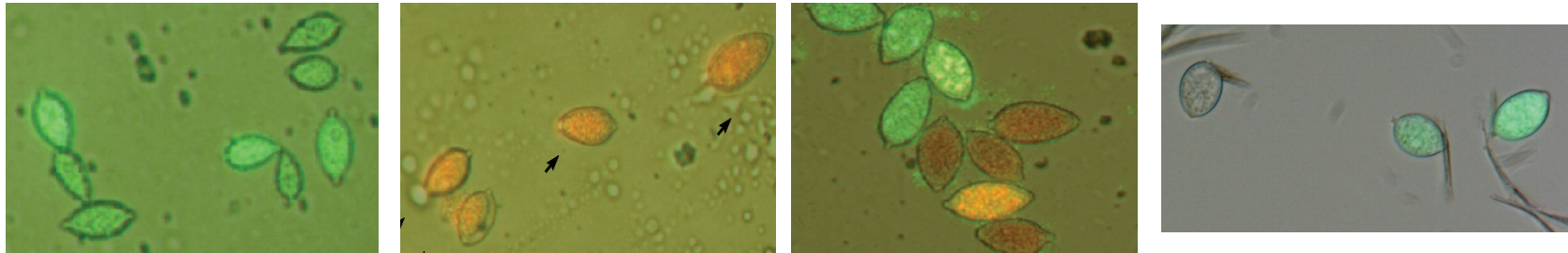
Methods for Viability Evaluation

- *In vitro* sporangia germination test in aqueous media
- *On planta* sporangia infectivity test on foliar discs or tuber slices
- Sporangia viability (vital staining)



A rapid Live/dead viability test using fluorescent fluorochromes developed / validated

Live/ dead Viability Test Comparison



FDA fluoresces bright green in viable spores / PI fluoresces red-orange in non viable spores under blue light

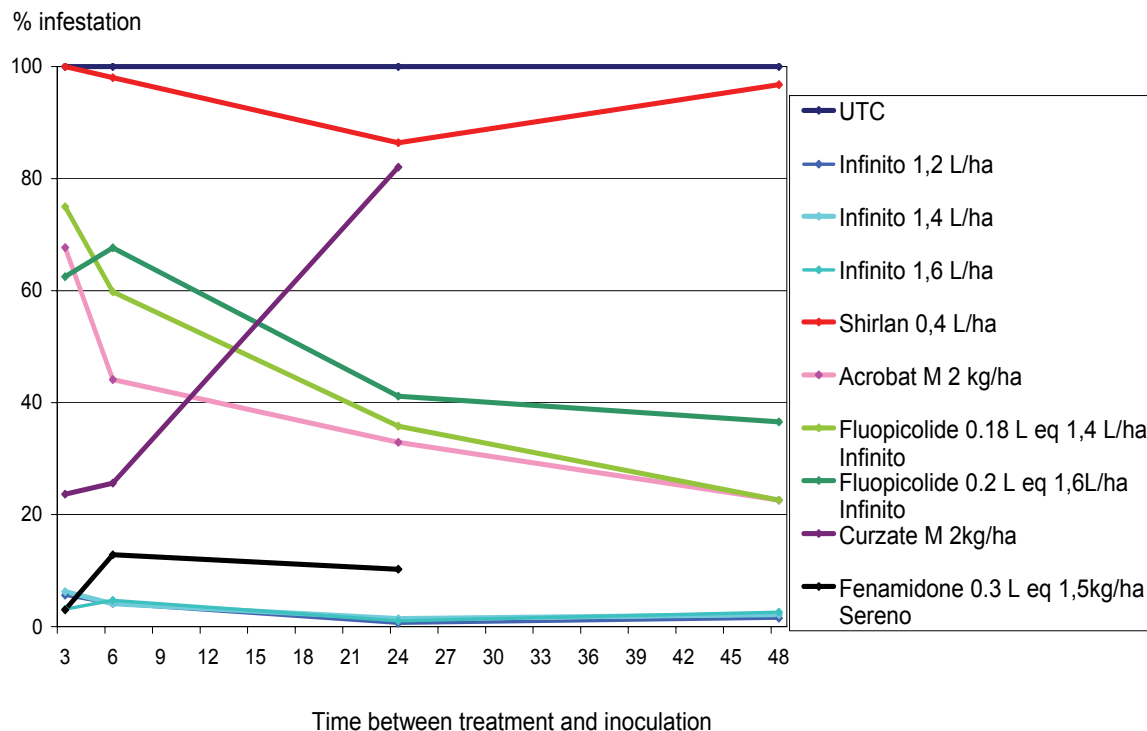
Advantage / disadvantage using FDA alone or in mixture Kit (FDA/PI)

- Live /dead viability Kit formulation stable for observation all day long
// FDA alone
- PI is a potential mutagen: handle with appropriate caution



**No significant differences detected between FDA alone and Kit (FDA+PI)
Ratio Alive/dead sporangia depends on time of sporangia harvest in relation to
beginning of sporulation and also links to the ability of products to reduce sporulation**

Translaminar Activity (% infestation)



Strong translaminar activity of Infinito

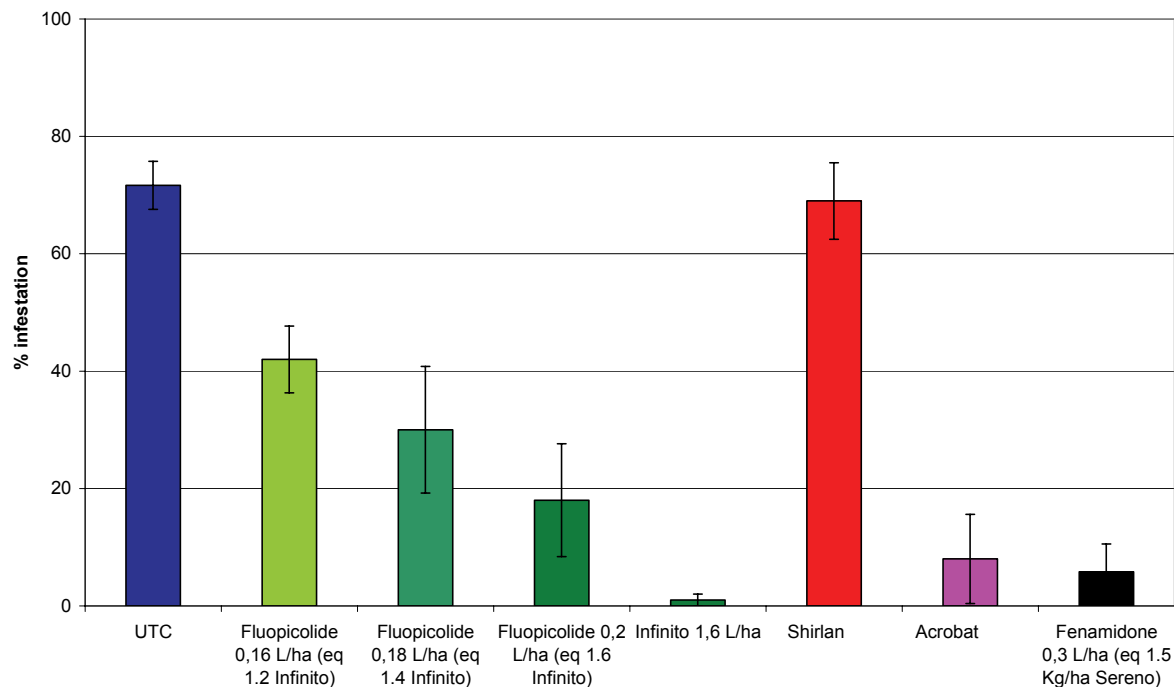
Good translaminar effect of fluopicolide and dimethomorph with kinetic response

Rapid penetration of fenamidone

Quick penetration cymoxanil but short persistence due to quick metabolism

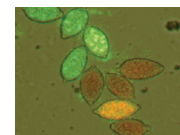
Translaminar Activity (% infestation)

Translaminar effect of fungicides with 24 h interval between preventive treatment and inoculation

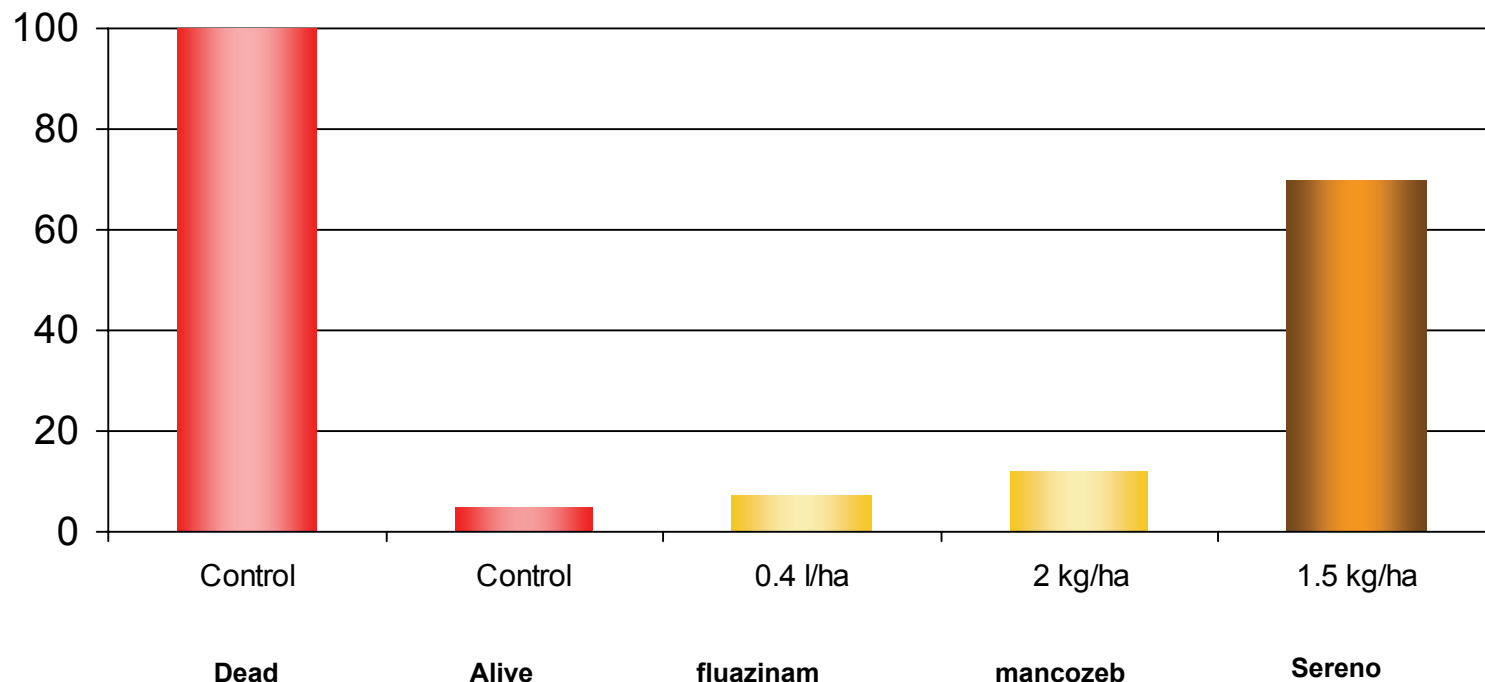


▶ Fluopicolide translaminar activity with clear dose response
Infinito strong translaminar profile within 24 hours after treatment
Sporangia for secondary infection could not be harvested for Infinito

Sporangia Viability by Vital Staining



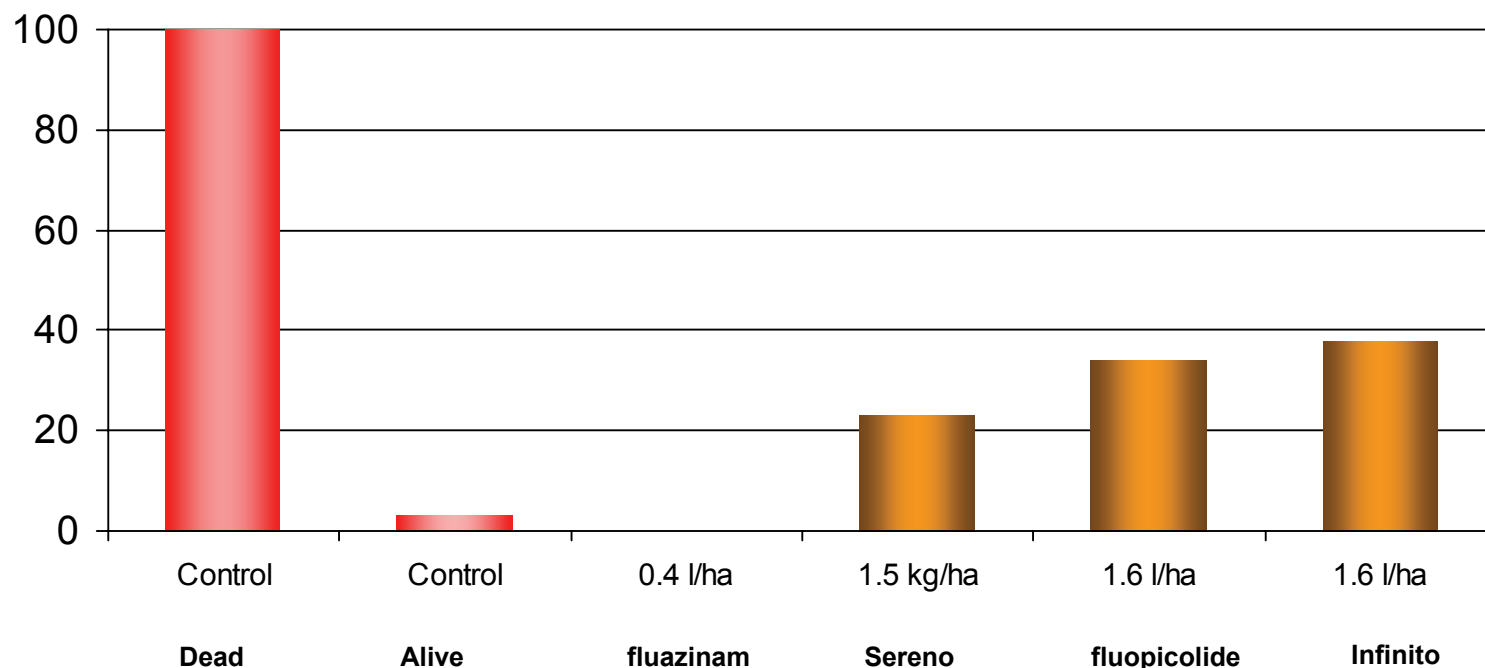
Dead sporangia (%) by viable staining 7 days after inoculation (48h, preventative)



Contact fungicides do not influence the viability of newly formed sporangia
Translaminar product such as fenamidone reduces viability of newly formed sporangia

Sporangia Viability by Vital Staining

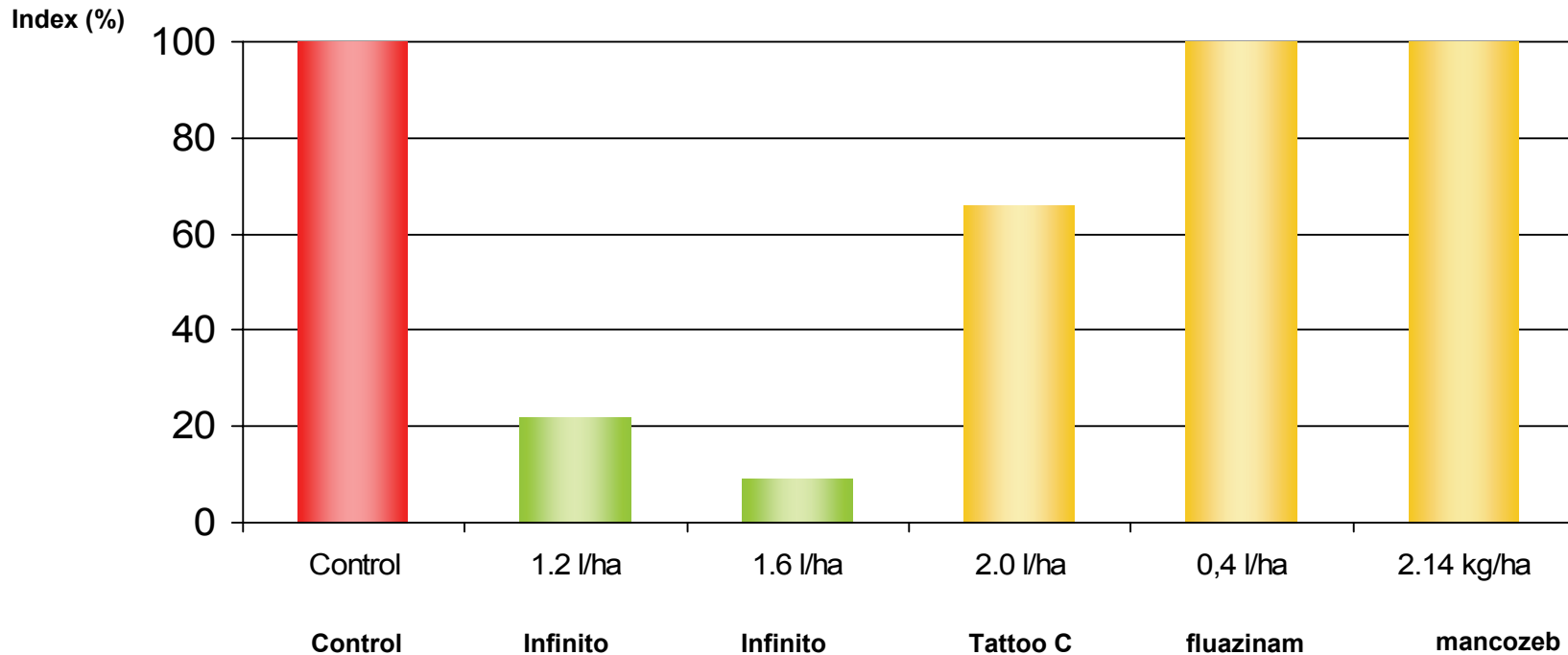
Dead sporangia (%) by viable staining 7 days after inoculation (48h, curative)



▶ Reduction of viability by translaminar fungicides at curative application lower compared to preventative
Infinito provided significant reduction of spore viability

Anti-sporulant Activity :

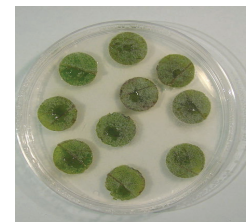
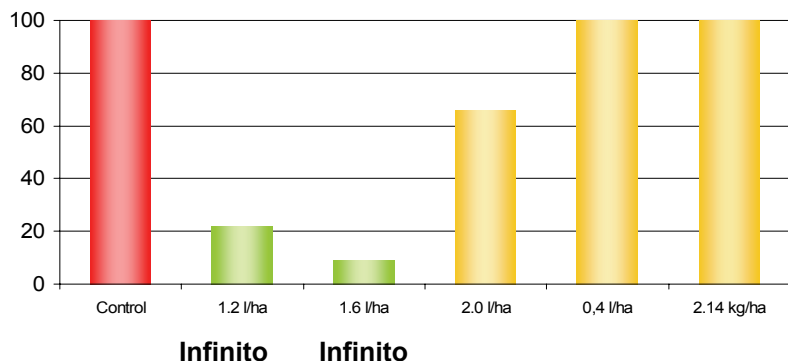
Sporulation index relative to untreated after curative application



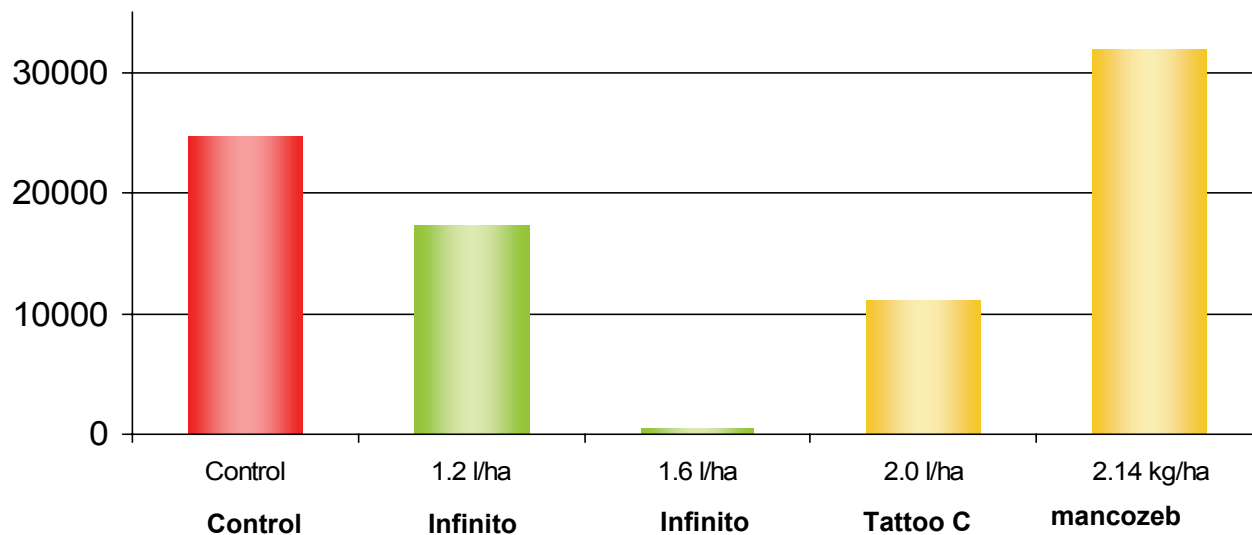
▶ Infinito has strong anti-sporulant properties

Infectivity Test (sporangia production)

Anti-sporulant effect

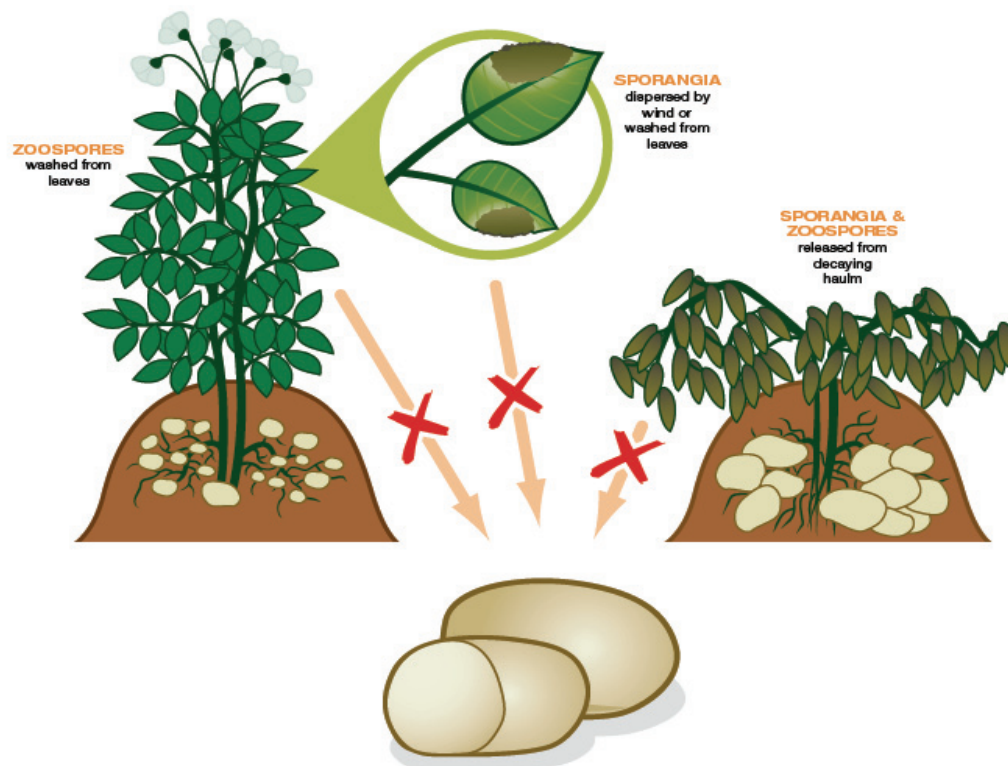


Infectivity newly formed sporangia (spores / ml)



▶ **Infinito reduces the infectivity of newly formed sporangia, coming from the reduction of sporangia both number and viability**

How to Control Tuber blight



Spore quantity

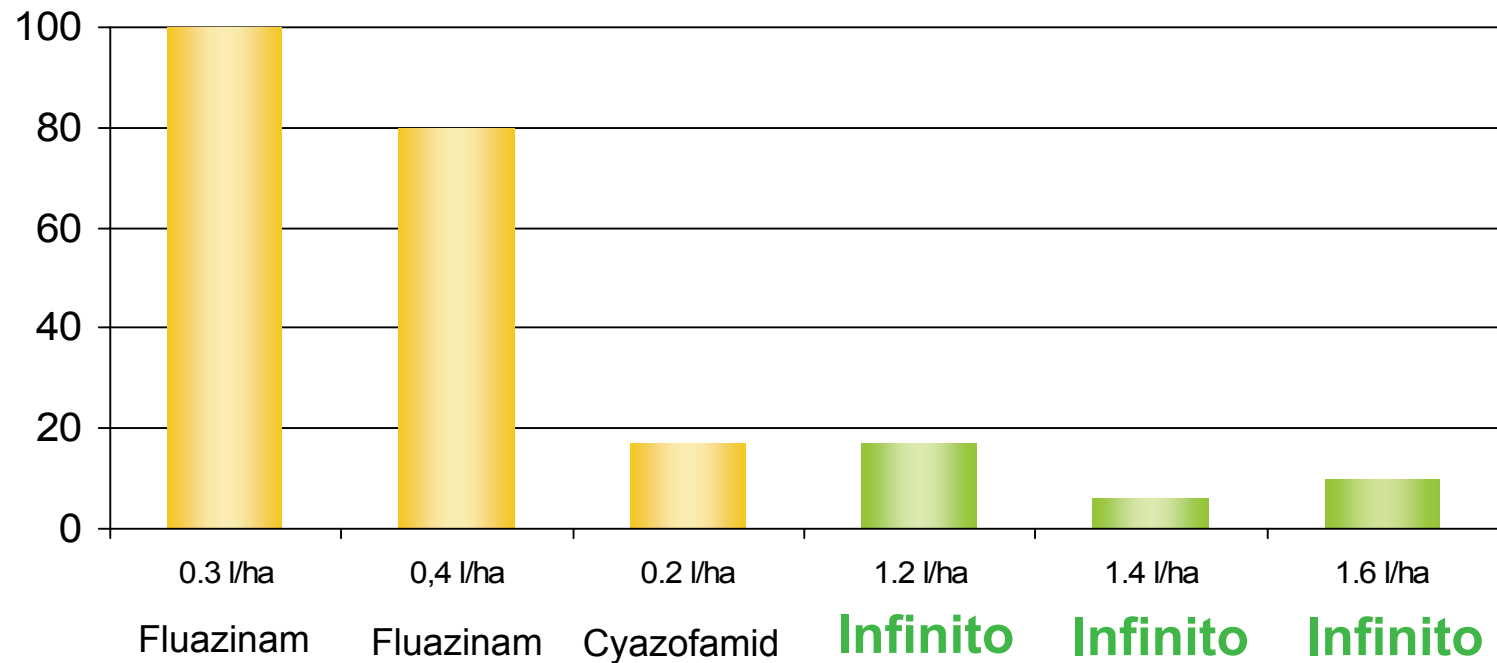
Sporicide effect

Spore viability

Tuber blight control of Infinito based on multiple action

Tuber Blight Control NL

Relative tuber blight infection (%)



(relative % diseased tubers, average of 2 trials BCS Netherlands 2006)

- ◆ The live/dead viability kit (FDA & PI) validated as a rapid indicator of *Phytophthora* sporangia viability
- ◆ Translaminar fungicides have potential to reduce sporulation according to their kinetics of penetration, bio availability and fungicidal properties
- ◆ Infinito was confirmed as a strong translaminar and anti-sporulant fungicide
- ◆ Infinito has a multiple action:
 - strong sporicide effect
 - reduction of sporulation
 - reduction of viability and infection success of sporangia
- ◆ The properties of fungicides on apparent infection rates should be considered for incorporation into DSS to optimise late blight / tuber blight control



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Thank you very much for your kind attention