

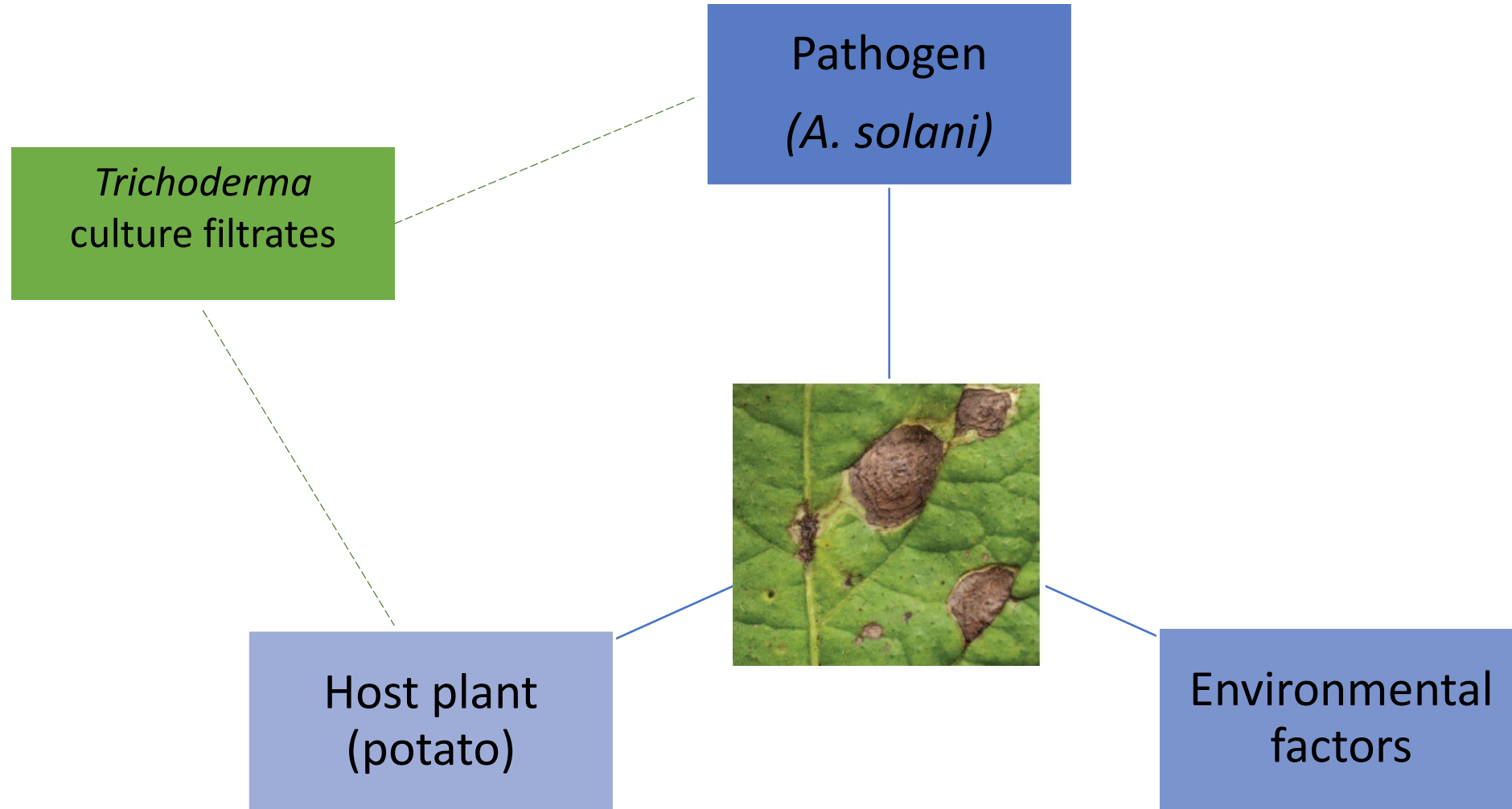
Trichoderma culture filtrates as biological control agent against
Alternaria solani on potatoes

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Patho-system



Trichoderma spp.

- Soil-borne fungus
- Widely researched as biological control agent/ antagonist
- Works in several mode of action
- Mostly living fungus or purified secondary metabolites

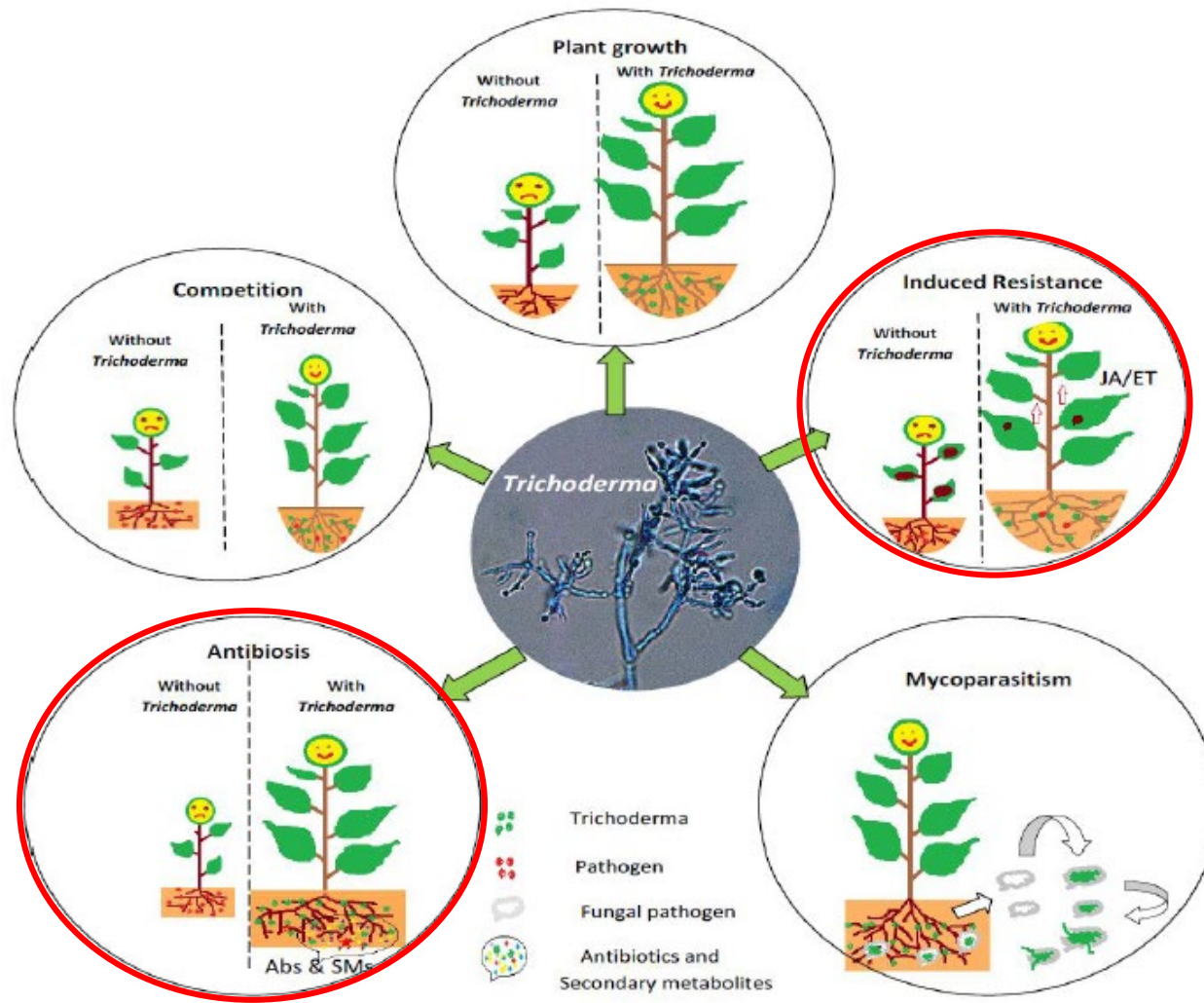
BUT:

- growing fungus with plates or purification of metabolites labor intensive
- Living fungus at risk of becoming pathogenic

→ Sterilized liquid cultures as possible solution (culture filtrates)



Trichoderma spp. – Mode of action



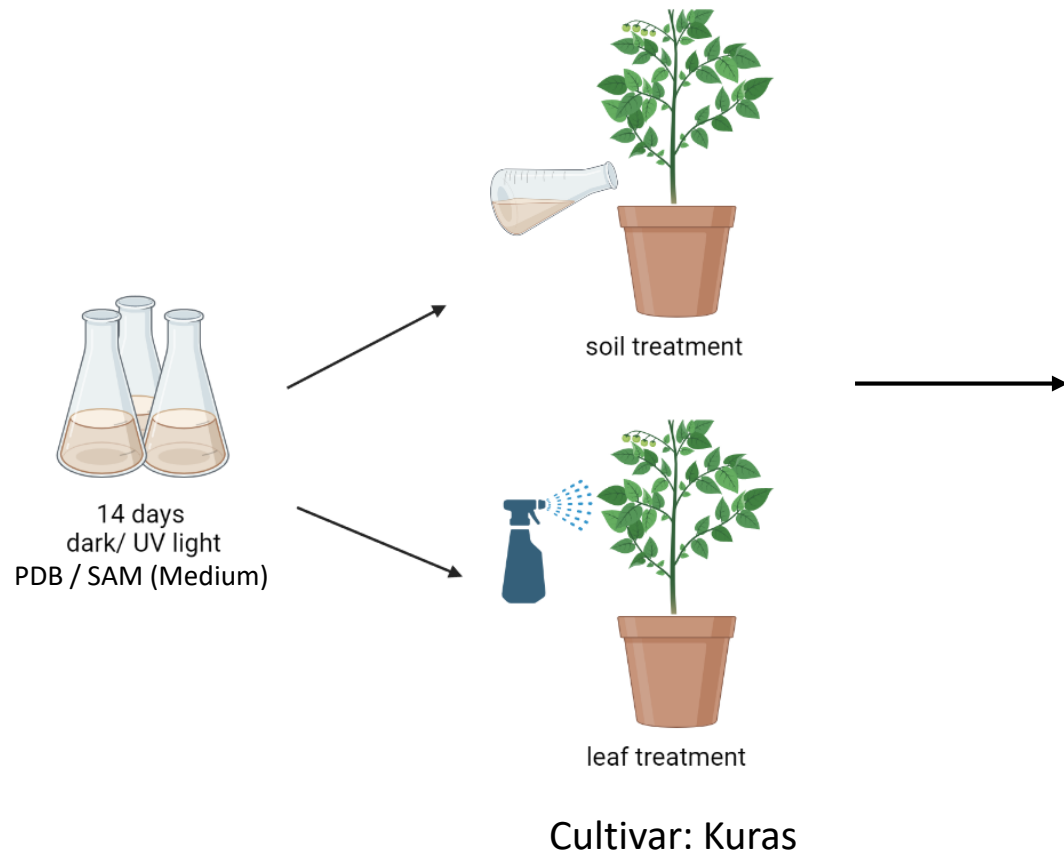
Singh et al. (2018), International Journal of Current Microbiology and Applied Sciences

Objectives



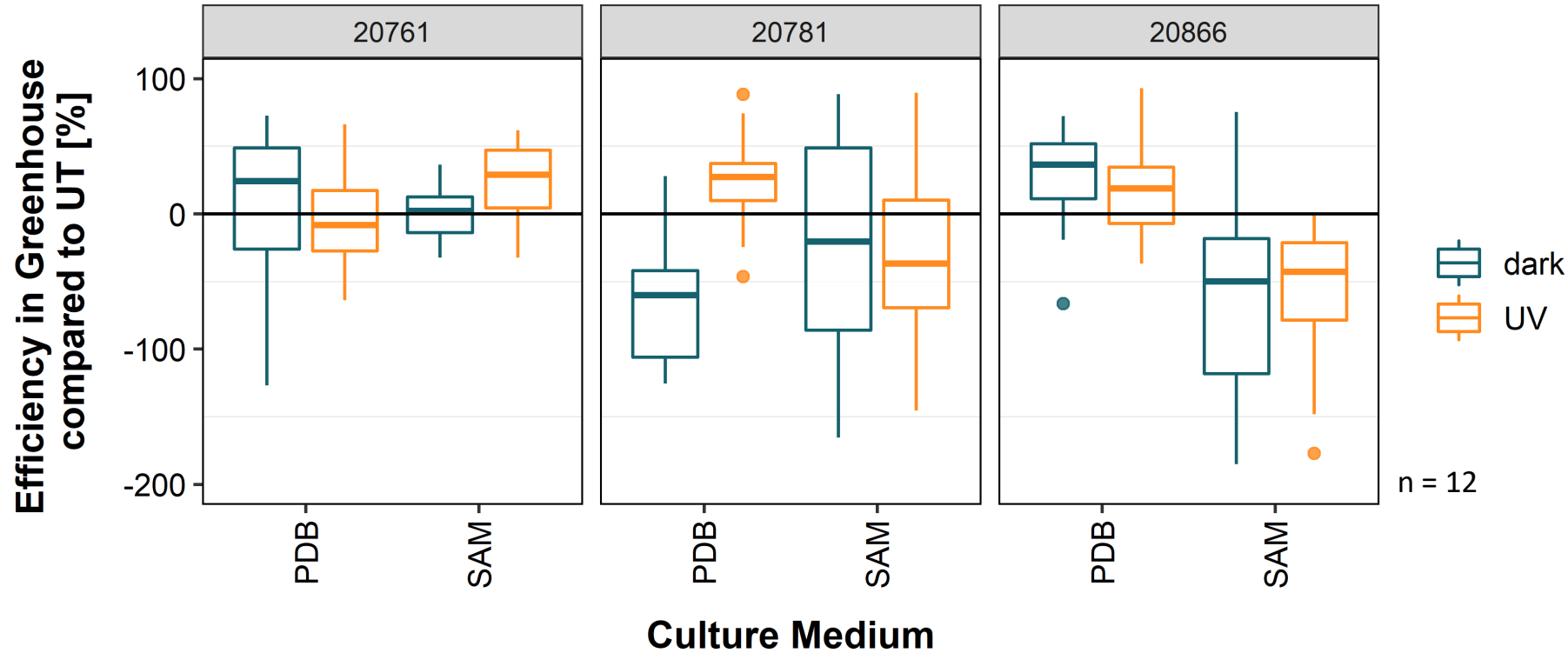
- Differences between *A. solani* isolates
- Efficiency of different *Trichoderma* species and isolates
- Growth conditions of the liquid cultures
- Application timing and methods variable

Greenhouse Trials



Disease assessment
after 7 days

Culture Growth Conditions



20761 *T. harzianum*
20781 *T. atroviride*
20866 *T. asperellum*

Leaf application

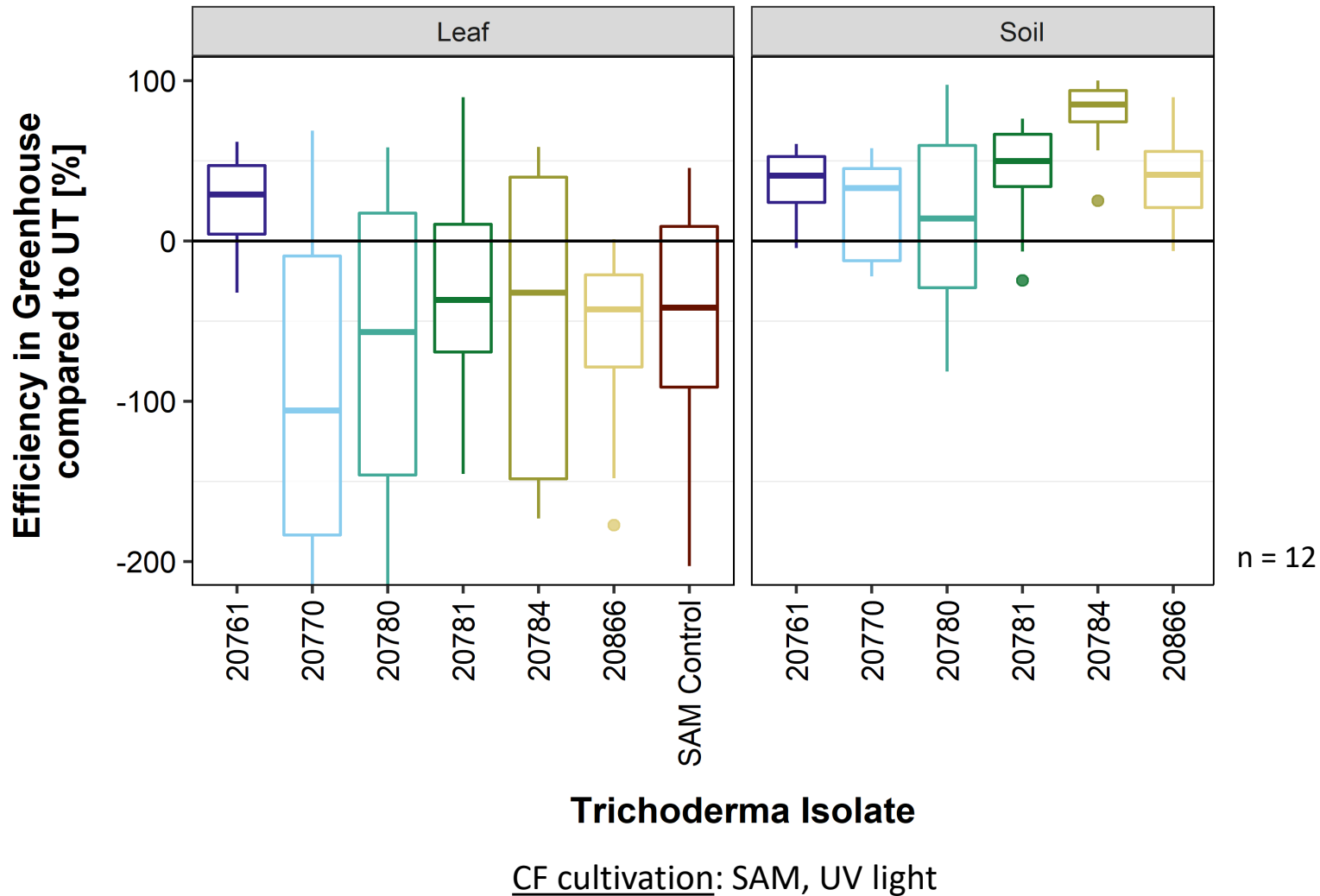
dark
UV

n = 12

Light conditions and growth medium can change the production of secondary metabolites

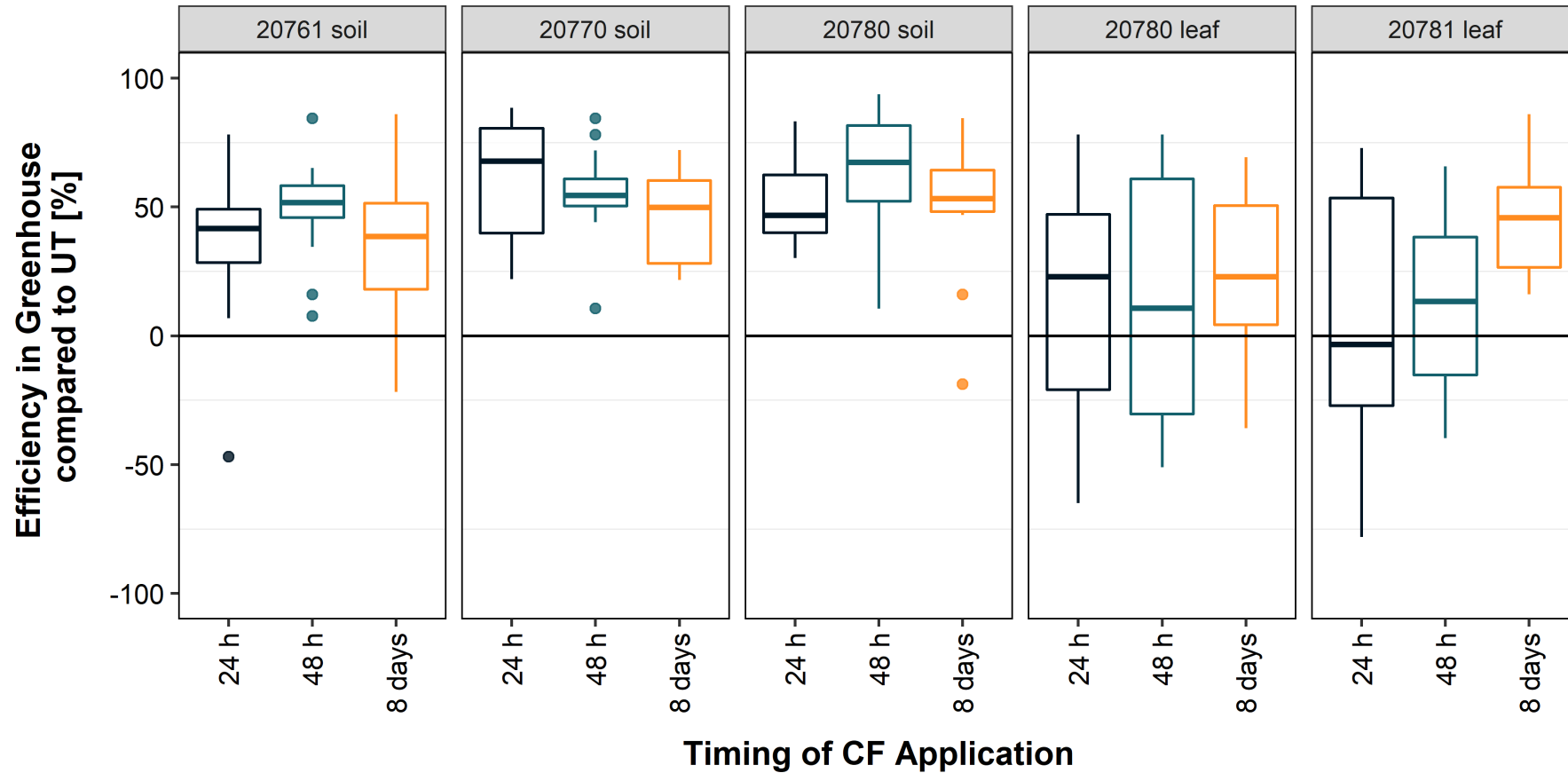
→ Optimal growth conditions are isolate specific

Application Methods



- Culture filtrates induce resistance in plants
 - Enhanced disease development with medium application
- Remaining sugar in medium might lower the efficiency of culture filtrates on the leaves (“food for the pathogen”)

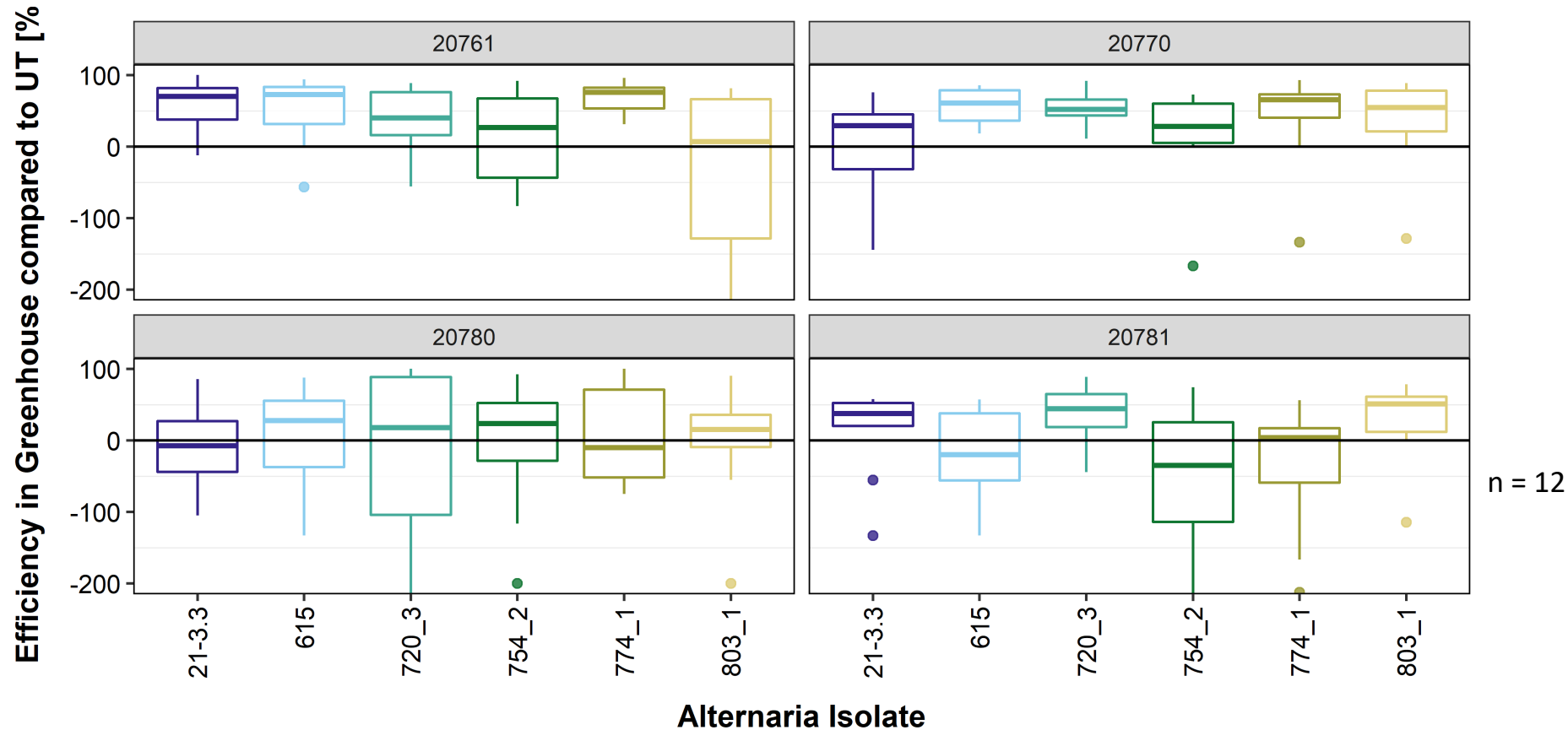
Application Timing



n = 12

- Isolate specific differences
- Only tendencies visible

A. solani Isolate Effect - Greenhouse



20761: soil treatment

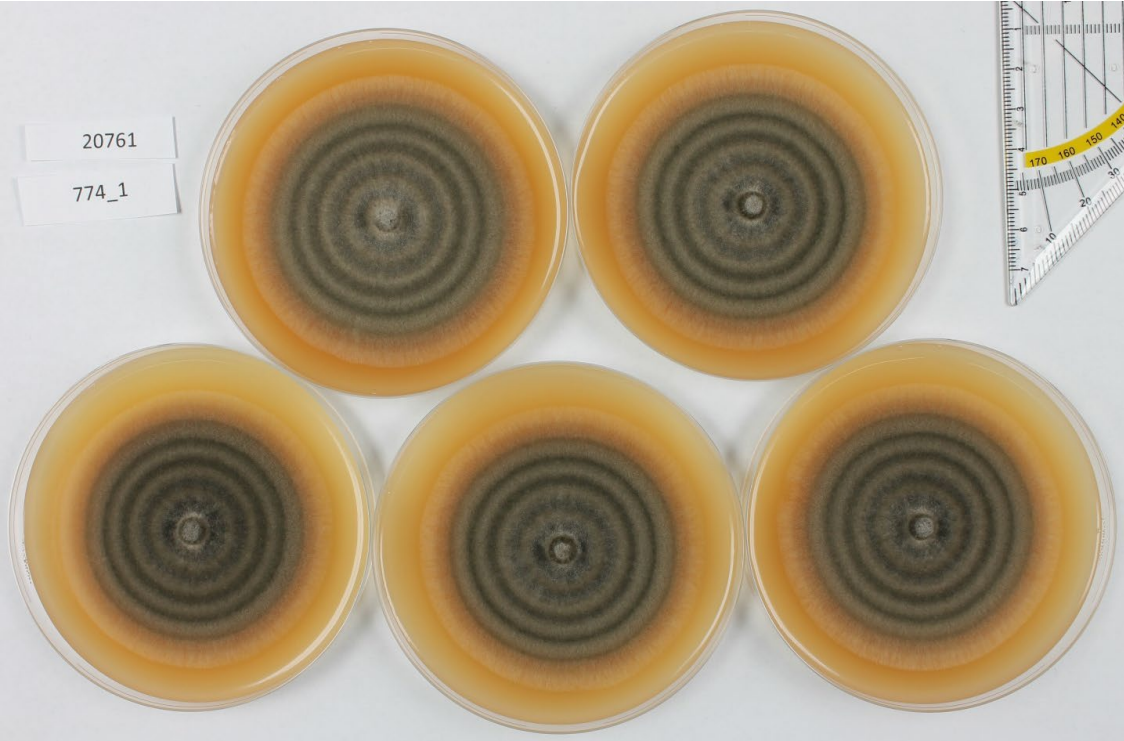
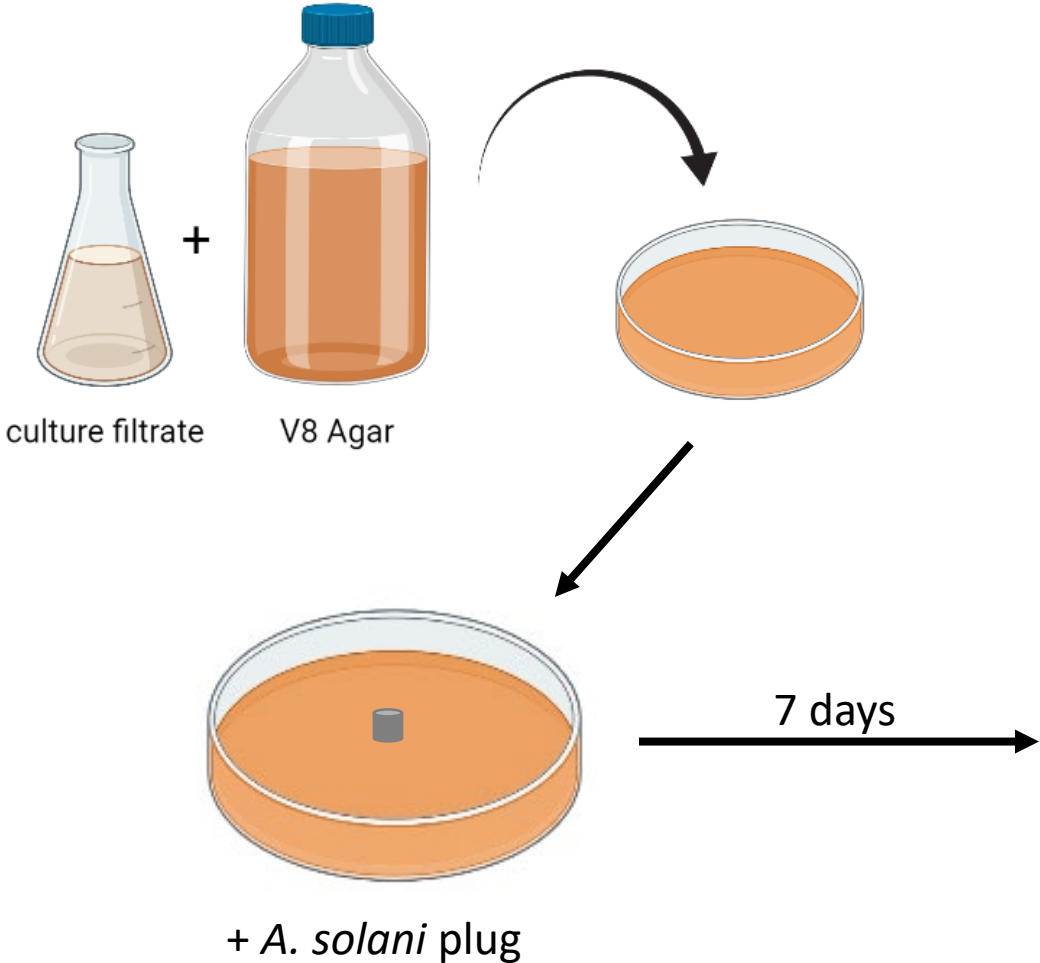
20770: soil treatment

20780: leaf treatment

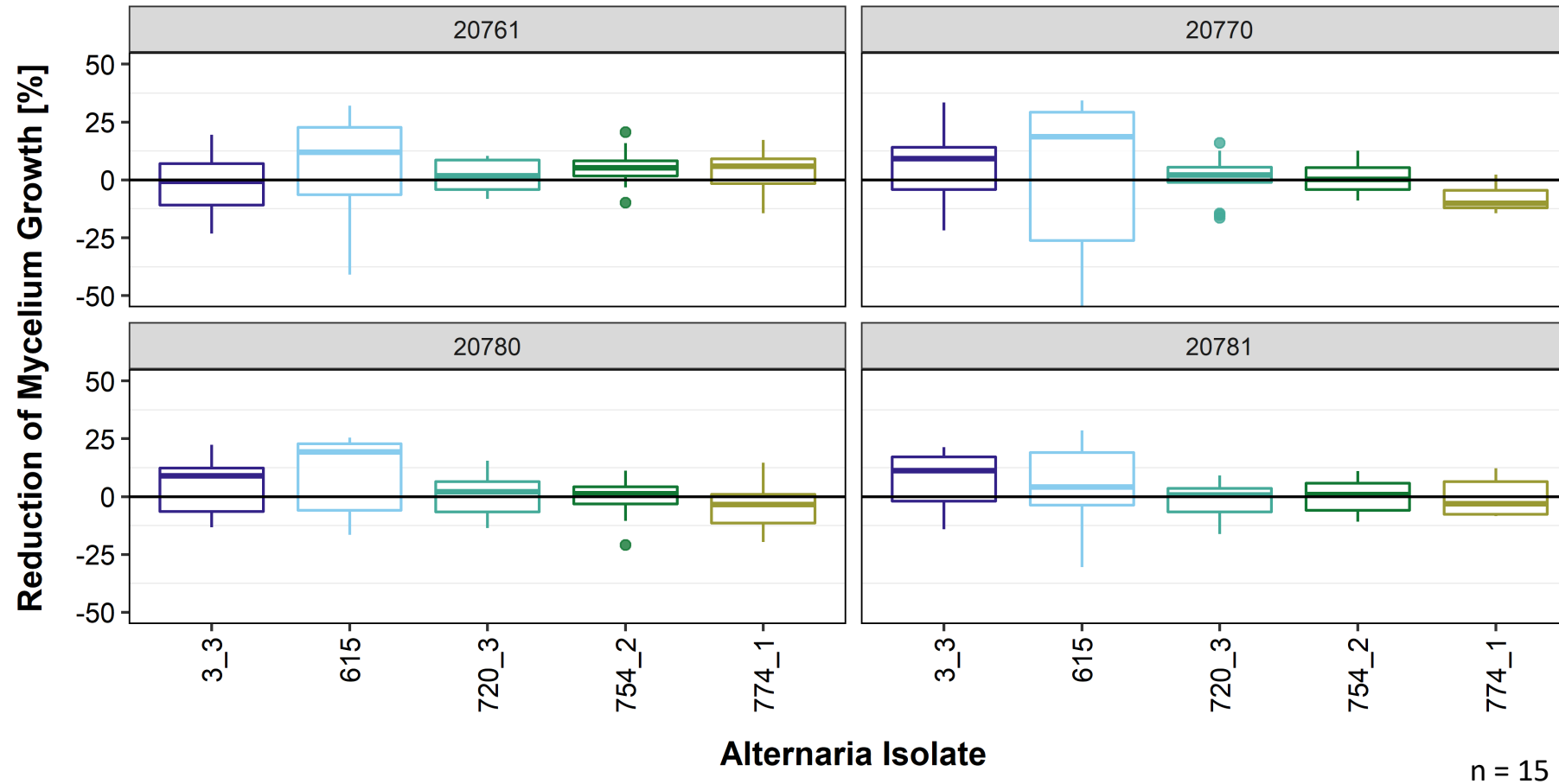
20781: leaf treatment

The efficiency of the culture filtrates is highly isolate dependent (*Alternaria* and *Trichoderma*)

Plate assays



A. solani Isolate Effect – Plate assay



Growth conditions:

20761: PDB, dark

20770: SAM, dark

20780: SAM, dark

20781: PDB, UV

The efficiency of the culture filtrates is highly isolate dependent (*Alternaria* and *Trichoderma*)

Conclusions & Outlook

- optimal growth conditions specific for each *Trichoderma* isolate
→ bottomless opportunities for optimization
- A longer cultivation time might reduce the amount of remaining sugar (better efficiency on the leaves?)
- An analysis of the *Alternaria solani* population might help in determining the potential of different culture filtrates
- The CF induce a resistance reaction in the plants and has a direct toxicity (plate tests)
→ Resistance reaction should be further investigated
- Effect of potato cultivars?

Thank you for your
attention!

