

Investigating the mechanisms of interaction among soil-borne pathogens of potato and their impact on various host responses

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WHAT

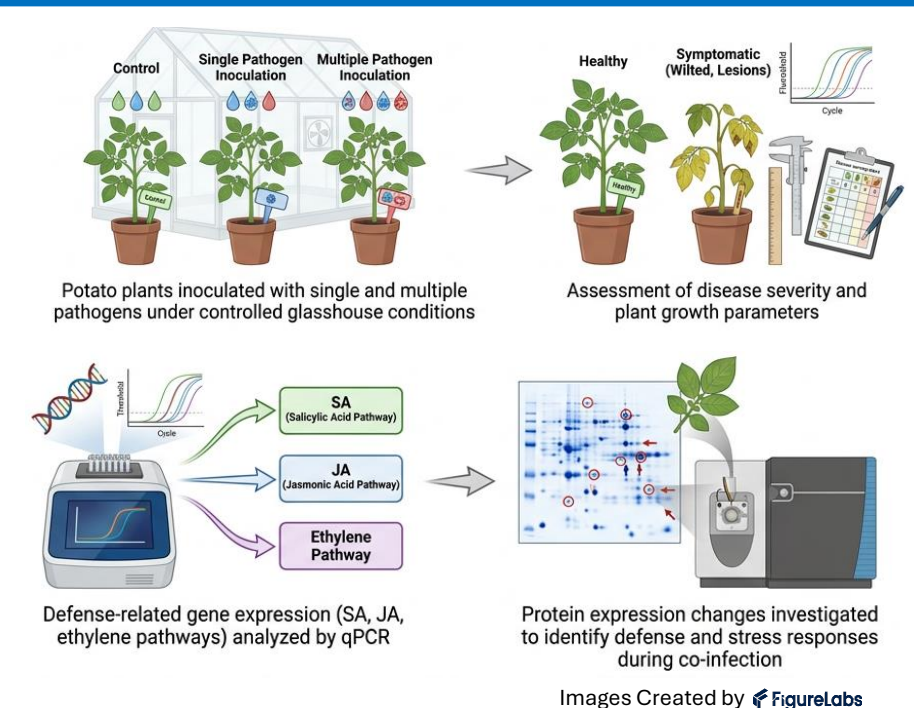
- Potato plants are often infected by more than one pathogen at the same time.
- Multiple infections can weaken the plant's natural defense system and increase stress.
- Combined diseases may cause greater crop damage, lower yield, and poor tuber quality.
- Understanding how different pathogens interact can help develop better disease management strategies and healthier potato crops.

WHY

- To investigate the effects of single and multiple pathogen infections on potato growth, yield, and disease development.
- To understand how pathogen interactions influence plant responses and disease severity.

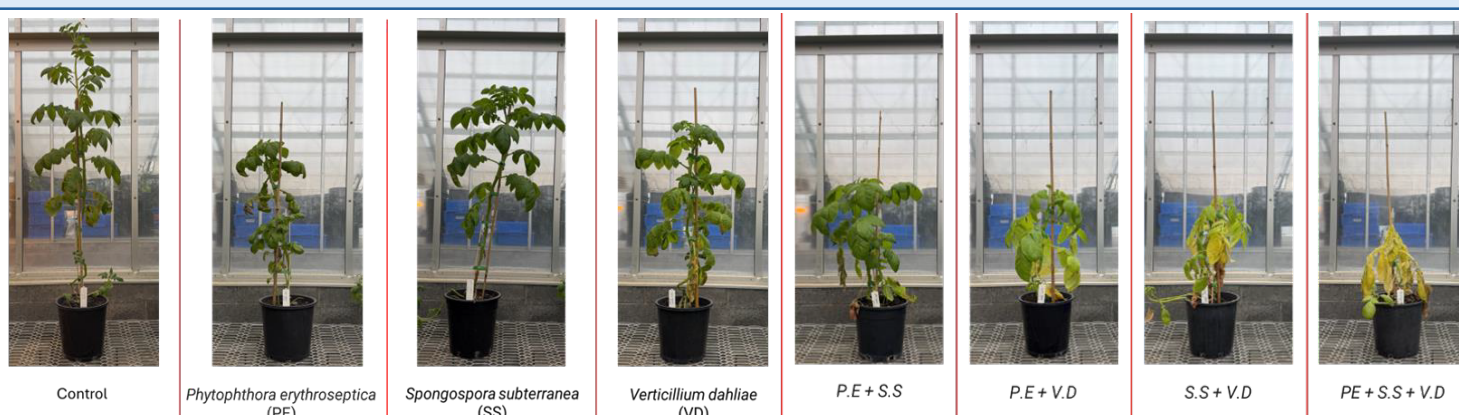
HOW

Experimental Design		
Treatments	Kennebec	Russet Burbank
T0	No pathogen	No pathogen
T1	Phytophthora (PE)	Phytophthora (PE)
T2	Spongospora (SS)	Spongospora (SS)
T3	Verticillium (VD)	Verticillium (VD)
T4	PE + SS	PE + SS
T5	PE + VD	PE + VD
T6	SS + VD	SS + VD
T7	PE+SS + VD	PE+SS + VD



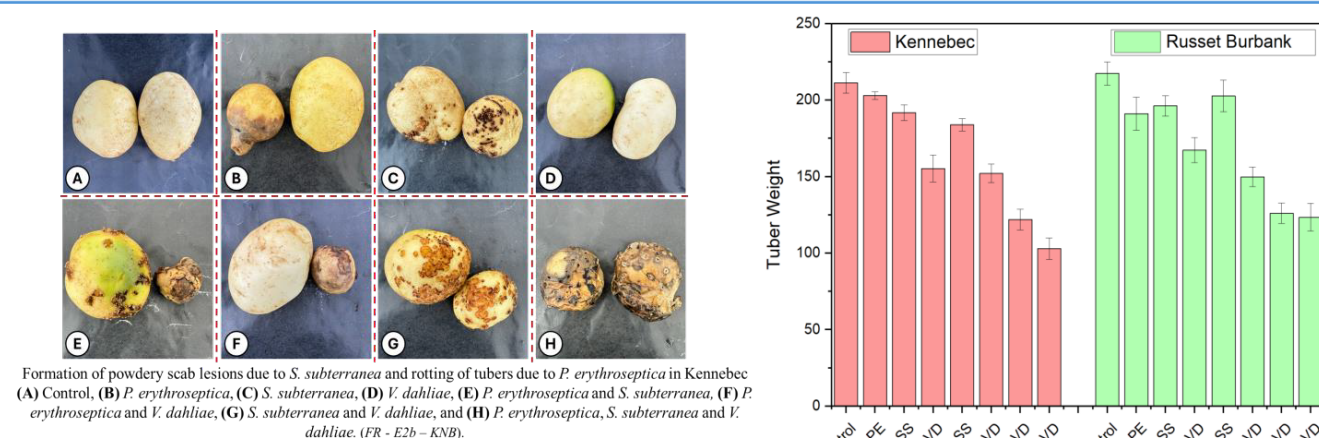
RESULTS

Impact on Plant Growth



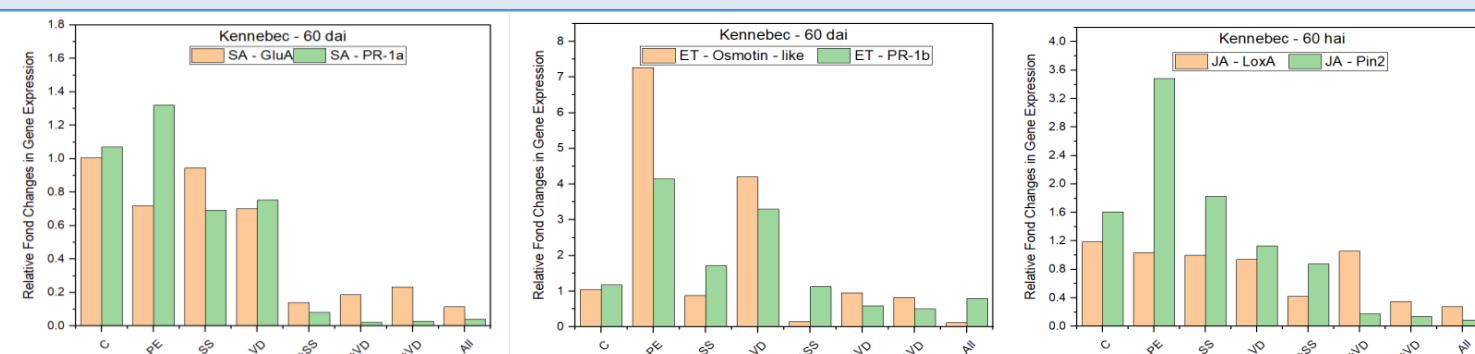
Single pathogen infections caused relatively minor effects on plant growth, whereas co-infections significantly reduced plant growth and led to early plant death.

Impact on Tubers Yield and Quality



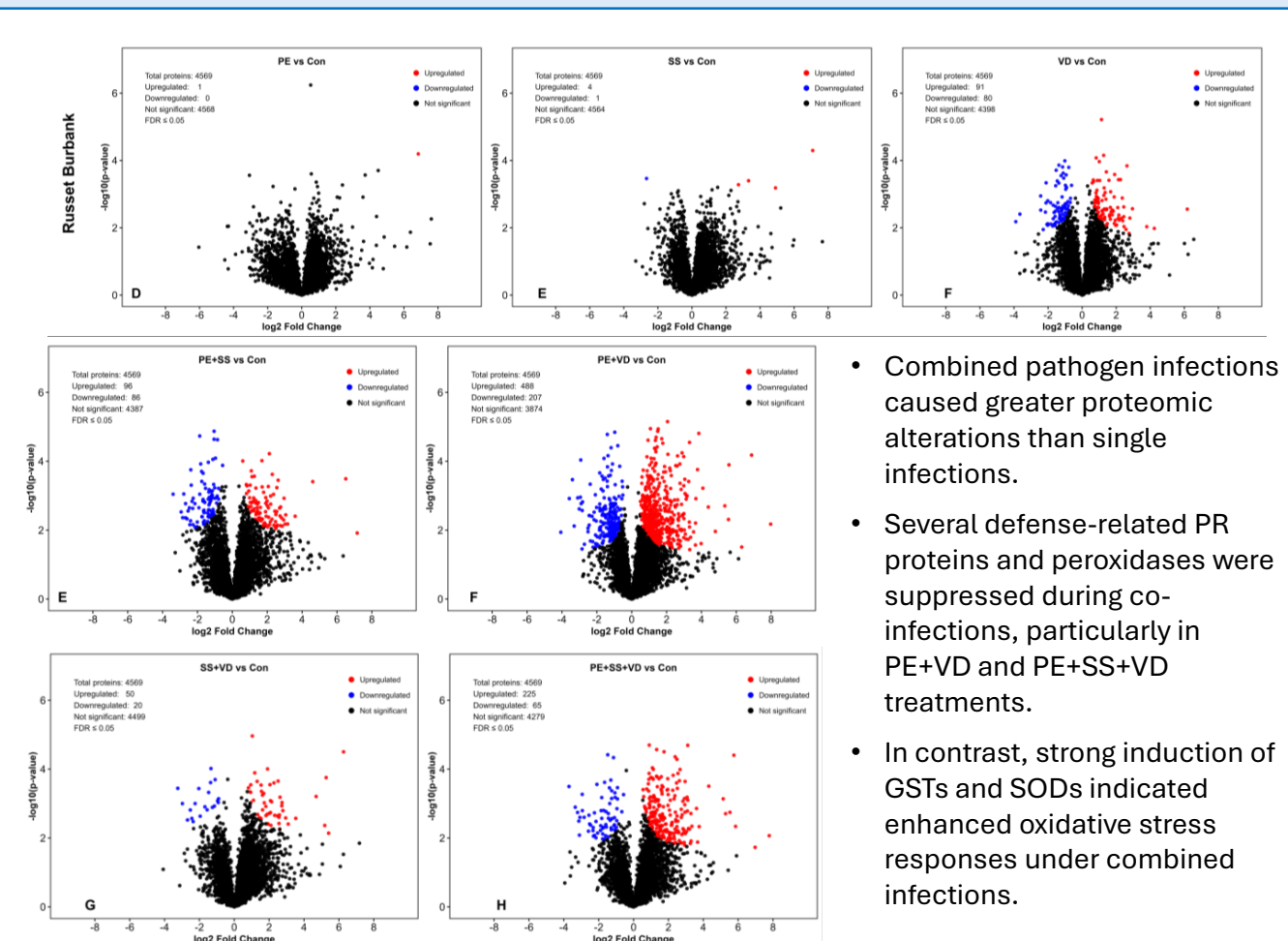
Multiple pathogen infections caused greater losses in tuber production and quality, with substantially higher levels of tuber infection than single pathogen treatments.

Impact on Plant Defense System



Co-infections altered the expression of defense-related genes involved in SA, JA, and ethylene signalling pathways, although stronger gene expression was generally observed during single pathogen infections.

Impact on Proteomic Profiles



“Multiple pathogen infections can significantly alter potato disease development, plant defense responses, and effective disease management strategies”

What is next

- Future work will focus on repeating and validating defense-related gene expression analyses under multiple pathogen infections.
- Repeated gene expression analyses will be conducted to validate defense signalling pathways.
- The effects of fungicide treatments targeting individual pathogens on non-target diseases and co-infection dynamics will also be investigated.
- This study aims to identify management strategies capable of reducing multiple pathogen infections while understanding their impacts on plant defense responses.