

Comparative effectiveness of biological treatments for management of damping off in cauliflower at Godawari, Fakalpur

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Introduction

Damping off is a major threat to cauliflower, causing up to 90% seedling mortality in just 48 hours under high temperature and moisture (Mukhopadhyay, 1987). Excessive use of chemical fungicides worsens the issue by harming plants, soil, and human health, while also leading to pesticide resistance (Mandal et al., 2020). Biological treatments, utilizing beneficial microorganisms, offer a sustainable alternative (Sharma et al., 2005). This study evaluates and compares different biological treatments and application methods, such as seed treatment and soil drenching, for effective damping off management in cauliflower.

Research questions

- Which organism and method of application is effective in management of damping off?
- How does the identified method prove sustainable in disease management?

Methodology

Treatments: 7 Replication: 4
 Experimental design: RCBD

- T1: *Trichoderma viridae* (Seed treatment)
- T2: *Trichoderma harzanium* (Seed treatment)
- T3: *Pseudomonas fluorescense* (Seed treatment)
- T4: *Trichoderma viridae* (Soil drenching)
- T5: *Trichoderma harzanium* (Soil drenching)
- T6: *Pseudomonas fluorescense* (Soil drenching)
- T7: Control

Parameters observed

1. Identification of pathogen (From laboratory test)
2. Germination % (at 25 DAS) $G\% = \frac{\text{No. of plants germinated}}{\text{Total no. of plants used}} \times 100$
3. Disease severity (%) or percent disease intensity = $\frac{\text{sum of all rating}}{\text{total no. of rating}} \times \text{maximum disease grade} \times 100$
4. Total yield per plot (kg/plot) and yield (Mt/ha)

Key findings

- Germination rate of cauliflower seedling was significantly higher in all plots treated with *Trichoderma spp.* and *Pseudomonas fluorescens* as compared to control plots (Figure 5)
- Disease severity (%) and disease incidence (%) were significantly lower in all plots treated with *Trichoderma spp.* and *Pseudomonas fluorescens* compared to control plots
- Yield of cauliflower was significantly higher in all the plots treated with *Trichoderma spp.* and *Pseudomonas fluorescens* as compared to control plots.



Figure 1: Pre-emergence damping off spotted in cauliflower seedling and seed



Figure 2: Post emergence damping off spotted in cauliflower seedling and seed

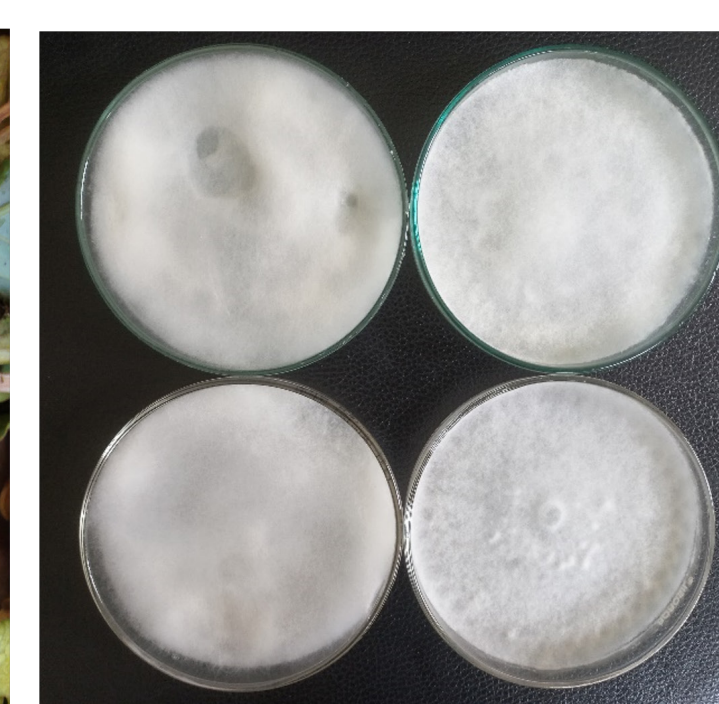


Figure 3: *Pythium* spp. colony extracted from diseased sample



Figure 4: Double walled spores and hyphae of *Pythium* spp.

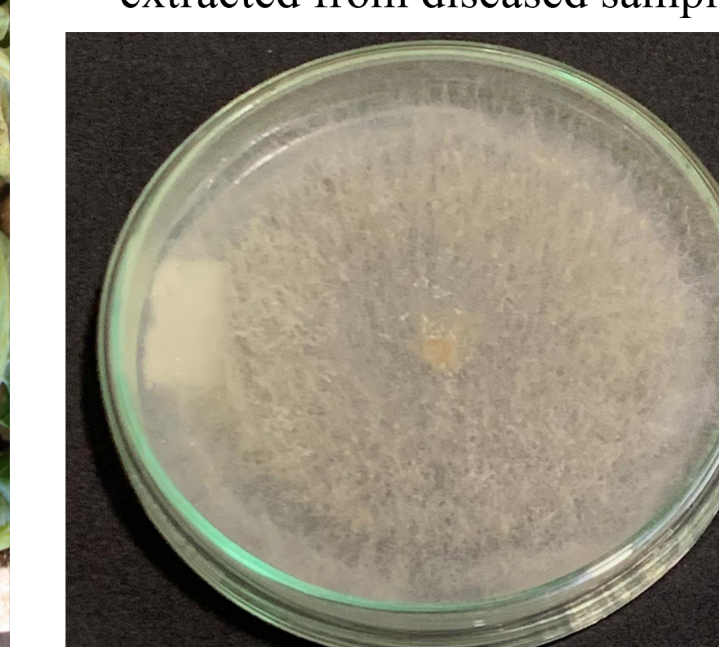


Figure 5: *Rhizoctonia* spp. colony extracted from diseased sample

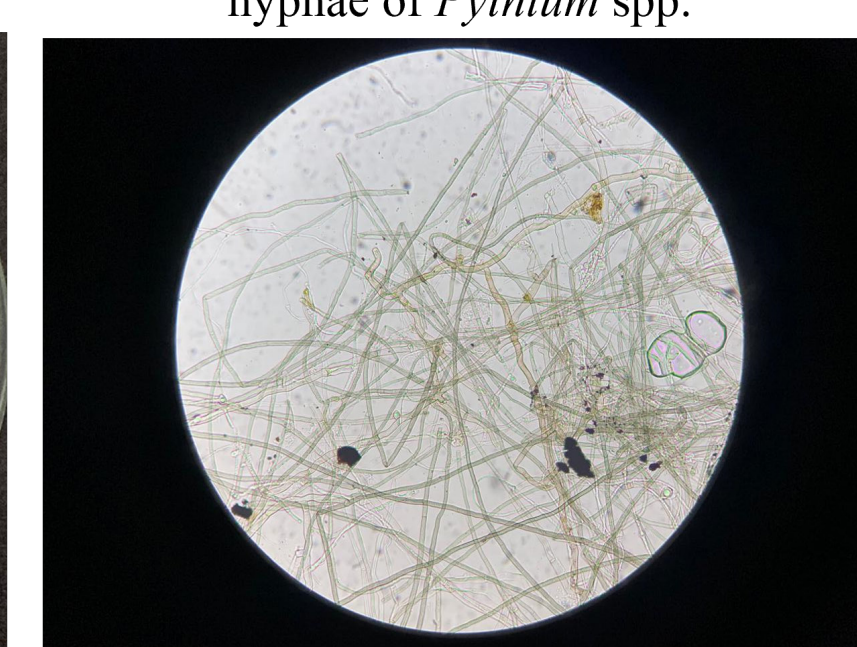
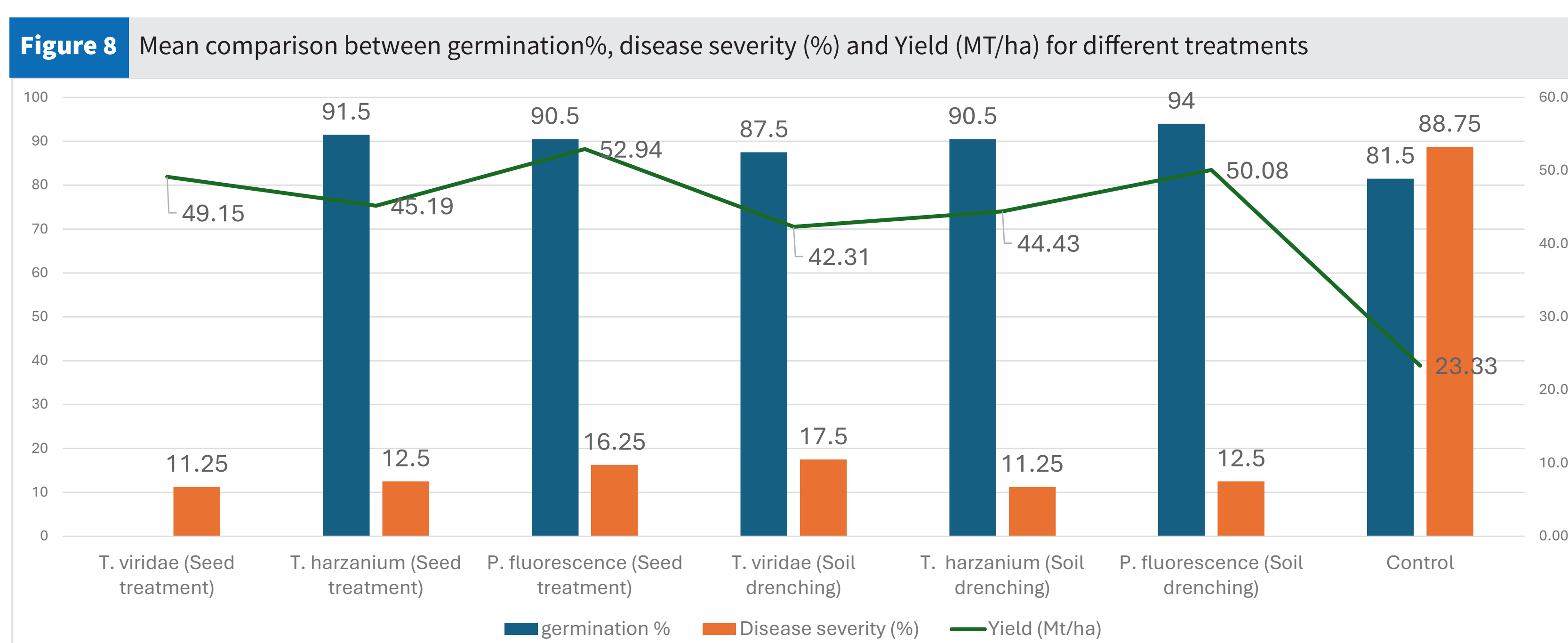
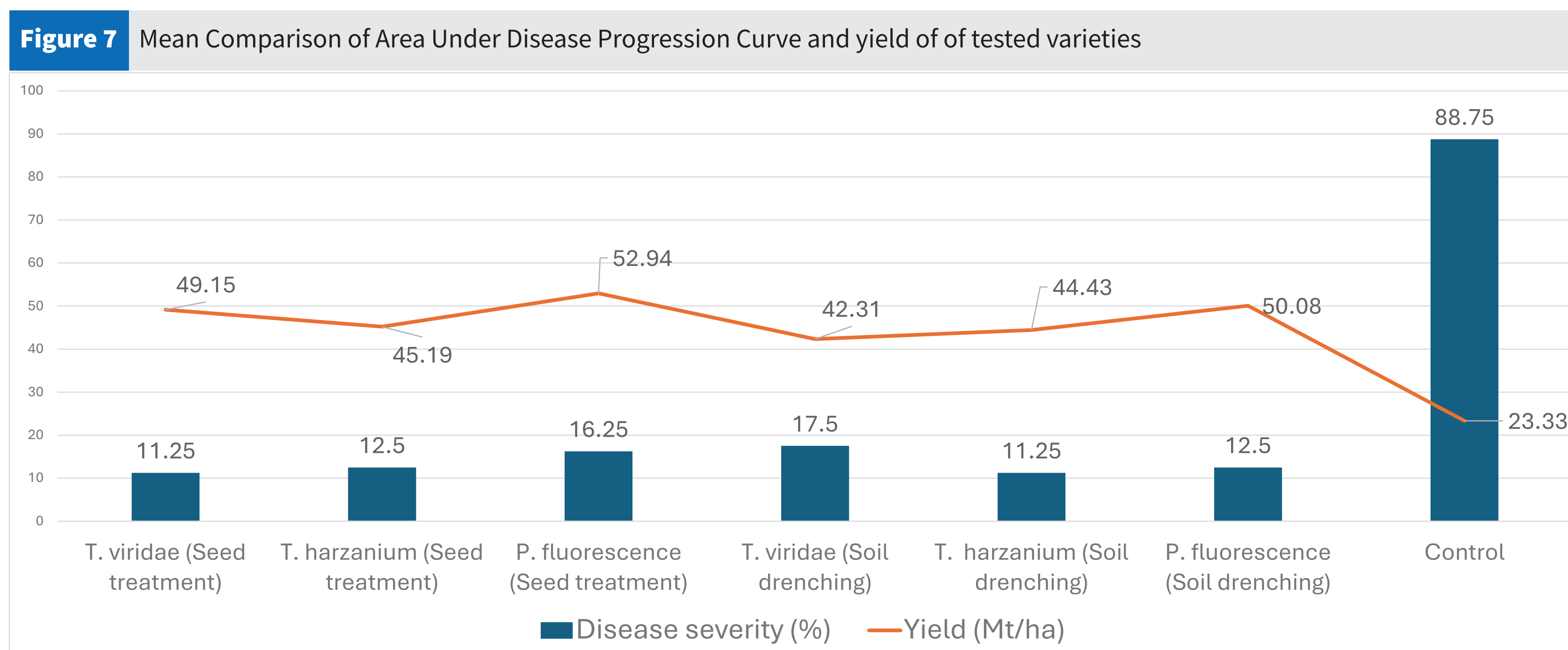


Figure 6: Hyphae of *Rhizoctonia* spp. under microscope



Conclusion

Integrating beneficial microorganisms as part of a disease management strategy can help reduce the incidence and severity of damping off disease, leading to higher seedling survival rates and improved crop yield. Further research, such as seed coating, soil drenching, and foliar spraying, as well as assessing the optimal timing of application during seedling production and transplanting stages, can help maximize the beneficial effects of these microorganisms on plant growth and disease suppression.

