



Primary
Industries

Managing baby spinach damping off, root rot and wilt

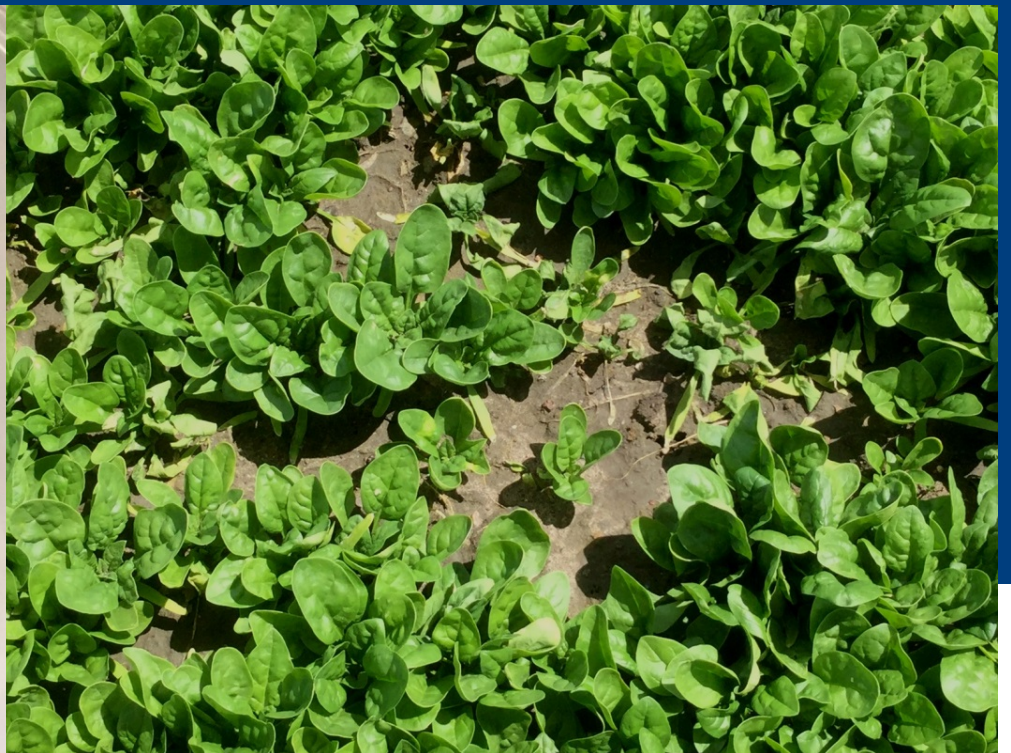
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Disease complex – several species

- Several *Pythium* species
 - *P. ultimum*, *P. irregulare* (cool temperatures)
 - *P. aphanidermatum* (warm temperatures)
- *Rhizoctonia solani* (at least 2 strains)
- *Phytophthora* species – *P. cryptogea*
- *Fusarium oxysporum* f.sp. *spinaciae*

Disease symptoms

- Rotted seed before emergence
- Seedling damping off post emergence – watery dark stem base
- Brown or black root rot
- Stunting, leaf yellowing and wilting



Source and spread of pathogens

- Common soil inhabitants
- External contaminant of seed (Fusarium)
- Form survival structures in organic matter and soil oospores, chlamydospores, sclerotia
- Spreads with dirt on machinery & people; with water; dust in air; with insects (flies)

Current greenhouse trials



Thiabendazole seed dressing on right



Rhizoctonia control



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Key management strategies

- Use 'fresh seed' – not physiologically aged
- Chemical seed dressing; Seed priming?
- Avoid persistent herbicides
- Increase soil pH – especially for Fusarium
- Avoid excess ammonium nitrogen
- Add organic matter or green manure and compost
- Grow brassicas or sorghum – biofumigation
- Fumigation (short-term solution)
- Calcium amendments
- Plant defence activators – chitosan & silicates
- Microbial biocontrols

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