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TIA is a joint venture of the University of Tasmania and the Tasmanian Government

Pink rot of potatoes – impact of soil factors on disease expression; future challenges and opportunities

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Tasmanian Institute of Agriculture, University of Tasmania

South Australian Research & Development Institute

6th October 2022 - AUSPICA Potato Conference, Ballarat

Simplot AUSTRALIA

McCain

Hort Innovation

Significant losses to pink rot in Tasmania

"Some potato paddocks experience a regular substantial yield loss ranging from 5 to 30 per cent even when recommended fungicide treatments are applied,"

"paddocks with high levels of infection could be categorised as unsuitable for cultivation."

Jo Tubb, Simplot Australia potato agricultural manager, (The Advocate, Aug 2020)

“Some heavily infected paddocks only getting 10t/ac (25t/ha)."

NE grower, May 2021

In Tasmania – why is it a problem?

Main reasons include:

- Unseasonal rainfall events (environmental)
- Reduced fungicide efficacy (pathogen)
- Susceptible varieties – Russet Burbank (host)

Also, the pathogen *Phytophthora erythroseptica* can survive for long periods in the soil

- most active between 15-25˚C.

- Infected tubers turn pink after cutting.
- Tuber wounding, splitting promotes infection.
- Effects leaves, emergence and reduce yields.
- Infested plants may wilt and collapse because of rotting at crown area.

Project global goals

PT19000 “Investigating soil pH and nutrition as possible factors influencing pink rot in potatoes – a pilot study”

- Investigate impact of soil pH and Ca formulations in field and pot studies
- Investigate impact of landform and soil structure
- Identify knowledge gaps and opportunities from literature and industry

Hort Innovation Strategic levy investment
POTATO – FRESH FUND
Hort Innovation Strategic levy investment
POTATO – PROCESSING FUND

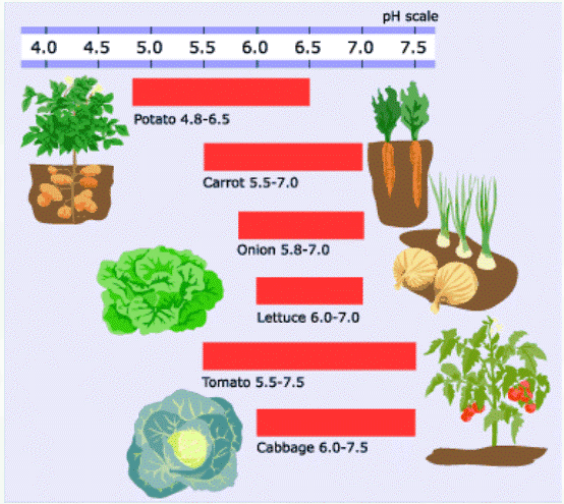
Upcoming project webinar

Dr Robert Tegg
Nov 10

https://potatolink.com.au/news-events

Key outcomes – soil pH and Ca

Optimal soil pH



http://www.agroconection.com/soil/soil-ph-an-overview/

From 20 field sites over 2 years:

- pH ranged from 5.2 – 6.6 at planting
- At harvest pH had dropped in most soils by 0.1 – 0.6 units.

- Where Ca (nanocal, calciprill, etc.) was applied pH was maintained or slightly raised
  however no reduction in pink rot was recorded

- Calcium applications/or raising pH are not a silver bullet
  - Not practical in highly buffered soils (ferrosols)
  - pH alteration requires non-practical amounts of Ca (up to 17t/ha)
  - Ca applications may offer general soil health benefits (but can exacerbate common scab)

Key outcomes – soil depth and quality

Topsoil depth (40cm)
Very good soil structure (8)

Topsoil depth (25cm)
Poor soil structure (3-4)

- Topsoil depth/slope and soil structure a useful guide for assessing where pink rot is likely to occur
- Typified by disease in headlands

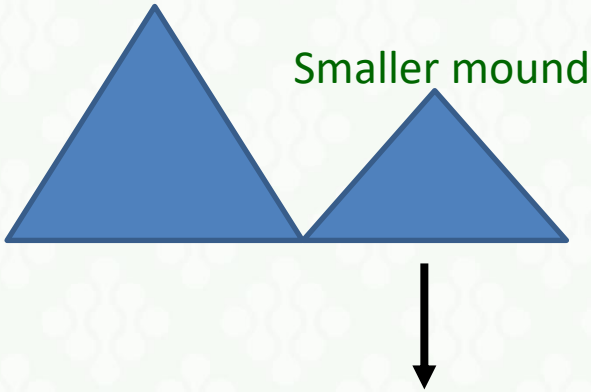
- Greater severity of disease was observed where topsoil depth was shallower, and compaction and soil quality ratings were poor.
- Additionally, low lying areas were more prone to disease in most cases.

Key outcomes – soil depth and quality

Equal consistent twin rows

Inconsistent twin rows

Smaller mounds

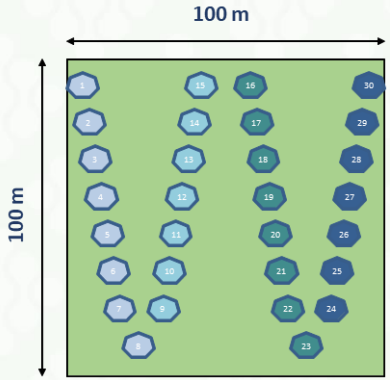


Greater likelihood of pink rot

- Mound depth consistency and orientation was also seen as an important factor
- Greater likelihood of pink rot from where downward rows cross into headland rows (greater chance of water pooling/high soil moisture/erosion)

Key outcomes – pathogen detection

- Pre-plant soil-borne inoculum detection is extremely difficult
- Important levels may be below detection limit
- Inoculum levels dynamic through season
- Sampling strategy (where and when) will be critical
- There is a probably need for post extraction enrichment



What next – further R&D needs

Improved detection and management of pink rot

- Enhance pathogen detection through targeted sampling and enrichment
- Correct diagnosis where multiple rots are present (not always pink)
- Monitor fungicide persistence in cropping soils

What next – further R&D needs

Determining the role of alternative hosts and volunteer potatoes in maintenance of soil-borne pathogen populations

- A rotation isn't a rotation with volunteers – but how many are needed to cause a problem?
- What rotational crops/weeds/pasture species will support the full lifecycle of the pink rot pathogen(s)

What next – further R&D needs

Understanding interactions between soil-borne potato diseases, physical factors and disease management practices

- How do different potato diseases encourage or inhibit infections by other pathogens?
- How does management interventions (fungicides, irrigation etc) affect other diseases?
- What resistance factors might be linked/enhanced/inhibited?
- How important is damage due to wind damage and tractor/irrigator runs?
- What are the critical soil factor thresholds that provide unacceptable risk of disease?

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