



The role of soil DNA testing in managing the risk of soilborne diseases

– how is it being used and what can it do?

Michael Rettke

Barbara Hall's group

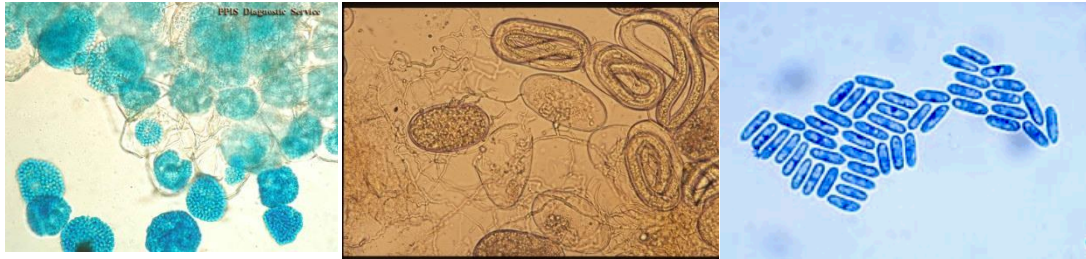
Alan McKay's group



**Hort
Innovation**

**VEGETABLE
FUND**

What is pathogen DNA testing



**Measures the total level of the DNA of a
specific pathogen
(in a soil, plant or other sample)**



What can we detect?

NEMATODES

Root knot
(5 species)

Root lesion
(5 species)

Other
(2 species)

Free living
(15 tests)

FUNGI

Rhizoctonia
(6 tests)

Pythium
(4 tests)

Other
(9 species)

Beneficial
(8 tests)

BACTERIA

Streptomyces
(1 test)

OTHER

Plasmodiophora
(1 test)

Tests relevant to
vegetable industry

http://www.pir.sa.gov.au/research/services/molecular_diagnostics

Soilborne pathogen DNA testing

Investigative



Post mortem to inform future decisions

Risk assessment

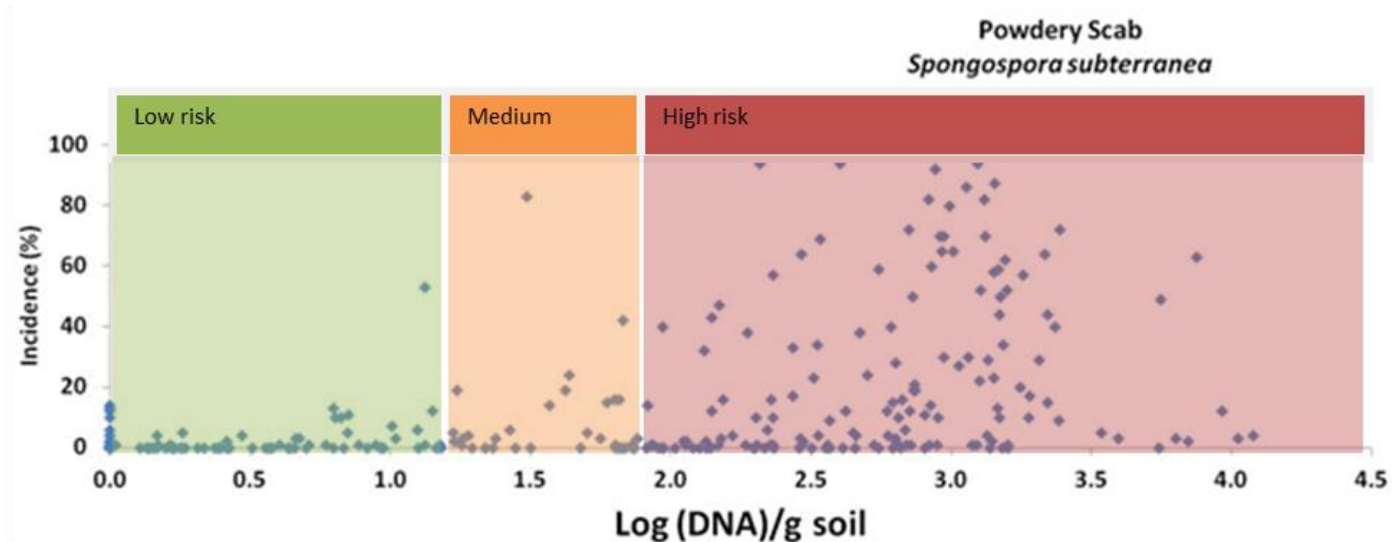


Inform decisions to avoid a post mortem

Where is pathogen DNA testing used

Pre-plant risk assessment

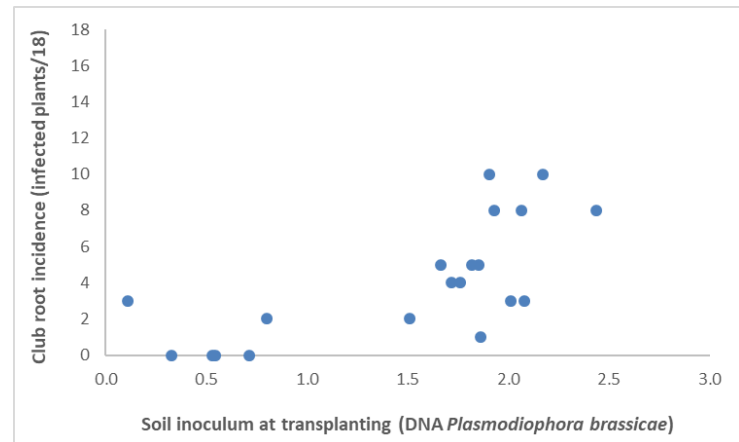
Established services for potatoes and cereal crops



Where is pathogen DNA testing used

Pre-plant risk assessment

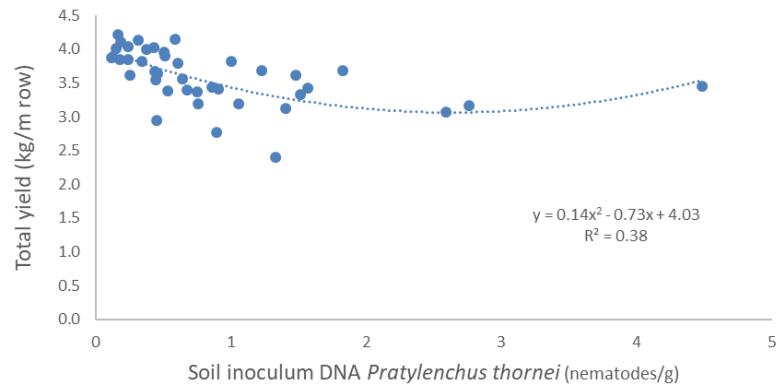
Being developed for brassica crops



Where is pathogen DNA testing used

Pre-plant risk assessment

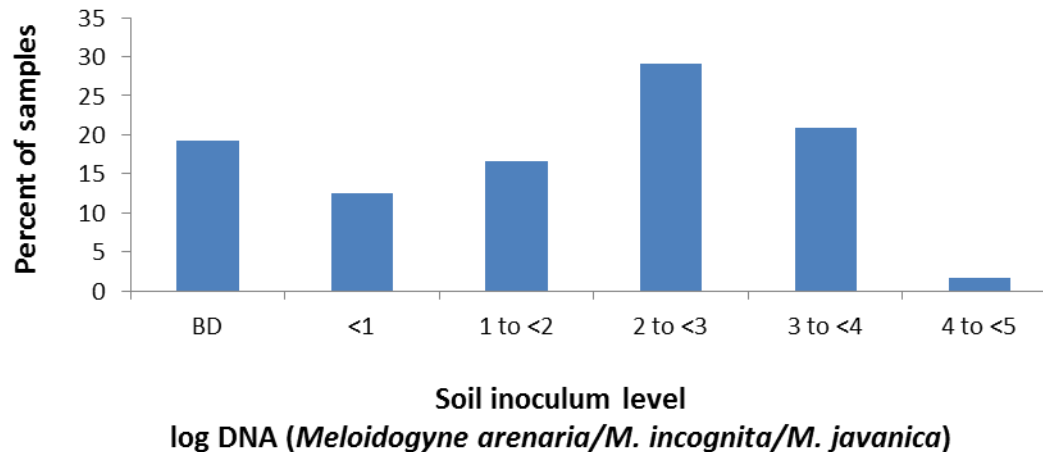
Being developed for carrot crops



Where is pathogen DNA testing used

Pre-plant risk assessment

Being developed for
root knot and root
lesion nematodes



Cucumbers grown in
protected cropping

If RKN poses a risk:

- Complete crop loss can occur soon after planting of seedlings

What do you do with the results?

- Paddock selection
- Crop scheduling
- Varieties
- Paddock and crop rotation
- Irrigation
- Crop nutrition
- Soil amendments
- Fallowing
- Bio-fumigation
- Chemical treatments

**Additional information to
inform, assess and refine
disease management strategies**

Where is pathogen DNA testing used



Where is pathogen DNA testing used



BB44072

P. sulcatum



BB44124

P. violae



BB47800

P. violae



BB44053

Pythium
Not detected



BB47801

Pythium
Not detected

Where is pathogen DNA testing used

BB31767
M. hapla



BB44019
Root knot
nematode
not detected



No DNA assay
for pathogen



DNA testing is a tool in diagnosis

Traditional

Molecular



Where is pathogen DNA testing used

- Quantify impact of management strategies



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To minimise cost of soilborne diseases

Growers need to:

- Know which pathogens pose significant risk
- Have management options



Management of most soilborne diseases requires that decisions are made and implemented prior to planting

