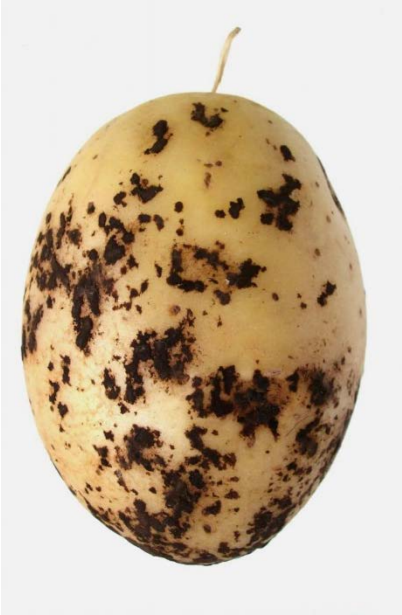
Does soil organic matter affect severity of disease on potato caused by *Rhizoctonia solani* ?

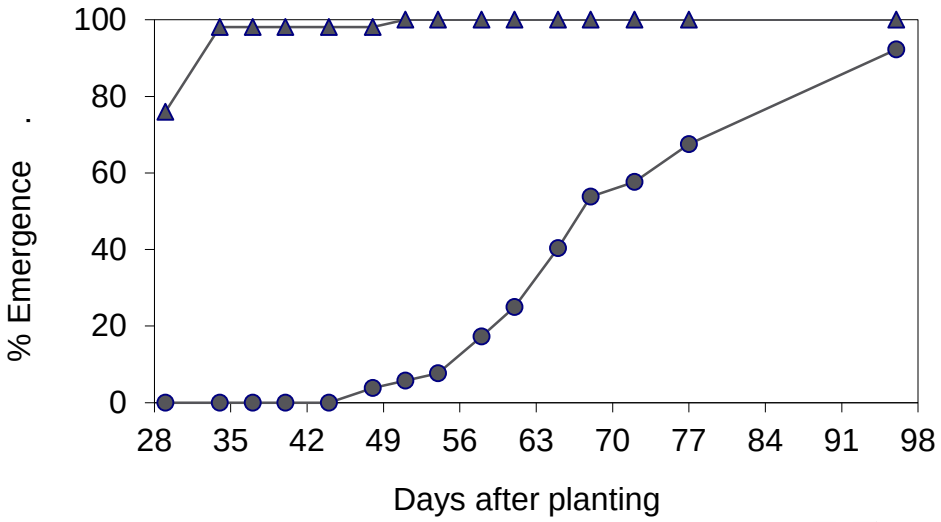
Jennie Brierley & Alison Lees

The James Hutton Institute

Rhizoctonia solani AG3

The James Hutton Institute



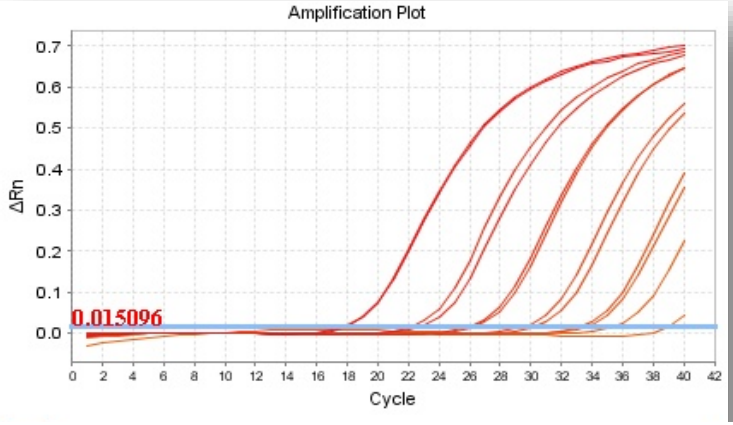


Evaluating disease risk

1

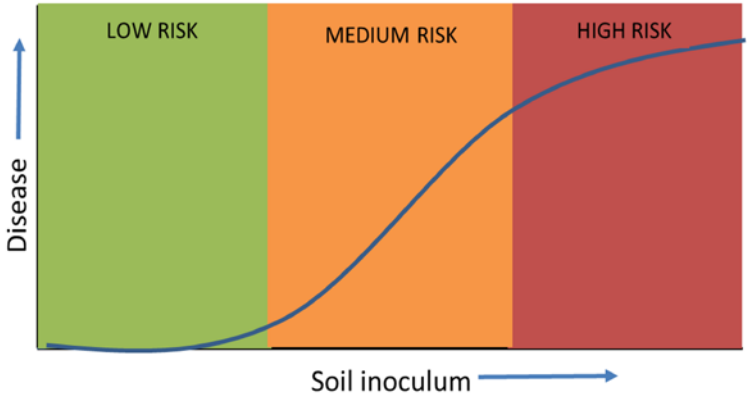
Soil sample (pre-planting)

2



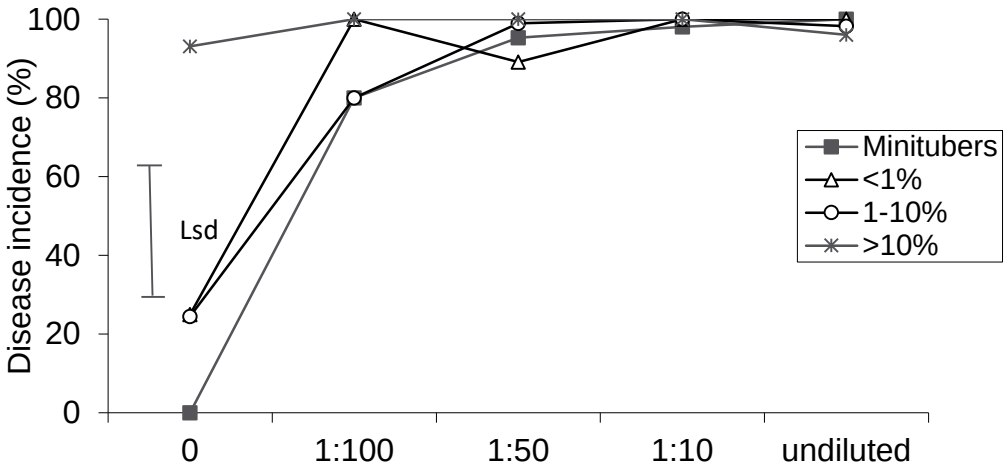
Quantification of target inoculum

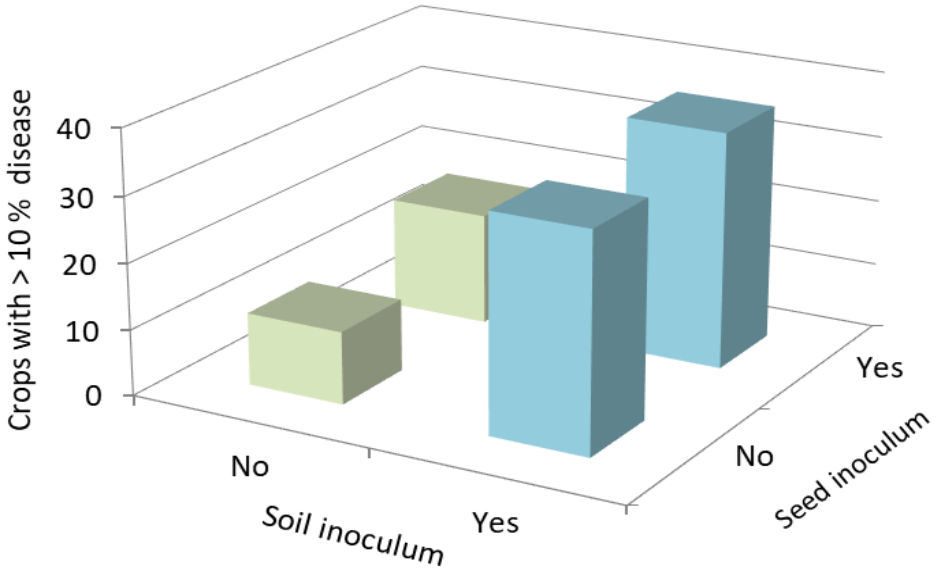
3



Relating inoculum to disease risk

R.solani : black scurf





Brierley *et al.* (2016) Potato Research

Farm scale monitoring:

Centre for sustainable cropping platform

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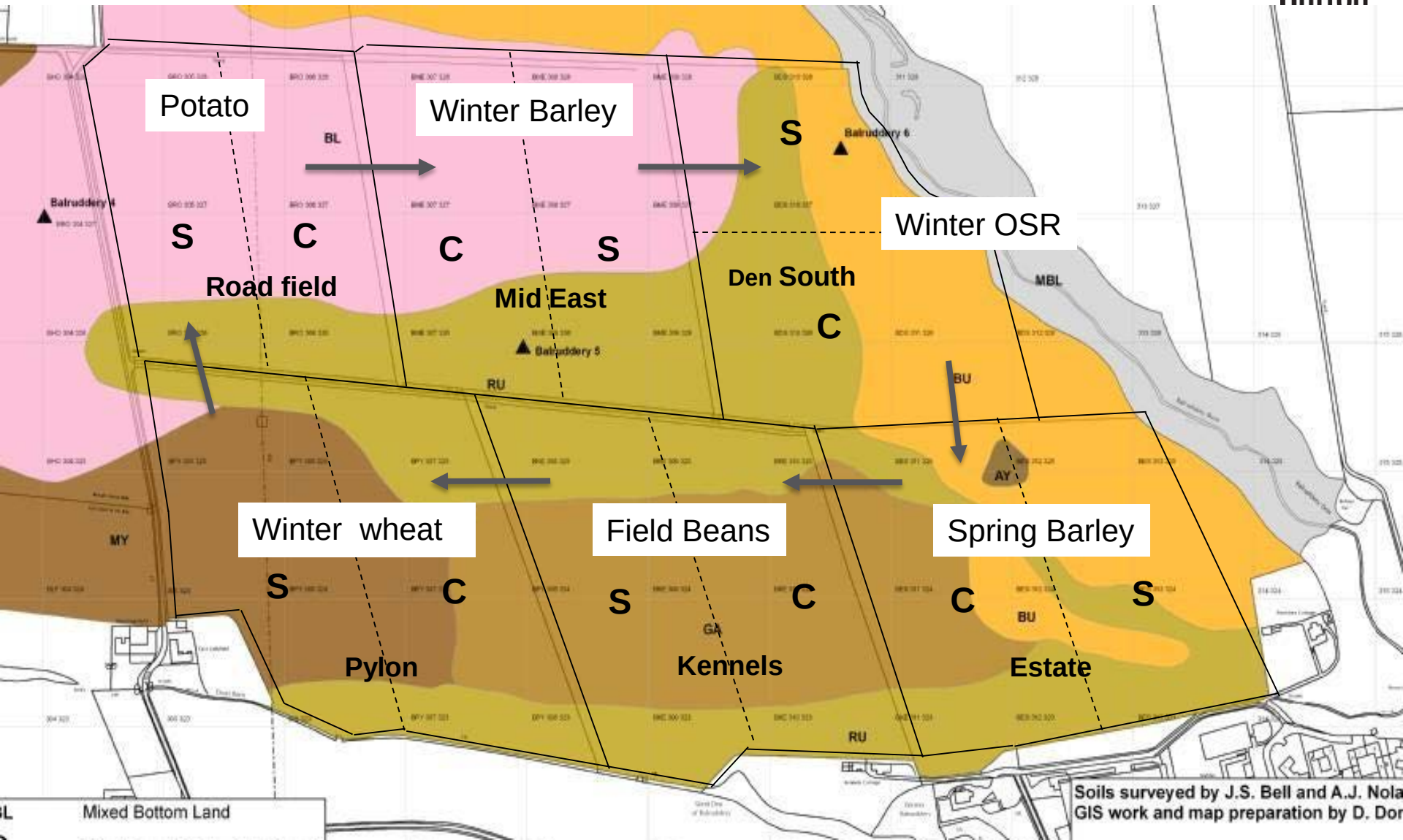
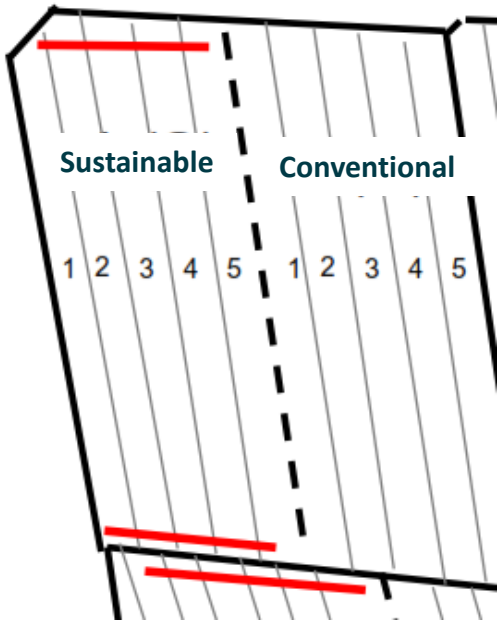
Rotation & field layout



Crop cultivars and treatments

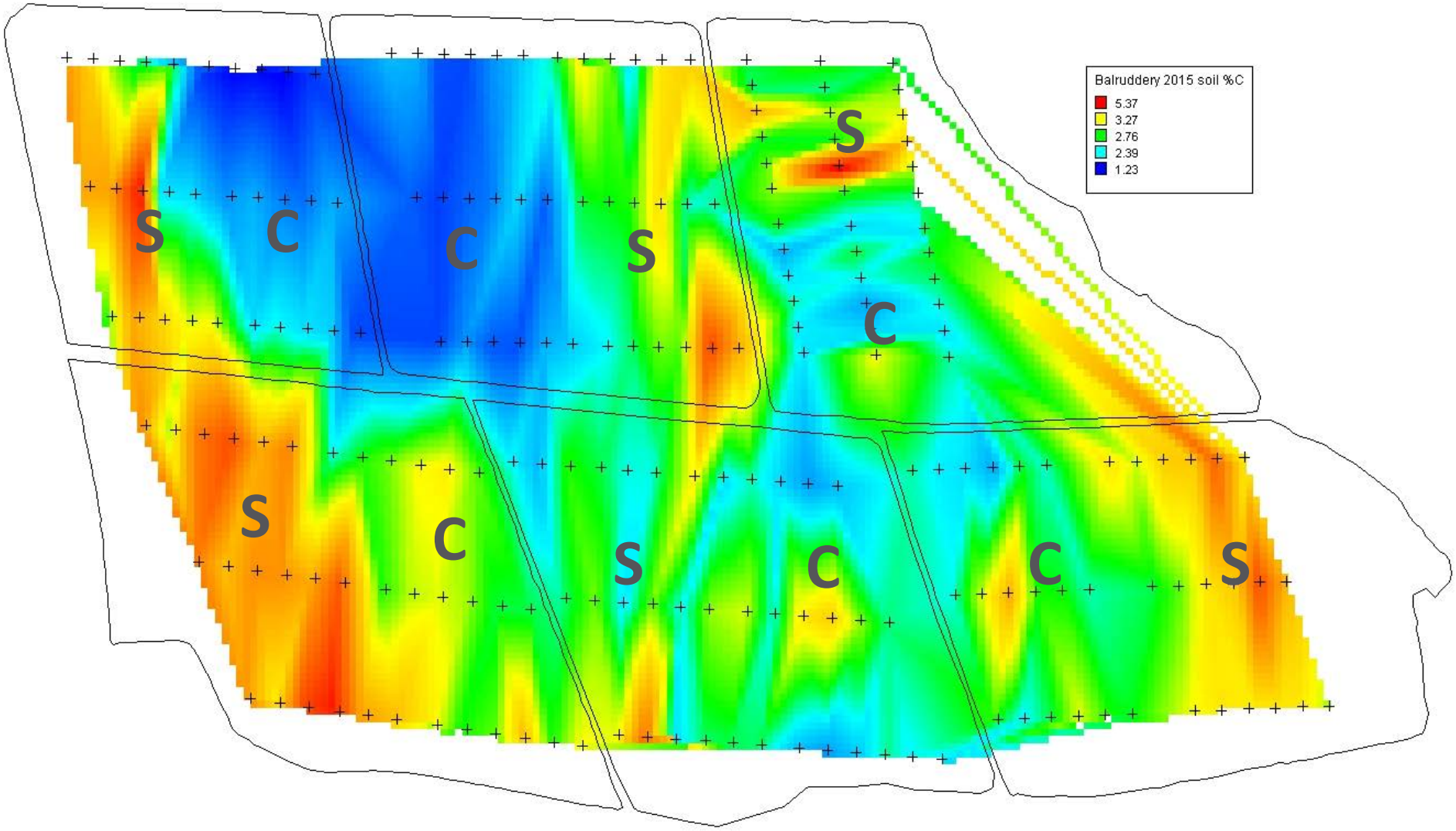


1. Lady Balfour
2. Mayan Gold
3. Vales Sovereign
4. Cabaret
5. Maris Piper

Sustainable treatments:-

- Addition of compost
- Reduced inorganic fertilizer
- Reduced herbicide application
- Reduced fungicide/pesticide application

Soil organic matter (2015)

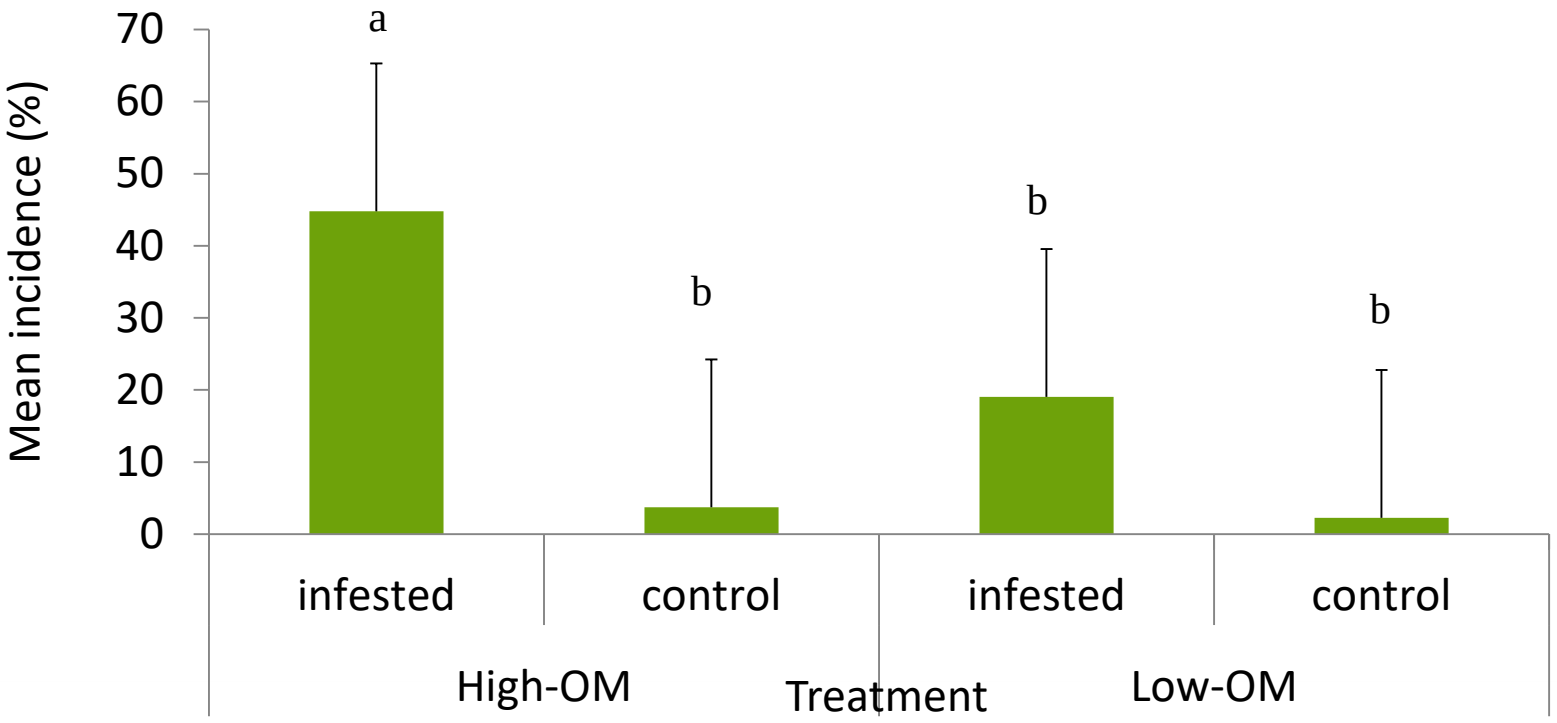


Black scurf on seed and progeny tubers

Black scurf (%) on seed stocks and progeny tubers grown in both conventional and sustainable treatments

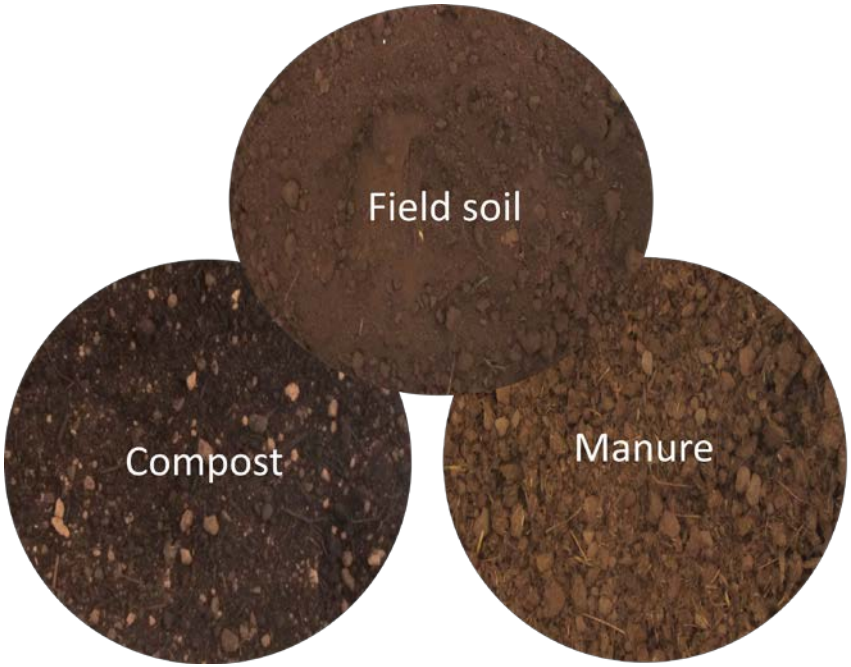
		2011		2012		2013		2014		2015		2016	
Cultivar	Agronomy	seed	progeny	seed	progeny	seed	progeny	seed	progeny	seed	progeny	seed	progeny
Cabaret	Conv.	28	46	0	0	0	0	0	0	8	0	13	0
	Sust.		13		0		0		0		13		0
Lady Balfour	Conv.	1	7	4	0	4	0	0	0	9	0	0	0
	Sust.		9		2		0		0		23		1
Maris Piper	Conv.	0	12	0	0	0	0	0	0	1	0	0	0
	Sust.		0		0		0		0		0		0
Mayan Gold	Conv.	0	0	0	0	0	0	0	0	9	0	12	0
	Sust.		0		0		0		0		22		2
Vales sovereign	Conv.	7	2	0	0	13	0	11	1	0	0	0	1
	Sust.		5		0		11		0		1		0

Effect of increased soil organic matter: field trial



- Plant emergence was delayed
- Stolon pruning increased
- Yield decreased
- Black scurf on progeny tubers increased

Effect of increased soil organic matter: Potting mixes

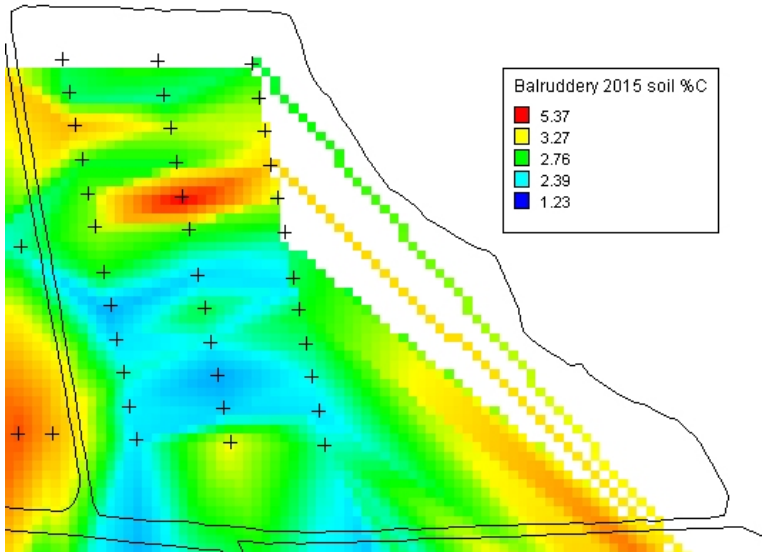


Potting mixes comprised of varying ratios of field soil and either manure or municipal compost were inoculated with *R. solani* AG3 and planted with a single Maris Piper mini-tuber.

Environment?
Variety?

Field soil 100%
Field soil 75% - Manure 25%
Field soil 50% - Manure 50%
Field soil 25% - Manure 75%
Field soil 75% - Compost 25%
Field soil 50% - Compost 50%
Field soil 25% - Compost 75%

Effect of increased soil organic matter: Comparing field soils



- 0 sclerotia added
- 0.01g sclerotia added per tuber
- 0.03g sclerotia added per tuber
- 0.06g sclerotia added per tuber

Acknowledgements

Decision making

Site selection

Varietal selection

Crop management

Chemical control

IPM@Hutton

http://ipm.hutton.ac.uk/

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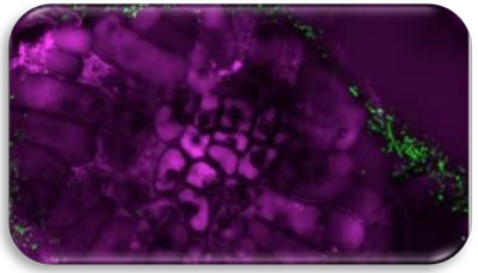
Crop protectants & Biopesticides

Biocontrol

Biodiversity

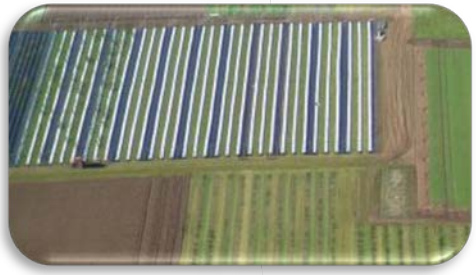
Landscape Management

Pest & Disease Resistance



Detection & Monitoring

Pollinators



Rotations & Crop Diversity

Weed Management

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