

Other Brassica projects at Warwick

Graham Teakle

Title: Roots of decline? Assembly and Function of the Rhizosphere Microbiome in Relation to Yield Decline

BBSRC Soil and rhizosphere interactions for sustainable agri-ecosystems (SARISA)

PI: Gary Bending (Warwick)

Co-Is: Graham Teakle, Jay Moore (Warwick), Penny Hirsch (RRES), Chris van der Ghist (CEH), David Bass (NHM), Peter Mills (HAU)

Collaborators:



ROTHAMSTED
RESEARCH



Centre for
Ecology & Hydrology

NATURAL ENVIRONMENT RESEARCH COUNCIL



NATURAL
HISTORY
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VELCOURT

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Harper Adams
University

WARWICK



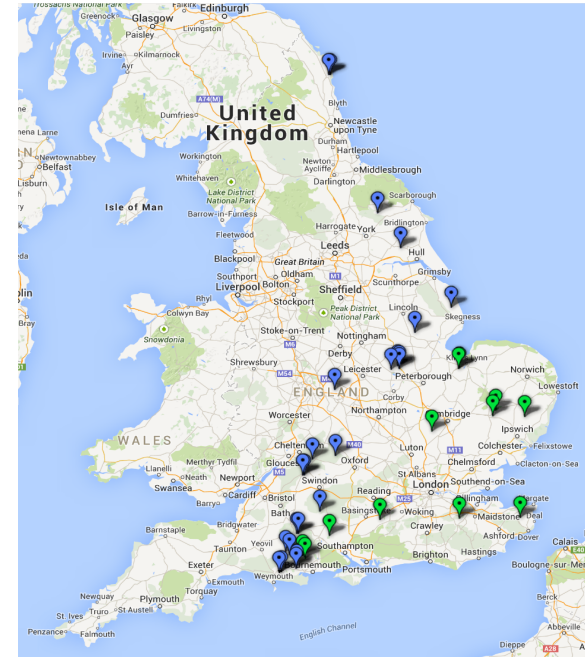
NERC
SCIENCE OF THE
ENVIRONMENT

Workpackage 1

Organisation of the rhizosphere microbiome

44 sites across 25 farms

- Core and satellite microorganisms
- Distance-decay relationships.
- Influence of environment on pathogens



Workpackage 2

Functional responses of the rhizosphere to rotation

3 sites:

- Wellesbourne
- Harper Adams
- Rothamsted Research

Rotation	2014-15	2015-16	2016-17	2017-18
Continuous OSR	Wheat	OSR	OSR	OSR
Alternate OSR	Wheat	OSR	Wheat	OSR
Virgin OSR	Wheat	Wheat	Wheat	OSR

3 rotations to simulate yield decline conditions

Workpackage 3

Rhizosphere engineering through crop genotype to control the root microbiome

4 contrasting varieties grown in all 21 possible rotation combinations over 3 years at Wellesbourne

- Yield
- Microbiome community analysis

Workpackage 4

Rhizosphere engineering the root microbiome through soil management to improve yield

Furzefield site at Rothamsted - cropped continuously with OSR since 1991

Treatments:

Rotation	2013-2014	2014-2015	2015-2016
1. Continuous OSR	OSR	OSR	OSR
2. FYM	OSR	FYM/OSR	OSR
3. Biosolids	OSR	Biosolids/OSR	OSR
4. Fallow	OSR	Fallow	OSR
5. Legume break	OSR	Faba beans	OSR
6. Oat break	OSR	Oats	OSR
7. Wheat break	OSR	Wheat	OSR

- Yield in 2016

Title: Exploiting sources of resistance to Turnip yellows virus for deployment in oilseed rape

BBSRC Crop Improvement Research Club (CIRC)

PI – John Walsh (Warwick)

Co-Is – Guy Barker and Graham Teakle (Warwick)

- OSR has a high incidence of infection by TuYV which is transmitted by aphids
- This has a significant impact on yield
- Pesticides have little effect on infection

1. Resistance identified in OSR and fine mapping in progress

2. Resistance identified in *B. oleracea* and mapped, fine mapping in progress

3. Resistance identified in *B. rapa* and mapping in progress

Brassica-related PhD studentships at Warwick

- Jemma Taylor (BBSRC-CASE) – Delayed bolting in rocket
- Max Newbert (BBSRC CIRC) – TuYV diversity and epidemiology
- Hussein Gherli (Syrian Government) – Nitrogen remobilisation within OSR
- Liam Harvey (HDC) – Cabbage aphid control by entomopathogenic fungi
- Spencer Collins (HDC) – Cabbage whitefly biology
- Christine Hicks (BBSRC) – Stress response and translation from Arabidopsis
- Sebastian Fairhead (MIBTP) – Downy mildew and white rust resistance
- Tongtong Wang (China Scholarship Council) – Virus resistance in B genome
- Chris Hale (BBSRC CIRC) – P acquisition in OSR
- Almustapha Lawal (Self funded) – Stress resistance and shelf life
- 2 new BBSRC iCASE studentships with John Walsh – TuYV and TuMV resistance