



Rhizosphere exudation: Cost or Benefit?

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Rhizodeposition: Net export of fixed carbon from the roots

~ 20% C budget in OSR

LMW organic compounds, proteins, polysaccharides, & phospholipids

Potential impacts

C (& N) loss

Mineral availability [P]

Detoxification [Al]

Modification of soil pH

Attraction of pests,

Attraction of pathogens, antagonists

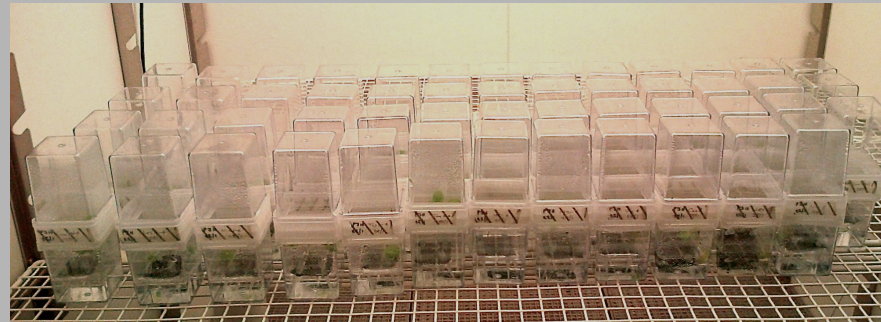
Nutrient cycling micro-organisms



BBSRC – CIRC: Yield improvement of oilseed rape through genetic manipulation of rhizosphere exudation

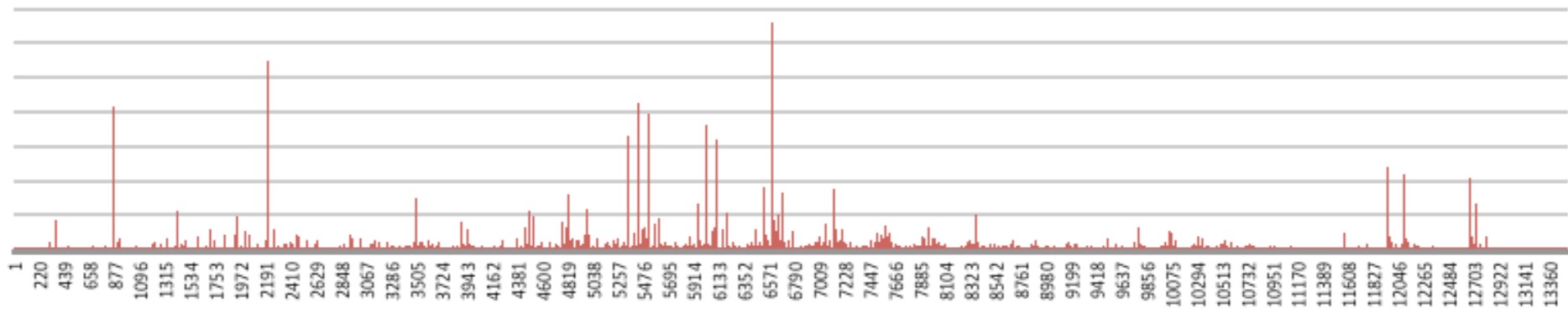
- ★ Determine variation in level & composition of rhizodeposits in OSR.**
- ★ Map QTL associated with variation in rhizodeposition.**
- ★ Assess impact of variation in on rhizosphere microbial diversity and function and on crop yield.**

Exudates harvested from hydroponic systems under CE

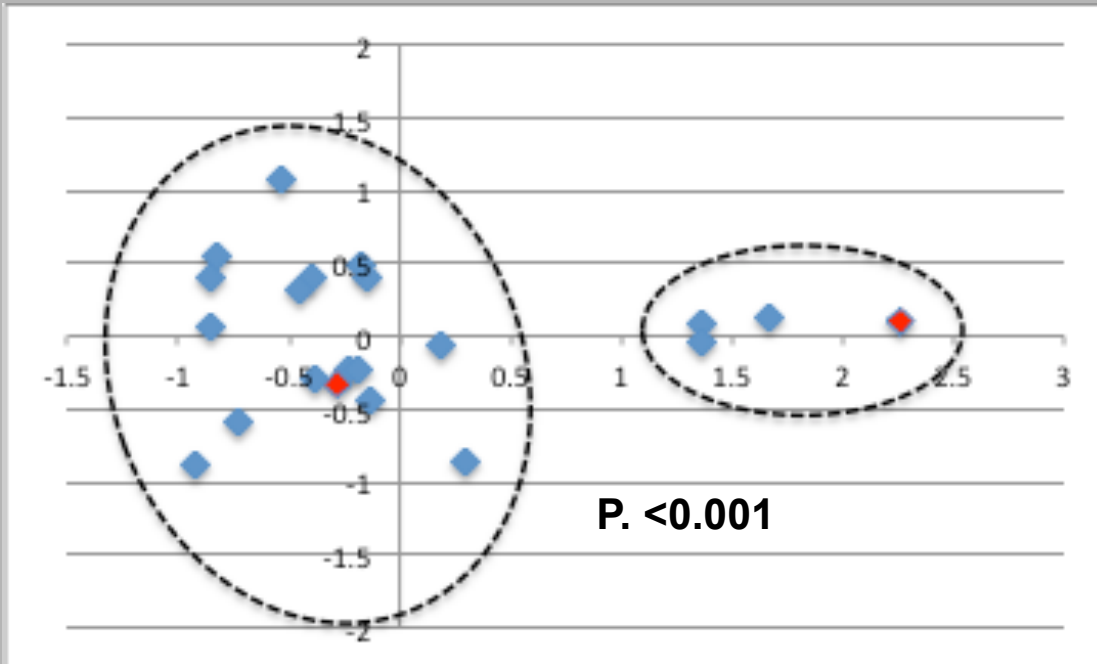


Qualitative and quantitative analysis of composition using ^1H -NMR and MS

Example FT-ICR -ve phase spectrum ~13,000 peaks



Investigation



Significant differences identified in exudate profiles of 21 OSR lines

Mapping parents with significant differences identified

QTL analyses underway on mapping population

Rhizosphere microbial analysis underway on lines (CE)

Investigation

- ✦ **Field trial underway with extreme lines**
 - Planted Sept 2014**
 - Due for harvest summer 2015**
- ✦ **Oil yield and quality data**
 - Rhizosphere microbiology (field)**
 - Meta-transcriptome – gene expression data**
 - Plant and microbiome**
- ✦ **Correlate data to elucidate relationships between plant genotype, rhizodeposits, microbial community composition, plant and microbial function and crop yield.**

University of Warwick

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(environmental microbiology)

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(*Brassica* genetics)

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(natural systems variation)

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Thank You



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