ROTATIONAL EFFECTS OF OILSEED CROPS: THE WITTLE BUGS WEALLY DO MATTER

PhD Dissertation Research

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Overall Objective

- Soil and rhizosphere microbial communities in agroecosystems may be affected by soil type, climate, plant species, and management.
- The plant species (oilseed crops) and management (rotation) factors will be investigated with four field scale experiments.
Field Scale Studies

- Canola (Davenport, WA)
  - Intermediate Rainfall (Annual Cropping Transition) Zone
- Camelina (Lind, WA)
- Safflower (Ritzville, WA)
- Rhizosphere (Ritzville and Mansfield, WA)
Rotational Crop vs. Biofumigation

- Research DOES involve brassica crops as rotational crops grown to maturity and harvested.
- Research DOES investigate effect of the intact plant material and residue on soil microbial communities.
- Research DOES NOT involve incorporation of green manures or seed meal for biofumigation purposes.
Washington - The Evergreen State
Microbial Community Biomarkers
Canola Study (Davenport)

0 to 5 cm

- WC
- WW
- SW-WC
- SW-WW

Biomarker group (nmol/g)

Fungi
AMF
Gram -
Gram +
T-PLFA 10x

All Years Combined

(b)
Microbial Community Biomarkers
Canola Study (Davenport)

![Graph showing microbial community biomarkers in canola study.]

- WC
- WW
- SWWC
- SWWW

Canonical 2 (16.68%)

Canonical 1 (79.45%)
Rhizosphere Microbial Community

Spring 2016

Biomarker groups (nmol/g)

- WC D
- WW D
- WC R
- WW R

Fungi
MYC
Gram +
Gram -
Total PLFA 10x
Rhizosphere Microbial Community
Spring 2016

![Diagram showing the distribution of microbial communities in the rhizosphere, with canonical axes and labels for different groups such as WC-D, WC-R, WW-D, and WW-R. The diagram also highlights categories like Fungi, Gram-, AMF, and Gram+ within the canonical space.]
Conclusions

• Reductions in SW yield following canola have been observed
• This effect has few references in the literature
• Some research indicates that brassica species have an effect on fungal pathogens
• For the same reasons, brassica species could effect beneficial organisms
• Data suggests that the fungal/mycorrhizal and total community are impacted as determined by PLFA
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Questions