

# Impact of shortened rotations on rhizosphere microbial populations

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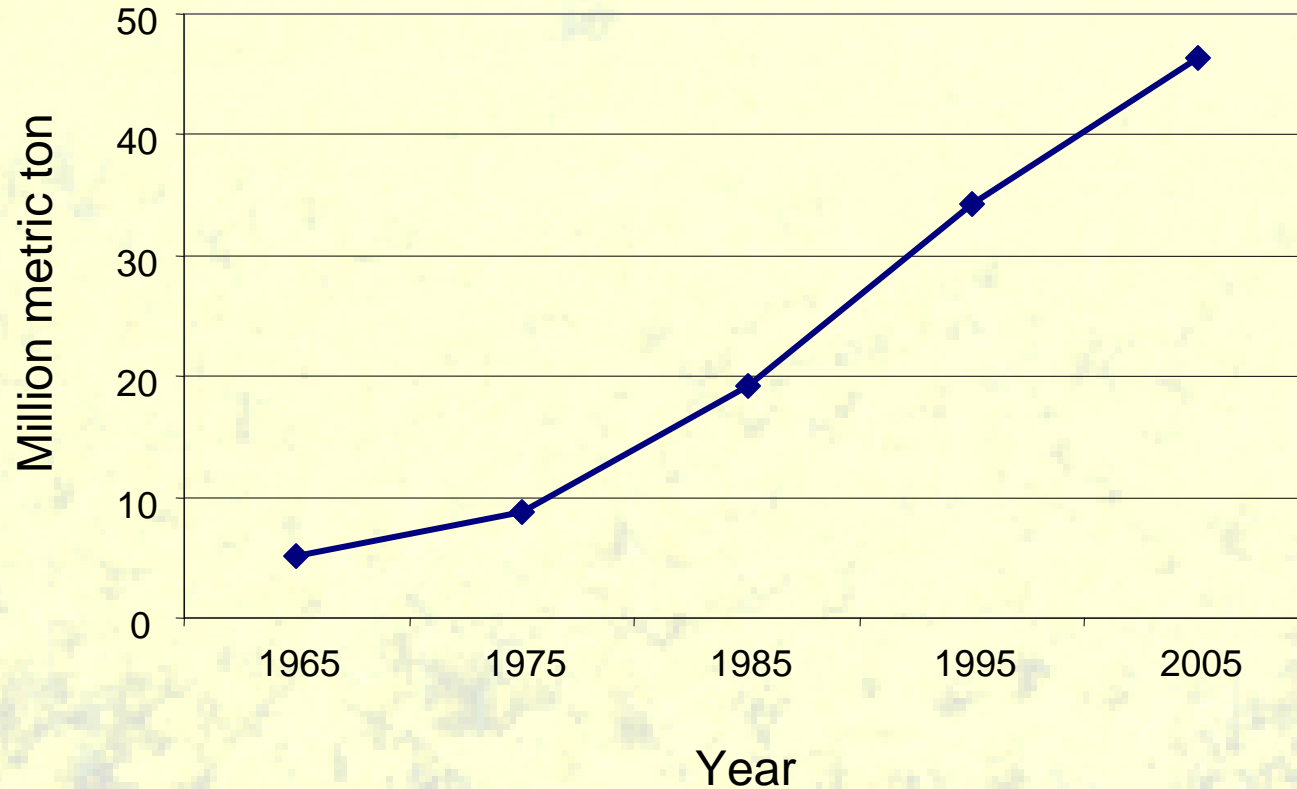
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# Crop rotation

- Crop rotation is usual practice
  - maintain or improve soil fertility
  - reduce build-up of plant pathogens
- Trend towards shortened rotations
  - yield decline

# Worldwide oilseed rape production



# Rotation treatments

O = Oilseed rape  
W = Wheat

- 1** Continuous rape (OOOO)
- 2** Continuous wheat (closest to) (OWWW)
- 3** Alternate wheat/rape (WOWO)
- 4** Rape after 2 years of wheat (OWWO)
- 5** First year of rape (WWWO)

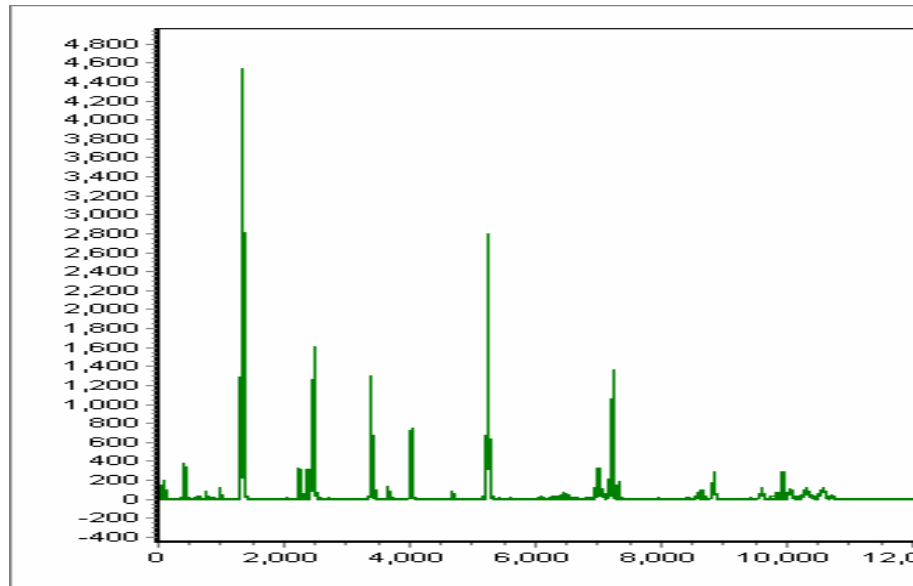
# DNA analysis



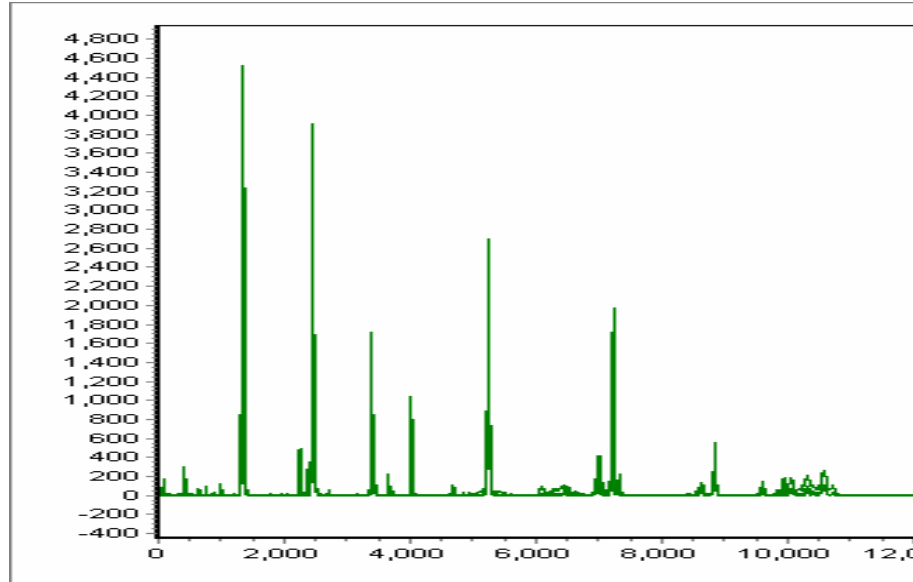
- DNA extracted from rhizosphere (fine roots and adhering soil) and bulk soil.
- The ribosomal RNA gene was amplified using generic fungal (ITS1f and ITS4r) labelled primers from the internal transcribed spacer (ITS) or bacterial (63f and 1087r) primers from 16s rRNA.
- The amplified PCR products were digested and used in Terminal Restriction Fragment Length Polymorphism (TRFLP) analysis, and cloned and sequenced to determine the taxonomic group of the organisms.

# Overlay of four replicate Bacterial Rhizosphere traces

Wheat  
(OWWW)

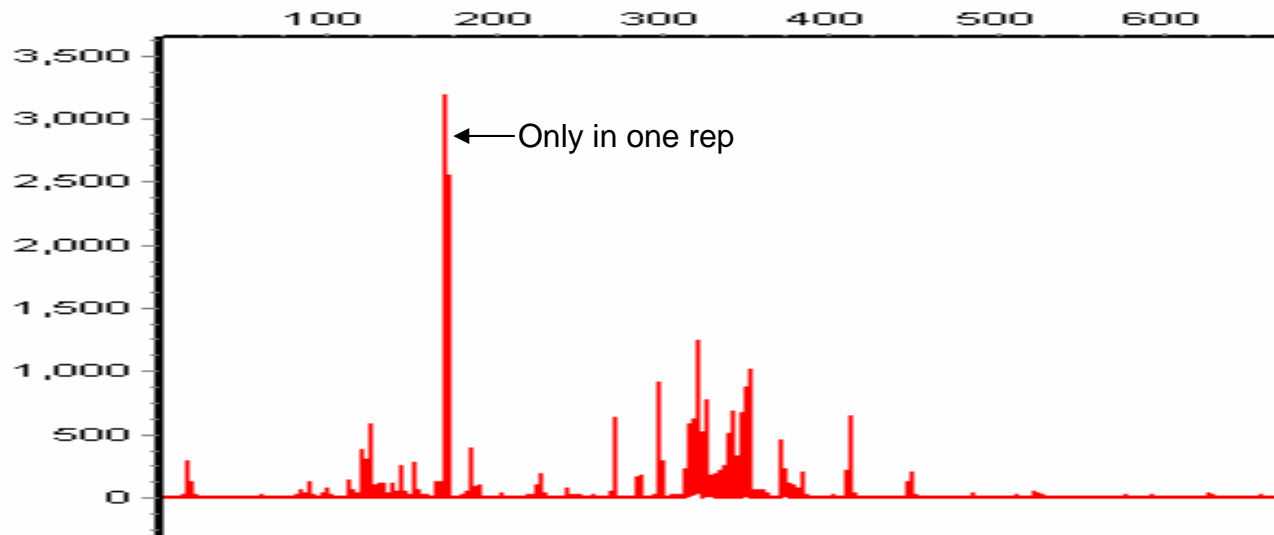


OSR  
(0000)

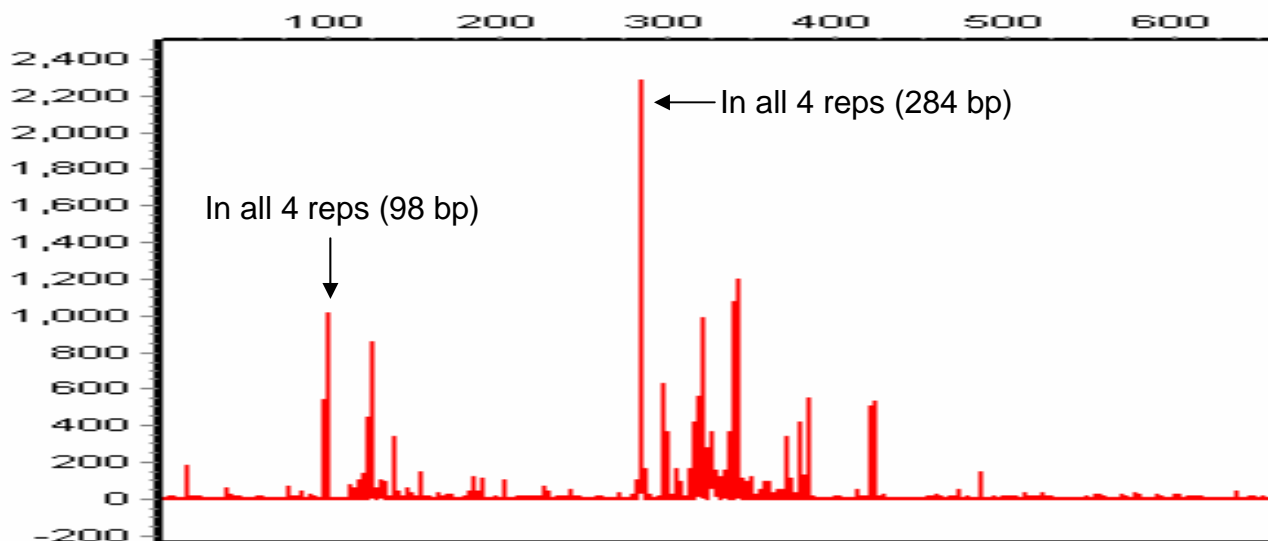


# Overlay of four replicate Fungal Rhizosphere traces

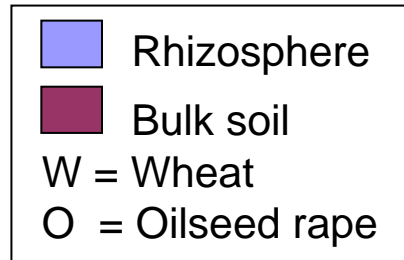
Wheat  
(OWWW)



OSR  
(O000)



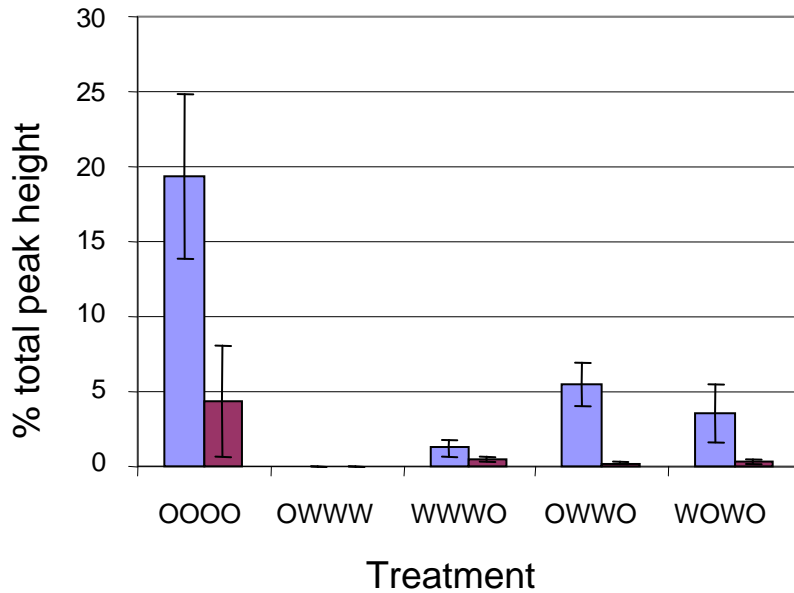
# TRFLPs (fungal species) showing significant differences between treatments



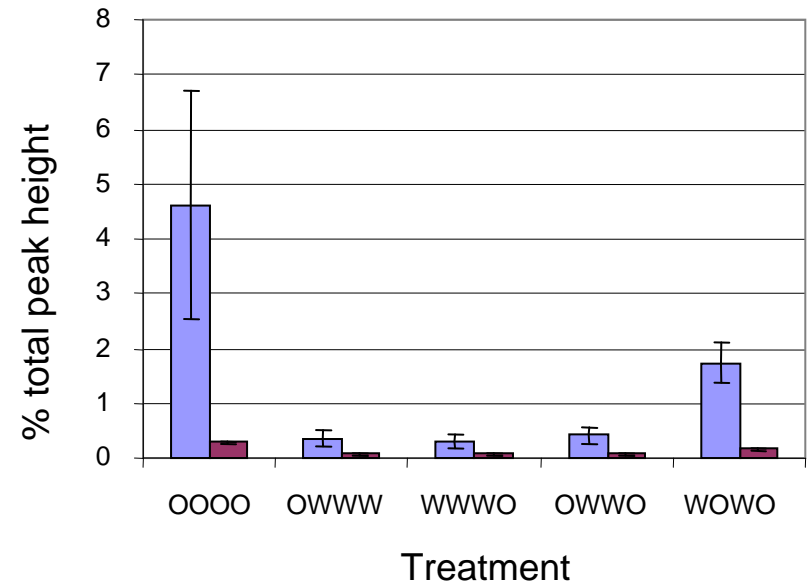
*Olpidium brassicae* (100 %)

*Pyrenochaeta lycopersici* (95 %)

TRFLP 284 bp



TRFLP 98 bp





# Field trials 2008/9



Rape after 2 yr wheat



Continuous rape

# Acknowledgments



Peter Mills

John Whipps

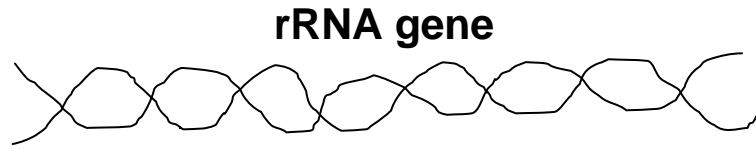
Gary Bending

Dave Chandler

Amanda Bennett

# TRFLP

Capillary electrophoresis



Amplified by PCR



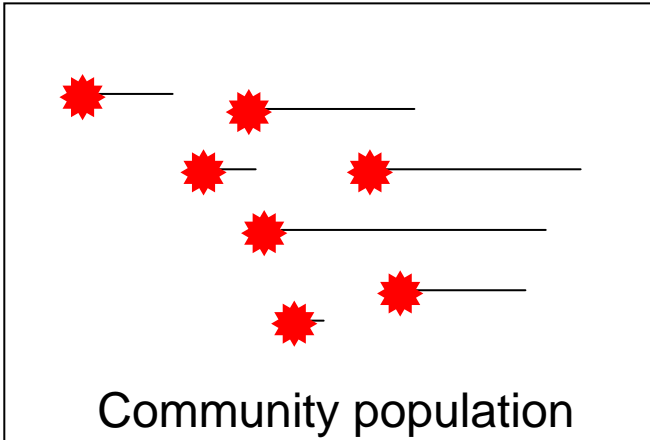
GCGC



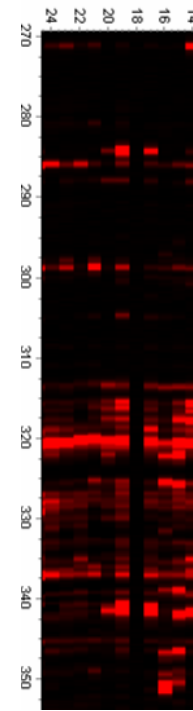
GCG



Digested with restriction enzyme



Community population



Chromatogram

