

EFFECT OF MIXED CROPPING ON RHIZOSPHERE MICROBIAL COMMUNITIES AND PLANT HEALTH

Hiddink G. A. ¹, Termorshuizen A. J. ¹, Raaijmakers J. M. ², van Bruggen A. H. C. ¹

¹ Biological Farming Systems group, Wageningen University, Wageningen
The Netherlands.

² Laboratory of Phytopathology, Wageningen University, Wageningen
The Netherlands.

Microbial communities in rhizosphere environments play an integral role in plant growth and health. As rhizosphere microbial communities are in part plant specific, the corresponding ecological processes could therefore also be specific [1]. We hypothesized that the microbial community in the rhizosphere of one plant species as well as its corresponding ecological functions can be affected by the rhizosphere of another plant species when grown in a mixture. In this study, the severity of *Gaeumannomyces graminis*, the causal agent of take-all disease, was investigated on roots of triticale grown in a mixture with clover. In a greenhouse bioassay with three soil types, take-all was less severe on roots of triticale grown in a mixture with clover than on roots of triticale grown alone ($P=0.08$). In both a field experiment and in a greenhouse bioassay, the disease incidence (proportion of diseased roots) was significantly lower when triticale was grown in a mixture with clover than when triticale was grown alone. Rhizosphere community composition, determined by PCR-DGGE (16S and 18S-rDNA), was different between clover and triticale. When triticale and clover were grown in a mixture, however, the composition of the rhizosphere microbial community of the mixed crops were more similar to each other. Bands only detected in the rhizosphere of sole cropped clover and absent in the rhizosphere of sole cropped triticale, were detected in the rhizosphere of triticale grown in a mix with clover. These results indicate that mixed cropping can induce changes in the rhizosphere microbial community and may affect plant health. The mechanism(s) underlying the observed effects are currently under investigation.

1. Wardle D.A., Bonner K.I., Barker G.M., Yeates G.W., Nicholson K.S., Bardgett R.D., Watson R.N., Ghani A., 1999. Plant removals in perennial grassland: Vegetation dynamics, decomposers, soil biodiversity, and ecosystem properties. *Ecological Monographs* 69:535-568.