Thesis Summary

The Growth and Colonisation of Rhizobia on Mycorrhizal *Trifolium Repens* (L.)

The growth and colonisation of genetically-marked *Rhizobium trifolii* on roots of mycorrhizal and non-mycorrhizal *Trifolium repens* were investigated on defined media in axenic tube cultures and in sterilised soil in open containers.

A study was first made on the combined growth of both microsymbionts on laboratory media to distinguish the direct microbemicrobe interactions from the indirect interactions mediated by the host. Interaction between *Glomus mosseae* and *R. trifolii* was neutral but two comparative slow-growing rhizobia enhanced endophyte hyphal development *via* an alkaline environment.

On agar-solidified media in axenic plant cultures, populations of two *R. trifolii* (effective strain RCR221Spe^r; ineffective strain RCR3Str^r) on four- to eleven-day and four- to five-week-old plant roots measured by direct plating on antibiotic-containing media were unaffected by VA mycorrhizal inoculation. Mycorrhizal infection levels were very low and erratic. Further studies to imimprove the method by varying the concentrations of P in the media confirmed its limited use.

In soil culture, mycorrhizal infections averaging 65% produced plant growth responses but numbers of RCR221Spe^r at one to seven days after inoculation were not different between mycorrhizal and non-mycorrhizal roots although greater numbers of RCR3Str^r were detected on mycorrhizal roots at some sampling stages.

In a later experiment, root colonisation by four *Rhizobium* strains (RCR-221Spe^r, RCR3Str^r, a non-infective *R. trifolii* RCR2Spe^r, the heterologous *R. lupini* RCR3211Spe^r) sampled during one to twenty days were unaffected by the different mycorrhizal treatments. Strains differed in their ability to colonise roots and the reasons for this are discussed.

Mycorrhizal roots did not affect the ratios of competing strains from a mixed population of RCR221Spe^r and RCR3-Str^r sampled one to nine days after inoculation.

The major finding of this work was that VA mycorrhiza do not affect *Rhizobium* strain colonisation of roots.

AHMAD IKRAM ABDUL JALIL

Awarded the degree of Doctor of Philosophy by University of Reading, 1985.

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