

Investigation into Plant Performance Under Different Mycorrhizal Innocula

Stephen Devlin and Ewan Robb
Grove Academy, Dundee
Craigie High School, Dundee



Scottish Crop Research Institute, Invergowrie, Dundee DD2 5DA Scotland.

Introduction

Mycorrhiza is the name given to the symbiotic relationship between a microscopic fungus and a plant. 80% of terrestrial plants form this mutualistic symbiosis where the fungi get a constant and direct supply of carbohydrate from the plant. In return the plant gains a supply of nutrients, such as phosphorus, that the fungus can absorb from the soil¹. Because of this the symbiosis is thought to be important for plant health and productivity².

The aim of our experiment was to assess the performance of the species *Rubus idaeus* (raspberry) in a variety of mycorrhizal innocula.

Our hypotheses were:

1. The performance of a raspberry plant is affected by the mycorrhizal soil inoculum in which it is grown
2. The performance of a raspberry plant will be best when grown in its natural soil
3. Soil innocula from sites with a high biodiversity will cause the greatest benefit to plant performance

Methods

A reciprocal pot experiment was set up in two polytunnels, using each combination of plant and soil.

Plant height, berry number (of tallest cane) and mineral content was measured.

Wild plants and soil:

Gella Bridge

Glen Doll

Kingoodie.

Commercial Cultivar:

Glen Ample

Arable soils:

SCRI

New Field - one year old plantation

Old Field - 25 year old plantation



Results

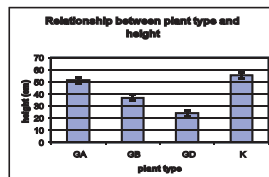


Figure 1: the height of each plant variety (mean values \pm I.s.d.). (P value < 0.001)

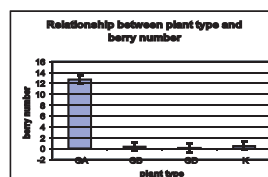


Figure 2: the mean number of berries on plants from each cultivar (mean values \pm I.s.d.) (P value < 0.001)

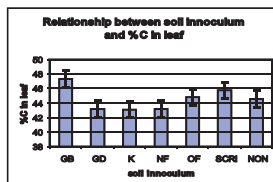


Figure 3: the mean percentage of carbon in plants grown in each soil innoculum (mean values \pm I.s.d.) (P value = 0.001)

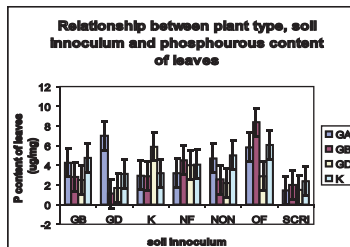


Figure 8: the mean phosphorous content for each combination of plant type and soil innoculum, showing the levels of phosphorus within cultivars in their natural soil compared to others. (mean values \pm I.s.d.) (P value = 0.003)

Conclusion

- Soil innoculum was seen to affect certain areas of plant performance. Height and berry number were largely unaffected but there were significant differences in mineral levels
- In general, plants of a certain cultivar did not perform best in their natural soil. Many performed better in a soil other than their native one
- Innocula from wild, undisturbed sites were not seen to benefit the plants' performance to a greater extent than agricultural innocula

References

1. Smith, S. E. & Read, D. J.
2. van der Heijden, M. G. A. et al. Nature 396, 69-72 (1998).

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