

Effect of nutrient supply to *Orobancha minor* parasitized and unparasitized clover host roots

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Introduction

There are approximately 4000 species of parasitic plants globally. They connect to the host plant by an organ called the haustoria and steal nutrients or water from their host. Parasitic plants have huge negative effects on agriculture as a result of attaching to the crops.

Orobancha minor is a holoparasitic plant which lacks the ability to photosynthesize, relying on its host for water and all nutrients including carbon (C). *O. minor* is an invasive species in Japan, parasitizing clover host plants. Infection by *O. minor* reduces host biomass, which is thought to be a result of changing host C status.

Previous research in our group hypothesized competition for C between the parasite and nitrogen (N) fixation by the legume host. Results suggested that parasite biomass accumulation was affected by light condition but not N supply, and no evidence of C competition between N fixation and the parasite was found. These results led to the hypothesis that N fixation and parasitism may occur on different roots, with C randomly allocated to parasitized and unparasitized roots.

Purpose of the Study

To determine the effect of nutrient supply to unparasitized and *O. minor* parasitized roots on the growth of clover plants.

Methodology

Host clover seeds were grown for a week before being transplanted to the split-root boxes shown in figure 1. Half the boxes had *O. minor* seeds in the left side chamber, while half the plants were unparasitized. Plants were given nutrient solution for three weeks and minus phosphate solution for two weeks to induce parasite attachment. Half the control and parasitized plants received N-containing nutrient solution to the left side root, and half received N-containing nutrient solution to the right side. N-deficient nutrient solution was supplied to the other chamber. Plants were grown for a further four weeks before biomass measurements.

Expected results

We hypothesize that parasitized plants will achieve lower shoot mass than control plants. Parasitized clover plants supplied nutrients to unparasitized roots will have significantly higher shoot mass than plants supplied nutrients to parasitized roots. We hypothesize that parasite mass will be higher when host plants are provided N to unparasitized roots, due to a higher rate of host photosynthesis.

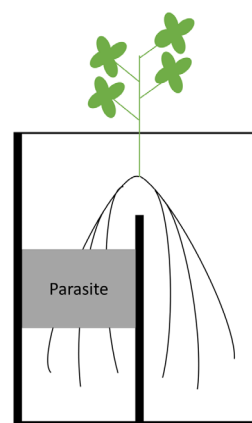


Fig 1. Split-root box design. The boxes were divided into two sections. In the parasitized treatment group, parasites were seeded in the left section

Results and Conclusion

Details will be explained at a presentation.

Reference

Jokinen JI, Irving LJ. 2019. Effects of light level and nitrogen supply on the red clover-*Orobancha minor* host-parasite interaction. *Plants*. 8(6):1–12. doi:10.3390/plants8060146.