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## ***Rhizobium* Systemically Suppresses Root Colonisation by the Arbuscular Mycorrhizal Fungus *Glomus mosseae* in the Rhizobial Non-Host Plant Barley**

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### **Abstract**

Rhizobial bacteria and arbuscular mycorrhizal fungi (AMF) can form mutualistic symbioses. Both symbionts improve the nutritional status (nitrogen and phosphorus) of their host in exchange for assimilates provided by their host and thus, promote the growth of many crop plants.

Whereas more than 80 % of all land plants are hosts for AMF, the host range of *Rhizobium* is limited (leguminosae). In legumes it has been shown that application of Nod-factor to one side of a split-root system or pre-inoculation of one side of a split-root system with *Rhizobium* systemically suppresses AM root colonisation on the other side.

In the present work, we tested whether a similar effect can be observed with the non-legume barley (*Hordeum vulgare* L. cv. Xanadu). Application of nod-factor to one side of a split-barley root system systemically reduced AM root colonisation on the other side. Application of one of the following mutant rhizobia strains (NGR234.GMS, NGR $\Omega$ rhcN, NGR $\Delta$ NodABC and NGR $\Delta$ NodD1), which are completely or partially deficient in nod factor production, to one side of a split-barley root system, resulted in a similar systemic reduction of AM root colonisation as observed with nod factor.

In presence of rhizobia the levels of salicylic acid (SA), an endogenous molecule in plant defence, were increased in barley roots.

Our results indicate that rhizobia are perceived by non-legumes in a similar way as by legumes and similar regulatory mechanism are activated. There are at least two different perception ways: one is activated by nod factor whereas another is Nod factor independent.

**Keywords:** Arbuscular mycorrhiza, *Rhizobium*, nod factor, barley, systemic effect