

Abstract

Aims

The focus of the study was to determine the symbiotic and growth response of three *Senegalia Senegal* (Syn. *Acacia Senegal*, gum arabic tree) provenances, namely Dahra (Senegal), Tera (Niger) and Makueni (Kenya) to inoculation with selected *S. Senegal*-nodulating rhizobia in soils from Dahra and Goudiry regions of Senegal, representing typical soil and environmental conditions for establishing gum arabic production plantations.

Methods

A greenhouse experiment was performed to evaluate the effect of 11 rhizobial strains on nodulation and growth of three *S. Senegal* provenances in two field soils, differing in nutrient status and indigenous rhizobia. After 4 months, plants were harvested for determination of nodulation, shoot and root dryweight.

Results

Nodulation and growth of *S. Senegal* varied in relation to rhizobial strain, provenance, soil type, and their interactions. Generally, nodulation was higher in Dahra than Goudiry soils, while Makueni provenance was the most compatible host. Inoculation had a significant effect on all parameters measured in Dahra field soil. By contrast, inoculation had a significant effect on height (shoot length), and shoot, root and total dry matter but not on nodulation. In the two field soils, seed provenance effect was significant for all parameters measured. The interaction between inoculation and provenance showed a significant effect on all parameters measured except nodule number in Dahra field soil while in Goudiry, the interaction had a significant effect on seedling height and shoot, root, and total dry matter but this effect was not significant with nodulation parameters.

Conclusions

S. Senegal is variable in its response to inoculation, it is therefore advantageous to select and match effective rhizobia-provenance symbionts for each site.

