

Field evaluation of rh/zob/um strains on Sainfoin (*onobrychis viciifolia Scop.*)

R.S. St. John-Sweeting and P.G. Tow

Roseworthy Agricultural College

Sainfoin (*Onobrychis* spp.) is a non-bloating, perennial forage legume adapted to dry calcareous soils. Forage quality, digestibility and palatability are excellent and it withstands hard grazing. It is tolerant or resistant to many common insect pests of *Medicago* spp. The main problems associated with the cultivation of sainfoin are its susceptibility to water logging and root rots and the absence of an effective strain of *Rhizobium* (1). Difficulties associated with sainfoin's inability to fix adequate amounts of nitrogen in symbiosis with *Rhizobium* have been reported by several workers (2, 3)

This experiment was designed to establish a better understanding of the problems associated with ineffective nodulation and to test a range of *Rhizobium* strains for effectiveness.

Methods

The experiment consisted of spaced sainfoin plants in two concurrent trials, one irrigated and one dryland. Each trial consisted of a randomized block design with 17 *Rhizobium* strains, including some locally isolated (RSY) strains and two uninoculated controls (with and without nitrogen) and 5 replications. Seedlings were raised and inoculated in the glasshouse before planting in rows in the field on August 20, 1981. Harvests of tops, roots and nodules were made on October 29 and December 8. Leghaemoglobin content of nodules was visually assessed. Duncan's Multiple Range Test was applied to calculate significant differences.

Results and Discussion

Under dryland conditions, strain RSY13 produced a significant increase of 74% top dry matter over the no-nitrogen control. Under irrigation conditions strains CC401, CC1107, RSY13, CC1061, CC1108, CC1109 and RSY14 were effective in producing a significant top dry weight mean increase of 122% over the control.

In December a significant positive correlation was found ($r=0.54^*$) between nodule number and top dry weight under both dryland and irrigation conditions. A significant positive correlation was also found ($r=0.77^{**}$) between leghaemoglobin level and top dry weight under both dryland and irrigation conditions.

Significant increases in weight, number and leghaemoglobin level of nodules due to irrigation were found. Under irrigation conditions a reduction in yield of control plants and those inoculated with ineffective strains was found; this effect was attributed to leaching of available nitrogen. Such an effect may also explain why more strains yielded significantly more than control plants under irrigation. This indicates likely importance of the masking effect of soil nitrogen in field evaluations of *Rhizobium* strains.

In the period of the experiment no effective wild strains were found on control plants in the Roseworthy Agricultural College soil. However, now that effective strains are available its agronomic potential can be more adequately studied.

St. John-Sweeting, R.S. 1981. International Congress on Dryland Farming. Working papers, V:11 August 25 - September 5, Adelaide.

1. Burton, J.C., and Curley, R.L. 1968. Sainfoin Symposium, Montana State University Bulletin 627: 3-5.
2. Ditterline, R.L., and Cooper, C.S. 1975. Montana State University Bulletin 681: 1-28.