

Studies on influence of rhizobial strains on growth and yield of cowpea cultivars

C. SHYAM RAJ NAIK¹, L. MADHUSUDHAN RAO¹, Y. SUNEETHA² AND T. SRINIVAS^{*3}

Department of Plant Physiology, College of Agriculture, Acharya N.G. Ranga Agricultural University, Rajendranagar, HYDERABAD (A.P.) INDIA

ABSTRACT

The influence of COC-10, TAL-169 and TAL-1000 rhizobial strains was investigated on Pusa Barsati, Pusa Kesari and C-152 cowpea cultivars with regards to nodulation, growth and yield. The results revealed significant differences among the cultivars, strains and their interactions for all the traits studied. Among the cultivars, Pusa Barsati was observed to be a high yielder. Further, COC-10 rhizobial strain was observed to be effective for increased nodule number, dry matter production, plant height, number of pods and seeds per plant in addition to grain yield for Pusa Barsati and Pusa Kesari cowpea cultivars, while TAL-1000 was effective for C-152 cultivar.

Key words : Cowpea, Cultivar, Growth, Nodulation, Rhizobia, Strain, Yield.

INTRODUCTION

Cowpea is an important pulse crop grown for seed, fodder and green manure purpose. It is also a good source of protein, calcium and iron. However, the crop yields are low as a result of its cultivation in poor and marginal soils with minimum attention. The crop yields can be significantly increased by rhizobial inoculation as cowpea, like other legumes is capable of fixing atmospheric nitrogen through symbiotic association with rhizobium bacteria. Further, the crops demand for fertilizer nitrogen could be significantly reduced by increasing the amount of nitrogen fixation through this symbiotic association. However, the amount of nitrogen fixed depends on the host cultivar and the rhizobial strain involved. Maximum nitrogen fixation occurs only when a highly effective and efficient strain interacts with a cultivar capable of supporting high nitrogen-fixation (Gajendragadkar and Vaishya, 1983). In this context, the present investigation was undertaken to identify suitable rhizobial strains for popular cowpea cultivars.

MATERIALS AND METHODS

The field study was conducted at Student's Farm,

College of Agriculture, Rajendranagar, Hyderabad on sandy loam soils with 7.60 pH, 0.47 per cent organic carbon, 253.53 kg/ha available nitrogen, 18.55 kg/ha available phosphorus and 301.73 kg/ha available potassium and the experimental material comprised of three popular cowpea cultivars, namely Pusa Barsati, Pusa Kesari and C-152 obtained from National Seeds Corporation, Hyderabad in addition to three rhizobial strains, namely COC-10, TAL-169 and TAL-1000 obtained from Agricultural Research Institute, Rajendranagar, Hyderabad.

Seeds of the cowpea cultivars were treated with the different rhizobial strains as per the procedure outlined by Singh and Chowbey (1971). An un-inoculated control was also included for each cultivar. The treatments were laid out in a factorial randomized block design with three replications. A spacing of 30 x 10 cm was adopted and a gross plot size of 3m x 4m was maintained for each entry in each replication. A common dose of nitrogen, phosphorus and potassium @ 20 kg N, 50 kg P₂O₅ and 40 kg K₂O ha⁻¹ was applied as basal through Urea, Single Super Phosphate and Muriate of Potash, respectively.

Observations on number of nodules per plant, dry matter production at 45 and 90 DAS, grain yield and yield component characters, namely plant height, number of pods per plant, number of seeds per plant and 100 seed weight were recorded from five randomly tagged plants in each plot and the data was subjected to standard statistical procedures outlined by Panse and Sukhatme (1978).

* Author for correspondence.

¹ Department of Plant Physiology, Agricultural College, Mahanandi, KURNOOL (A.P.) INDIA

² Krishi Vigyan Kendra, Deccan Development Society, ZAHEERABAD (A.P.) INDIA

³ Department of Plant Breeding, Agricultural Research Station, Ragolu, SRIKAKULAM (A.P.) INDIA