



## EFFECT OF RHIZOSPHERIC BACTERIA AND RHIZOBIUM INOCULATION ON NODULATION, GROWTH AND YIELD OF CHICKPEA (*CICER ARIETINUM* L.)

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### ABSTRACT

Field experiment during *Rabi* 2006-07 was conducted in sandy loam soil at Shamli to compare the efficiency of different rhizobacteria, alone and with *Rhizobium* on performance of chickpea (*Cicer arietinum* L.). Irrespective of rhizobacteria, *Rhizobium* sp. recorded numerical increases of 16.4 to 25.4 in nodule number and 21.7 to 44.4 % in nodule dry weight at different intervals. It also increased the grain and straw yields, by 10.8 and 14.4 %, respectively. Different rhizobacteria significantly influenced the nodule number, by 6.8 to 58.4%, nodule dry weight, by 8.24 to 115.8% and plant dry weight, by 0.6 to 30.4%, at different intervals. Grain and straw yields were 31 to 736 and 205 to 698 kg/ha higher following inoculation of different rhizobacteria. Rhizobacteria PUK-171 gave the highest number and dry weight of nodules at 60 days and grain and straw yield. It was also significantly superior to all the other treatments in grain yield production.

**Key words :** Chickpea, *Cicer arietinum* L., *Rhizobium*, Rhizospheric bacteria, Seed inoculation.

### INTRODUCTION

Legumes roots are colonized by several rhizospheric microorganisms and these organisms have definite influence on the survival and nodulation ability of inoculated rhizobia (Dashti *et al.*, 1998). Numerous rhizospheric microorganisms have been found to influence the nodulation and N<sub>2</sub> fixing capacity of rhizobia through synergism (Rautela *et al.*, 2001; Gupta *et al.*, 2003). However, compatibility of these microorganisms needs to be evaluated because of the possibility of antagonistic interactions among them. Co-inoculation of rhizobacteria with *Rhizobium* in pulse crops received much attention in recent years and their inoculation with rhizobia showed increased nodulation, N<sub>2</sub> fixation and yield in pot and

field conditions through a variety of mechanism (Burdman *et al.*, 1996; Khot *et al.*, 1996).

Chickpea is a major grain legume of India occupying 6.95 million ha area with a production of 5.47 m tones contributing 39.9% to the total production of pulses in the country. The average productivity of chickpea in India is about 815 kg/ha. Such low productivity of the chickpea may be attributed to several biotic and abiotic stresses associated with the crop including its cultivation on low fertile soils without adequate fertilizer and crop management. The crop has inherent capacity of nitrogen fixation symbiotically in association with *Rhizobium*. *Rhizobium* sp. nodulating Chickpea is highly specific in infectivity and do not show affinity with any member of