EFFECT OF RHIZOBIUM AND AM INTERACTION ON GROWTH AND YIELD OF URD BEAN CULTIVARS UNDER RAIN FED CONDITION.

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Abstract: Two varieties of urd bean (PU-35, T-9) inoculated with *Rhizobium* and arbuscular mycorrhiza fungi (applied through layering technique) were raised under rain fed field conditions. The interaction enhanced the morphological characters *i.e.*, plant height, number of leaves, branch number per plant, dry matter production, grain yield straw yield and harvest index also increased in the arbuscular mycorrhizal inoculated plants, however, it was higher when *Rhizobium* and arbuscular mycorrhizal fungi were applied together.

Keywords: Arbuscular mycorrhiza, Growth and Yield, Harvest index, *Rhizobium*, Urd bean

REFERENCES

Ahmad, M.H., Eaglesham, A.R.J., and Hassouna, S. (1981). Examining the potential for inoculant use with cowpeas in West African soils. *Trop.Agric.* (*Trinidad*), 58:325-335.

Azacon, C-Aguilar, G.D., Azcon, R and Barea, J.M. (1979). Endomycorrhizal fungi and *Rhizobium* as biological fertilizers for *Medicago sativa* in normal cultivation . *Nature*.279: 325-327.

Bagyaraj, D.J. and Hegde, S.V. (1978). Response of cowpea (*Vigna unguiculata* (L.) Walp.) to *Rhizobium* seed inoculation.*Curr. Sci.* **47**: 543-549.

Crush, J.R. (1974). Plant growth responses to vesicular-arbuscular mycorrhiza VII. Growth and nodulation of some herbage legumes. *New Phytol.* **73**: 743-749.

Entry, J.A., Rygiewicz, P.T., Watrud, I.S., Donnelly, P.K. (2002). Influence of adverse soil conditions on the formation and function of arbuscular mycorrhiza. *Advances Environ. Res.7:123-138.*

Freire, J.R. (1984). Important limiting factor in soil for the Rhizobium-legume symbiosis.[In] Biological Nitrogen Fixation and its Ecological Basis .(eds) M.Alexander. *PlenumPress.New York.pp.* 75-98.

Khan, I.A. (1985). Correlation and path coefficient analysis of yield components in mung bean (*Phaseolus aureus* Roxby). *Botanical Bulletin Academia Sincia*, 26: 13-20.

Malik, Madhu (2010). Effect of Plant Growth – Promoting Rhizobacteria (PGPR) and micronutrients on pigeonpea (*Cajanus cajan* (L.)Millsp.).*Ph.D. Thesis. Botany. C.C.S. Univ. Meerut.*

Mahadi, A. and Atabani, I.M.A. (1992). Response of *Bradyrhizobium* inoculated soya bean and lablab bean to inoculation with Vesicular Arbuscular Mycorrhiza. *Expl. Agric*.28:399-407.

Malik, P. (2009). Influence of *Rhizobium leguminosarum* inoculation and application of phosphorus and micronutrients on the growth, yield, nodulation and seed quality of Pigeonpea (*Cajanus cajan*). *Ph.D Thesis. Botany.C.C.S.Univ.Meerut.*

Mosse, B. (1973). Advance in the study of Vesicular Arbuscular Mycorrhiza. *Annu. Rev. Phytopathol.* 11: 171-176.

Nidhi (2010). Role of phosphate solubilizing bacteria (PSB) and *Rhizobium* with phosphorus and zinc in black gram (*Vigna mungo* L.Hepper). *Ph.D. thesis. C.C.S. Univ., Meerut.*

Panwar, J.D.S., Shukla, D.S. and Sirohi, G.S. (1986). Growth and developmental aspects in relation to yield of mung bean. *Indian J. Plant Physiol.* **29**(4): 312-317.

Rathi, B.K., Jain, A.K., Kumar, S. and Panwar, J.D.S. (2009). Influence of *Rhizobium leguminousserum* along with sulphur and micronutrients on quality aspect of black gram (*Vigna mungo*). *Legume Res.* 32(2):62-64.

Rednte, E.F. and Reeves, F.B. (1981). Interactions between vesicular-asbuscular mycorrhiza and *Rhizobium* and their effect on sweetvetch growth. *Soil Sci.* **132**(6):410-415.

Sahu, S. and Behera, B. (1972). Note on effect on *Rhizobium japonicum* inoculation on cowpea, groundnut and green gram. *Indian J. Agron.* 17: 359-360.

Sharma, Satyawati, Mishra, Seema, Singh, Anil Pratap and Vasudevan, Padma. (2008). Mycorrhiza: A potential approach for augmenting soil fertility and productivity. [In] Rhizospherestrategies for augmenting soil fertility and productivity by Shiva Dhar et al., Division of Agronomy, Indian Agricultural Research Institute, New Delhi. pp 86-114.

Singh, A., Ahlawat, I.P.S. and Saraf, C.S. (1984). Response of spring/summer green gram (*Vigna radiata* (L.) Wilczek) to irrigation and antitranspirants with and without mulching. *Indian J. Agron.* 28: 260-262.

Thakur, A.K. and Panwar, J.D.S. (1997). Response of *Rhizobium* – vesicular arbuscular mycorrhizal symbionts on photosynthesis, nitrogen metabolism and sucrose translocation in green gram (*Phaseolus radiatus*).*Indian J.Agric Science*. 67(6):245-248.*June*, 1997. Thiagrajan, T.R., Ames, R.N. and Ahmad, M.H. (1992). Response of cowpea (*Vigna unguiculata*) to inoculation with co-selected vesicular-arbuscular mycorrhizal fungi and *Rhizobium* strains in field trials. *Can. J. Microbiol.*38:573-576.

Vijaylakshmi (1988). Influence of benzyladenine on photosynthesis and assimilate partitioning in mung bean under different source-sink relationship. *M.Sc. Thesis, Plant Physiology P.G. School. I.A.R.I. New Delhi.*