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RESEARCH ARTICLE

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Response of summer clusterbean [*Cyamopsis tetragonoloba* (L.) Taub.] to irrigation scheduling and integrated nutrient management

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ABSTRACT

An experiment was conducted in summer seasons during 2004 and 2005 at ECFP Farm (Now, Regional Research Station), Anand Agricultural University, Anand to study the response of summer clusterbean [*Cyamopsis tetragonoloba* (L.) Taub.] to irrigation scheduling and integrated nutrient management under middle Gujarat conditions. Plant height at harvest was found significantly higher under 0.7 IW:CPE ratio whereas, dry weight of root nodules per plant at 45 DAS as well as number of branches and pods per plant at harvest were significantly higher under irrigation scheduling at 0.5 IW:CPE ratio. Irrigating the crop 0.5 IW: CPE ratio recorded significantly higher seed yield (1319 kg ha^{-1}) and registered the highest net realization (Rs. 13,822 ha^{-1}) and CBR (2.83). Application of 100 % RDF or 75 % RDF along with 10 t FYM ha^{-1} or 75 % RDF plus seed inoculated with *Rhizobium* + PSB recorded higher plant height, number of branches and number of pods per plant as well as significantly higher seed and straw yields and higher water user efficiency than control. While, application of *Rhizobium* + PSB inoculation along with 10 t FYM ha^{-1} recorded maximum number and dry weight of root nodules per plant at 45 DAS as compared to control and 100 % RDF. Application of 75 % RDF along with seed inoculation with *Rhizobium* + PSB recorded maximum net returns of Rs. 14,740 ha^{-1}, the highest CBR of 3.61 and save 25 % of chemical fertilizers.

KEY WORDS : Clusterbean, Integrated nutrient management, Irrigation scheduling, *Rhizobium*

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INTRODUCTION

Clusterbean [*Cyamopsis tetragonoloba* (L.) Taub.] is an important drought resistant leguminous crop of India grown in Rajasthan, Gujarat, Haryana, Utter Pradesh and Punjab. The cultivated area of clusterbean in the country during 2007-08 was 25.2 lack hectares with production of 7.5 lack tones. It is used for human consumption, cattle feed, green manuring, medicinal and industrial purposes as well as for soil improvement. Clusterbean has recently assumed significant role because of its gum (galactomannan) content (35-40 %). India is a leading exporter of guar gum and earns about Rs 731 crores annually. Clusterbean meal, the by-product of guar industries is used as concentrate for animals, which contains 42 per cent protein. Clusterbean is a short duration crop and could be grown in the summer season with assured irrigation facilities. Nutrient management is one of the important cost effective agronomic factors to augment the crop production. To compensate the short supply of inorganic fertilizers and due to recent price hike in it, the use integrated nutrient practices should be advocated.

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MATERIALS AND METHODS

Twenty-four treatments comprising of all possible combinations of three irrigation scheduling (I_1: irrigation at branching, flowering and pod development stages, I_2: irrigation at 0.5 IW:CPE ratio and I_3: irrigation at 0.7 IW:CPE ratio) with eight integrated nutrient management practices (N_1: control, N_2: 100 % RDF *i.e.* 20:40:0 NPK ha^{-1}, N_3: FYM @ 10 t ha^{-1} + 50 % RDF, N_4: FYM @ 10 t ha^{-1} + 75 % RDF, N_5: *Rhizobium* + PSB + 50 % RDF, N_6: *Rhizobium* + PSB + 75 % RDF, N_7: *Rhizobium* + PSB, N_8: FYM @ 10 t ha^{-1} +*Rhizobium* + PSB) were tested in a split plot design with four replications. The soil of the experimental field was loamy sand in texture having good drainage capacity. It was low in organic carbon and available nitrogen, medium in available phosphorus and high in available potassium. Gujarat Guar-1 variety was