



Enhancing the yield and yield attributes of chickpea by using nitrogenous fertilizer and rhizobium culture

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ABSTRACT

A field experiment was conducted on chickpea to study the effect of seed treatment with rhizobium and the different level of nitrogenous doses 25%, 50%, 75% and 100% of Recommended Dose of Fertilizer (RDF) for estimating the yield and the yield attributes. The experiment was laid out in Randomized Block Design (RBD) with three replications during Rabi season of 2017-2018 in the experimental field of Lovely Professional University, Phagwara, Punjab, India. The aim of experiment was to focus on the variations in yield due to rhizobium treatment and different level of nitrogenous doses. The collaboration of rhizobium culture showed variations in different treatments of chickpea. The best treatment was T₅: 100% RDF in chickpea brought out fundamentally a proper growth, development and yield of the crop during this experiment.

Key words: Crop, Inorganic fertilizer, Rhizobium

Received 15.08.2018

Revised 21.09.2018

Accepted 08.11.2018

INTRODUCTION

Chickpea, Gram or Bengal gram (*Cicer arietinum* L.) is the most commonly grown legume crop in the world based on total production after soybean, groundnuts, beans and peas [3, 4]. Gram is a fundamental nutritive crop yield of rural and urban family household of the poor in the developing world. It is a good source of protein with high vitality and nutritive esteem (EI- Karamany and Bahr, 1999). It is a rich source of protein, starch, vitamins and certain minerals, especially to the population of evolving countries [2].

Chickpea is a 90-120 days crop specially grown in Rabi season in the month of September- November and harvesting in February. Duration of the crop varies from variety to variety. The duration of the desi varieties are short while Kabuli varieties are longer period. In cooler region like northern India take longer period compared to moderately warm climate in southern part of India. Chickpea is suited to areas having low to moderate rainfall and heavy rainfall after sowing or at flowering stage are harmful for crops.

Rhizobiums are the microbes which settle the nitrogen through root nodules of crops. The fixing of nitrogen cannot be done independently without a plant host. Nitrogen fixation helps in the yield of crop in low nitrogen and less fertile soil.

Albayrak *et al.* [1] observed improvement in seed germination, root elongation and stimulation of leaf development by using rhizobium treatment. In addition development of root and proliferation of plants in response to activities of rhizobium enhanced the water and nutrient uptake [7, 3].

MATERIAL AND METHODS

Location

A field experiment was conducted during the 2017-18 in the experimental field of Lovely Professional University, Phagwara, Punjab. The soil of experimental plot was sandy loam having pH 7.2. The climate of the fields comes under Agro ecological sub region (northern plain, hot sub humid eco-region Punjab). Area comes under the semi arid and zone with annual rainfall 527.1 mm annually.

Treatment Details

For the present investigation Chickpea variety PBG-5 was used with seven different treatments. The combinations of seven treatments were tried in a three replication using Randomized Block Design

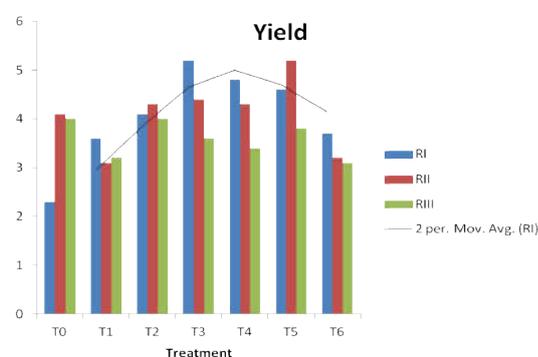
(RBD). The treatment were, T₀: control, T₁:seed inoculation by Rhizobium culture, T₂: 25% N, T₃: 50% N, T₄: 75%N, T₅:100% RDF and T₆:Rhizobium +100% of RDF). As per the treatment the seed was inoculated with Rhizobium about two hours before sowing. For the all treatments the first irrigation was given 15 DAS, the second irrigation was given 60 DAS. The morphological observations were recorded on different stages like vegetative, flowering and pod formation while the yield attributes were recorded after the harvesting of crops.

RESULTS AND DISCUSSION

Yields attributes

The experiment was mainly depends on different doses of nitrogen with collaboration of rhizobium culture which showed variations in different treatments of chickpea. The best treatment was T₅: 100% of RDF in chickpea brought out fundamentally a proper growth, development and yield of the crop. It improved the No. of pods, No. of branches, No. of grains per pods and as well as the yields. The plant height was significantly affected by the doses of different nitrogenous fertilizer application while the inoculation of rhizobium with the experimented seeds showed no significant variation on the growth and development.

Treatment	RI	RII	RIII
T ₀	2.3	4.1	4
T ₁	3.6	3.1	3.2
T ₂	4.1	4.3	4
T ₃	5.2	4.4	3.6
T ₄	4.8	4.3	3.4
T ₅	4.6	5.2	3.8
T ₆	3.7	3.2	3.1



CONCLUSION

From the present investigation it was presumed that the inoculation of rhizobium is firmly connected with the growth of development of chickpea but as per the experimental result the inoculation of rhizobium showed no significant affect on the growth parameters and yield attributes of chickpea. Among the different recorded data from the different treatment which was done in the experiment showed a great result with the different doses of nitrogenous fertilizer in field. It was discovered that the inoculation of the only rhizobium culture in chickpea crop certainly not significantly improved the growth and development parameters.

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CITATION OF THIS ARTICLE

Puyam Binita Devi, Ajeet Prakash, Diptanu Banik, and Mayur Darvhankar. Enhancing the yield and yield attributes of chickpea by using nitrogenous fertilizer and rhizobium culture. Bull. Env. Pharmacol. Life Sci., Vol 8 [1] December 2018 : 131-132