

Original Research Article

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## Influence of Priming on Growth, Yield and Seed Quality Parameters in Chickpea (*Cicer arietinum* L.)

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### ABSTRACT

#### Keywords

Chickpea, biopriming, *T. viride*, *P. fluorescense*, Neem leaf extract, Tulasi leaf extract, Coconut water, *Azospirillum*

#### Article Info

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The present study was done to know the efficiency of biopriming on growth, yield and seed quality in chickpea. The experimental factors were laid out in RBD with three replications. Chickpea seeds were bioprimed with 13 treatments combinations (*Trichoderma viride*@10gm/kg, *Pseudomonas fluorescense*@10gm/kg, Neem leaf extract@10ml/kg, Tulasi leaf extract@10ml/kg, Coconut water@10ml/kg, *Azospirillum*@10ml/kg). Among the above treatments tested, the treatment combination of *Trichoderma viride* + *Pseudomonas fluorescense*@10ml/kg shows the highest plant height (40.9), Number of primary branches (6.4), Seed yield per plant (19.45), Seed yield per plot (1284.36).

### Introduction

Chickpea (*Cicer arietinum* L.) 2n=16, belongs to family leguminaceae. It is also known as Bengal gram. Gram is the most important rabi pulse crop grown in India. Rank first in area as well as in production of gram (FAO, 2012). In world it is grown in an area of about 12.75 million hectares with an annual production of 8.76 million tonnes and average yield of 687 kg/ha. In India it is grown on an area about 8.26 million hectares with an annual production of 6.2 million tonnes and average

yield of 751 kg/ha. Madhya Pradesh is the largest producer of chickpea, which covers 2.63 million hectares area with the total annual production of 2.40 million tonnes with an average production of 913 kg/ha (Agriculture Ministry of India, NB Research, 2009).

Chickpea contributes 45-47% of the total pulse production and about 40% of total pulse growing area in the country. The average yield of chickpea is very low because it is mostly grown as rain fed crop with or without application of balance fertilizer.

The rain being generally separative, result in low production. Suitable status of moisture in the soil and balance fertilizer has a profound influence in the yielding capacity of chickpea. Chickpea is largely grown under residual moisture conditions.

Proper germination and better establishment of the plant for normal plant population is a major cause responsible for low yield of chickpea.

### **Materials and Methods**

The Research study was conducted at experimental research field, Department of Genetics and Plant Breeding, Naini Agriculture Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during Rabi-2018.

The experiment was conducted in Randomized Block Design (RBD) with three replications. [T<sub>0</sub>: Control, T<sub>1</sub>:*Trichoderma viride*@10gm/kg, T<sub>2</sub>:*Pseudomonas fluorescense*@10gm/kg, T<sub>3</sub>:Neem leaf extract@10ml/kg, T<sub>4</sub>:*Trichoderma viride* + *Pseudomonas fluorescense*@10ml/kg, T<sub>5</sub>:Tulasi leaf extract@10ml/kg, T<sub>6</sub>:*Pseudomonas fluorescense* + Coconut water@10ml/kg, T<sub>7</sub>:Coconut water@10ml/kg, T<sub>8</sub>:*Trichoderma viride* + Coconut water@10ml/kg, T<sub>9</sub>:Azospirillum@10gm/kg, T<sub>10</sub>:Coconut water + Tulasi leaf extract@10ml/kg, T<sub>11</sub>: Azospirillum + Coconut water@10ml/kg, T<sub>12</sub>:Tulasi leaf extract + Neem leaf extract@10ml/kg].

### **Results and Discussion**

In plant growth parameters (plant height (cm) and number of primary branches) of chickpea crop the treatment T<sub>4</sub> (*Trichoderma viride* + *Pseudomonas fluorescense* @10gm/kg) shown maximum performance in all plant growth parameters and it was followed by T<sub>1</sub>

(*Trichoderma viride*@ 10gms/kg) and the least performance was given by T<sub>0</sub> (control) while compared with the other treatment combinations.

The minimum days to 50% flowering (56 days) was recorded in treatment T<sub>4</sub> (*Trichoderma viride* + *Pseudomonas fluorescense* @ 10 gm/kg seed) and it was followed by treatment T<sub>1</sub> (*Trichoderma viride* @ 10 gm/kg seed). The maximum days to 50% flowering (69.8 days) was recorded in the treatment combination T<sub>0</sub> (control).

In yield parameters (number of pods per plant, seed yield per plant (g) and seed yield per plot (g)) of chickpea crop the treatment combination T<sub>4</sub> (*Trichoderma viride* + *Pseudomonas fluorescense* @10gm/kg) shown maximum performance in all the yield parameters and it was followed by T<sub>1</sub> (*Trichoderma viride*@ 10gms/kg) and the least performance was given by T<sub>0</sub> (control) while compared with the other treatment combinations

In seed quality parameters (germination (%), root length, shoot length, seedling length, seedling dry weight, vigour index-I and vigour index-II) of chickpea crop the treatment combination T<sub>4</sub> (*Trichoderma viride* + *Pseudomonas fluorescense* @10gm/kg) shown maximum performance in all the yield parameters and it was followed by T<sub>1</sub> (*Trichoderma viride*@ 10gms/kg) and the least performance was given by T<sub>0</sub> (control) while compared with the other treatment combinations

Based on experiment conducted the treatment combination T<sub>4</sub> [*Trichoderma viride* + *Pseudomonas fluorescense*@10gms /kg seed combination] is recommended as the best treatment combination for obtaining the better growth, yield and quality seed in chickpea crop (Table 1 and 2).

**Table.1** Mean performance of growth and yield parameters in chickpea during kharif-2018

<b>Treatments</b>	<b>Plant height (cm)</b>	<b>No. of primary branches</b>	<b>Days to 50% flowering</b>	<b>Days to maturity</b>	<b>No. of pods per plant</b>	<b>Seed yield per plant (g)</b>	<b>Seed yield per plot (g)</b>
<b>T0</b>	31.6	4.2	69.8	118.6	53.5	8.46	540.77
<b>T1</b>	38.1	6.2	58.3	111.3	62.6	17.36	1101.07
<b>T2</b>	37.5	6.0	59.2	110.2	61.1	16.65	1075.31
<b>T3</b>	34.6	5.3	65.5	113.8	57.7	9.367	599.61
<b>T4</b>	40.9	6.4	56	109.06	64	19.45	1284.36
<b>T5</b>	33.3	5.2	63.9	115.1	57	12.26	793.35
<b>T6</b>	33.2	4.8	64	114.8	58.2	12.63	820.99
<b>T7</b>	35	4.4	69.8	116.13	55.13	9.38	601.84
<b>T8</b>	35.8	5.13	67.26	115.5	58.06	11.01	689.41
<b>T9</b>	36.6	4.5	63.4	115.9	59.2	12.72	806.37
<b>T10</b>	34.28	5.2	65.2	112	56.6	9.54	592.1
<b>T11</b>	33.45	5.5	66.4	115	59	8.86	564.13
<b>T12</b>	35.07	4.8	65.2	116.2	57.5	9.87	635.21
<b>Mean</b>	<b>35.37</b>	<b>5.24</b>	<b>64.16</b>	<b>114.14</b>	<b>58.46</b>	<b>12.124</b>	<b>777.27</b>
<b>CD at 5%</b>	<b>0.758</b>	<b>0.675</b>	<b>3.74</b>	<b>3.97</b>	<b>2.85</b>	<b>1.32</b>	<b>88.47</b>
<b>SE. m</b>	<b>0.259</b>	<b>0.232</b>	<b>1.283</b>	<b>1.36</b>	<b>0.98</b>	<b>0.454</b>	<b>30.37</b>
<b>SE. d</b>	<b>0.368</b>	<b>0.329</b>	<b>1.82</b>	<b>1.924</b>	<b>1.39</b>	<b>0.642</b>	<b>42.95</b>

**Table.2** Mean performance of seed quality parameters in chickpea during kharif-2018

Treatments	Germination %	Root length (cm)	Shoot length (cm)	Seedling length (cm)	Seedling dry weight (mg)	vigour index-I	vigour index-II	Seed index
T0	84.25	12.9	8.6	21.60	11.35	1816.62	956.7	10.22
T1	90.75	18.62	12.8	31.43	19.55	2850.48	1773.2	15.64
T2	88.5	18.74	12.7	31.47	17.05	2784.37	1507.07	14.81
T3	86.5	16.28	10.4	26.71	15.7	2307.13	1360.92	12.78
T4	94	19.75	14.13	33.89	20.8	3185.25	1954.95	16.17
T5	88.25	16.12	10.03	26.16	14.05	2307.89	1239.47	14.45
T6	86.5	17.04	9.57	26.63	15.32	2305.77	1325.37	13.98
T7	87.5	13.68	9.29	22.98	12.45	2011.48	1087.8	10.8
T8	82	14.3	10.17	24.53	12.67	2009.97	1027.87	12.98
T9	84.35	15.81	9.54	25.35	14.32	2136.24	1207.12	14.17
T10	86	16.24	9.29	25.54	16.47	2197.44	1418.97	12.49
T11	87	15.15	10.71	25.88	17	2251.36	1480.6	12.92
T12	84.5	15.11	10.61	25.74	13.8	2175.42	1172.42	13.94
<b>Mean</b>	<b>86.923</b>	<b>16.1480</b>	<b>10.611</b>	<b>26.76</b>	<b>15.426</b>	<b>2333.80</b>	<b>1347.115</b>	<b>13.491</b>
<b>CD</b>	<b>6.05</b>	<b>2.06</b>	<b>2.34</b>	<b>3.29</b>	<b>2.67</b>	<b>320.109</b>	<b>239.163</b>	<b>2.67</b>
<b>SE.m</b>	<b>2.12</b>	<b>0.72</b>	<b>0.82</b>	<b>1.15</b>	<b>0.93</b>	<b>111.906</b>	<b>83.608</b>	<b>0.94</b>
<b>SE.d</b>	<b>2.98</b>	<b>1.02</b>	<b>1.16</b>	<b>1.63</b>	<b>1.32</b>	<b>158.259</b>	<b>118.240</b>	<b>1.32</b>

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