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Response of chickpea (*Cicer arietinum* L.) to FYM and Vermicompost Under rainfed condition

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Abstract

The experiment was conducted at the Rajola Agricultural Research farm of the Faculty of Agricultural Sciences, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot – Satna (Madhya Pradesh) during Rabi, 2017. The objective was to find out the best treatment comprising of FYM and vermicompost on growth and yield of Chickpea. In this investigation nine treatments were tested in randomized block design with three replications. Randomly five plants were selected to record the observations on different fifteen characters. Significantly maximum grain seed yield (19.3q/ha) was recorded under T6: (FYM₁V₂) followed by 18.7q/ha T9 (FYM₂V₂) and over control.

Keywords: Chickpea, FYM, vermicompost, seed yield, yield attributes

Introduction

Chickpea (*Cicer arietinum* L.) is the fourth largest grain legume crop in the world, about 90% of chickpea in the world is grown under rainfed conditions where drought is one the major constraints, limiting its production. Most production and consumption of chickpea takes place in developing countries. It is one of the dry edible legumes with best nutritional composition. It does not contain any specific major anti-nutritional or toxic factors often present in other legumes. Chickpea seeds contain an average of 23% proteins and the crop meets up to 80% of the nitrogen requirements from symbiotic nitrogen fixation. Recent studies have also shown that they can assist in lowering of cholesterol in the blood stream. Among the food legumes, chickpea is the most hypercholesteraemic agent; germinated chickpea was reported to be effective in controlling cholesterol level in rats. Glandular secretion of the leaves, stems, and pods consists of malic and oxalic acids, giving a sour taste. Medicinal applications include use for aphrodisiac, bronchitis, cholera, constipation, diarrhoea, dyspepsia, flatulence, snakebite, sunstroke and warts. Acids are supposed to lower the blood cholesterol levels. And Increase in nutrient availability especially of nitrogen is also noted with application of FYM in the soil and it is advantageous for its residual value. (Jouquet *et al.* 2010) [3] reported that both compost and vermicompost led to an improvement in soil properties with an increase in the pH, soil organic matter and nutrient content, compared to soil fertilized with chemical fertilizers. (Khan *et al.* 2015) [4] reported that application of vermicompost caused a substantial increase (54–83%) in the soil organic carbon pool of the soil.

Method and Materials

The experiment was conducted at experimental farm, Rajola farm Mahatma Gandhi Gramodaya Vishwavidyalaya Chitrakoot, Satna (M.P.) during the rabi 2017. The objective was to find out the best treatment comprising of FYM and vermicompost on growth and yield of Chick Pea, for this region. In this investigation nine treatments *viz.* T1 (FYM₀V₀), T2 (FYM₀V₁), T3 (FYM₀V₂), T4 (FYM₁V₀), T5 (FYM₁V₁), T6 (FYM₁V₂), T7 (FYM₂V₀), T8 (FYM₂V₁), T9 (FYM₂V₂), were tested in randomized block design with three replications. Randomly five plants were selected to record the observations on different characters Plant height (cm), Number of branches/plant, No of root nodules, root length, weight of wet root nodules, weight of dry root nodules, No of pod/plant, No of pod weight/plant, No of seed/plant, No of seed weight/plant, No of seed/pod, weight of 100 seeds, no of plant/plot, grain yield, straw yield.

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Result and Discussion

The result presented in table revealed that significantly higher plant height (30 DAS) (14.3 cm) was recorded in T6(FYM₁V₂) at 60 DAS and 90 DAS respectively. Significantly maximum number of branch/plant (30 DAS) (2.66 nos) was also recorded in the same treatment (T6) (FYM₁V₂) at 60 DAS and 90 DAS respectively. Highest No of root nodules (45 DAS) (22.66), root length (60 DAS) (15.66), weight of wet root nodules (0.65 gm), weight of dry root nodules (0.15 gm), No of pod/plant (40), No of pod weight/plant (15.78), No of seed/plant (45.75), was significant higher in T6(FYM₁V₂). Data further revealed that significantly highest No of seed weight/plant (12.43), No of seed/pod (1.45), weight of 100 seeds (1.45), no of plant/plot

(534) and highest grain yield (19.5 q/ha), straw yield (63.08) was also recorded in the same treatment i.e. (T6) (FYM₁V₂). In the present study all the growth parameters and yield contributory characters were significantly increased with the application of FYM and vermicompost and their interactions. The results of the study are corroborated by findings of several investigators. Ganeshamurthy *et al.* (2005) [2], Basir *et al.* (2008) [1], Singh *et al.* (2012) [5]. Atiyeh *et al.* (2002) [6] have reported that plants grown in 10–20% vermicomposted food wastes contained more chlorophyll than the plants grown on control. Sangwan *et al.* (2010) [7] have also reported that plants grown in cow dung vermicompost had higher total chlorophyll content than control.

Table 1: Effect of different treatments on all parameters during study

| S.No. | Treatment | Plant height (cm) | | | Number of Branches per plant | | | yield attributes of Indian chickpea | | | | | | yield attributes of Indian chickpea | | | | | | |
|-------|----------------|-------------------|--------|--------|------------------------------|--------|--------|-------------------------------------|------------------------|---------------------------------|--------------------------------|-------------------------|------------------------------|-------------------------------------|---------------------------------|----------------------|--------------------|-----------------------|--------------------|--------------------|
| | | 30 DAS | 60 DAS | 90 DAS | 30 DAS | 60 DAS | 90 DAS | Number of root nodules (45 DAS) | Root length cm(60 DAS) | Weight of wet root nodules (gm) | Weight of dry root nodules(gm) | Number of pod per plant | Number of Pod weight/p plant | Number of seed per plant | Number of seed weight per plant | Number of seed / pod | Weight of 100 seed | Number of plant /plot | Grain yield(q/ ha) | Straw yield (q/ha) |
| 1 | T ₁ | 9.66 | 20.9 | 34.3 | 2.4 | 9 | 12.93 | 9.33 | 13.66 | 0.3 | 0.06 | 29.6 | 10.9 | 39 | 8.97 | 1.09 | 23.88 | 504 | 14.41 | 45.2 |
| 2 | T ₂ | 13 | 22.7 | 34.9 | 2.46 | 9.26 | 13.4 | 15.66 | 15.33 | 0.28 | 0.11 | 34 | 11.4 | 40.73 | 9.72 | 1.22 | 26.9 | 468 | 16.9 | 54.12 |
| 3 | T ₃ | 13.1 | 22.4 | 38.9 | 2.53 | 9.3 | 15.8 | 22 | 14.5 | 0.39 | 0.11 | 33 | 10.75 | 37.06 | 9.04 | 1.23 | 27.17 | 492 | 17.53 | 55.83 |
| 4 | T ₄ | 12.7 | 22.9 | 38.5 | 2.53 | 10.26 | 15.66 | 13.33 | 17 | 0.19 | 0.09 | 35.66 | 14.86 | 43.6 | 11.4 | 1.19 | 27.05 | 513 | 16.32 | 54.02 |
| 5 | T ₅ | 12.5 | 21.8 | 37 | 2.46 | 9.46 | 15.4 | 20.33 | 14 | 0.3 | 0.12 | 29.66 | 11.62 | 37.26 | 9.13 | 1.25 | 26.39 | 519 | 18.21 | 57.94 |
| 6 | T ₆ | 14.3 | 24.1 | 39 | 2.66 | 10.46 | 16.26 | 22.66 | 15.66 | 0.65 | 0.15 | 40 | 15.78 | 45.73 | 12.43 | 1.45 | 28.39 | 534 | 19.3 | 63.08 |
| 7 | T ₇ | 13.2 | 21.3 | 38.4 | 2.53 | 8.93 | 13.4 | 15.33 | 15 | 0.38 | 0.12 | 37.93 | 15.42 | 44.93 | 12.21 | 1.17 | 25.79 | 531 | 17.04 | 55.51 |
| 8 | T ₈ | 13.9 | 23 | 37.9 | 2.53 | 9 | 14.13 | 18.66 | 15.16 | 0.49 | 0.14 | 39.86 | 15.55 | 45.13 | 12.4 | 1.12 | 27.56 | 513 | 18.46 | 62.04 |
| 9 | T ₉ | 13.9 | 22.6 | 38.1 | 2.6 | 10.26 | 13.66 | 21 | 15.33 | 0.4 | 0.13 | 30.93 | 11.94 | 44.46 | 9.49 | 1.19 | 27.95 | 510 | 18.7 | 60.06 |
| | Maximum | 14.3 | 24.1 | 39 | 2.66 | 10.46 | 16.26 | 22.66 | 15.66 | 0.65 | 0.15 | 40 | 15.78 | 45.73 | 12.43 | 1.45 | 28.39 | 534 | 19.3 | 63.08 |
| | Minimum | 9.66 | 20.9 | 34.3 | 2.4 | 9 | 12.93 | 9.33 | 13.66 | 0.3 | 0.06 | 29.6 | 10.9 | 39 | 8.97 | 1.09 | 23.88 | 504 | 14.41 | 45.2 |
| | Average | 12 | 22.5 | 36.6 | 2.53 | 9.73 | 14.59 | 15.99 | 14.66 | 0.47 | 0.105 | 34.8 | 13.34 | 42.361 | 10.7 | 1.27 | 26.13 | 519 | 16.85 | 54.14 |
| | SE+- | 0.29 | 0.57 | 1.12 | 0.083 | 0.474 | 0.679 | 1.893 | 0.385 | 0.091 | 0.024 | 2.928 | 1.19 | 0.053 | 0.999 | 3.276 | 0.595 | 9.931 | 0.272 | 1.024 |
| | CD5% | 0.87 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.798 | N/A | 0.824 | 3.096 |
| | FXV | 1.51 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

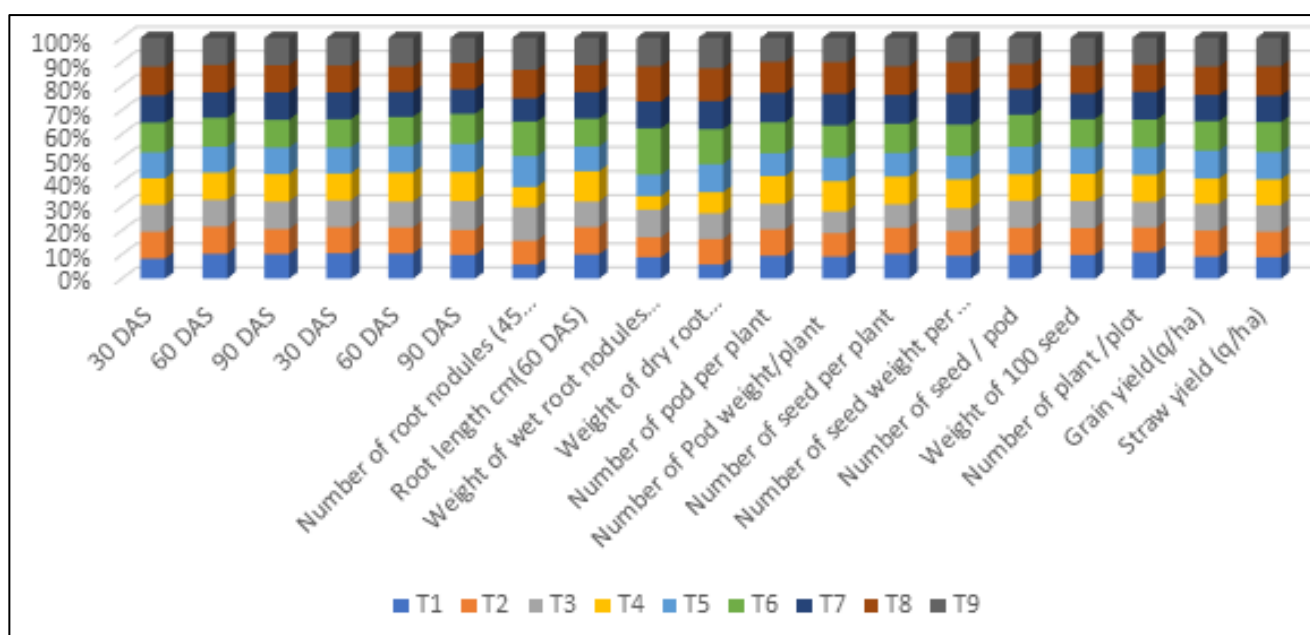


Fig 1: Effect of different parameters

Conclusion

The present investigation revealed that “Response of chickpea (*Cicer arietinum* L.) to FYM and Vermicompost Under rainfed condition” was aimed to evaluate the performance of chickpea under varied organic treatments. On the basis of present studies, conducted that a combination dose of F₁V₂ was optimum for growth and yield of Chickpea (*Cicer arietinum* L.) Under the given agroecosystem of experimentation.

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