



# International Journal of Research in Agronomy

E-ISSN: 2618-0618

P-ISSN: 2618-060X

© Agronomy

[www.agronomyjournals.com](http://www.agronomyjournals.com)

2024; SP-7(9): 465-467

Received: 02-06-2024

Accepted: 07-07-2024

**Aarti Kumari**

Department of Soil Science and  
Agricultural Chemistry, Naini,  
Sam Higginbottom University of  
Agriculture Technology and  
Sciences, Prayagraj,  
Uttar Pradesh, India

**Arun A David**

Department of Soil Science and  
Agricultural Chemistry, Naini,  
Sam Higginbottom University of  
Agriculture Technology and  
Sciences, Prayagraj,  
Uttar Pradesh, India

**Tarence Thomas**

Department of Soil Science and  
Agricultural Chemistry, Naini,  
Sam Higginbottom University of  
Agriculture Technology and  
Sciences, Prayagraj,  
Uttar Pradesh, India

**Corresponding Author:**

**Aarti Kumari**

Department of Soil Science and  
Agricultural Chemistry, Naini,  
Sam Higginbottom University of  
Agriculture Technology and  
Sciences, Prayagraj,  
Uttar Pradesh, India

## Response of vermicompost and inorganic fertilizers on physic-chemical properties of soil, growth and yield attributes of cowpea (*Vigna unguiculata* L.) var. ganga kanchan

**Aarti Kumari, Arun A David and Tarence Thomas**

DOI: <https://doi.org/10.33545/2618060X.2024.v7.i9Sg.1518>

### Abstract

The details of the materials used and technologies adopted during the courses for present investigations entitled “Response of vermicompost and inorganic fertilizers on physico-chemical properties of soil, growth and yield attributes of cowpea (*Vigna unguiculata* L.) var. Ganga kanchan”. This experiment was conducted during Zaid season 2023 on crop research farm of Soil Science and Agricultural Chemistry, Naini, SHUATS. The experiment was conducted in randomized block design with three replication consisting of nine treatments. The observations were recorded viz., plant height (cm), number of leaves per plant, number of pods per plant at 45 days, weight of pods per plant (kg) harvesting after 5 days and pods yield ( $q\ ha^{-1}$ ). Data on different aspects of cowpea crop were subjected to statistical analysis as per the procedure of randomized block design (Panse and Sukhatme, 1967). To achieve higher growth and yield of rainy cowpea variety Ganga Kanchan application of  $T_5$  [N, P, K @ 50% + vermicompost @ 100%] was found equally effective under Prayagraj conditions.

**Keywords:** NPK, vermicompost, growth, yield and cowpea

### Introduction

Cowpea [*Vigna unguiculata* (L.) Walp] belonging to family Leguminosae, chromosome No. ( $2n = 22$  or  $24$ ) also known as southern pea and black eye pea, is one of the most important vegetable. It is cultivated for its long, green or purplish pods to be cooked as vegetable or for dry seeds used as pulse. Its foliage is also used as fodder or green manure, producing 20-30cm elongated kidney shaped, 8-12mm long seeds. In India cowpea has been known, since the vedic period and it is grown almost throughout the country. It is fairly an inexpensive source of vegetable protein. Hence it deserves to get a place in every farms and kitchen gardens. Legumes are rich sources of protein (Singh 2002, Parrek and Chandra 2003)<sup>[12, 9]</sup> that is required for growth and maintenance of body. According to Aykroyd (1941)<sup>[2]</sup> fresh green pods of cowpea contains about 24.6% protein and vitamin B 500mg per 100g green pods. Protein content in the cowpea seeds varies from 23.09 to 28.75 percent (Singh, 1972)<sup>[13]</sup>. So it has got potential to solve the protein problems

Organic manure vermicompost help in the improvement of soil structure, aeration and water holding capacity of soil. Further, it stimulates the activity of microorganisms that makes the plant to get the macro and micro-nutrients through enhanced biological processes, increase nutrient solubility, alter soil salinity, solidity and pH. (Alabadian *et al.*, 2009)<sup>[11]</sup>. Though, they contain relatively low concentrations of nutrients and handling them is labour intensive, there has been large increase in their use over inorganic fertilizers as nutrient source (Kannan *et al.*, 2005)<sup>[6]</sup>.

Organic manures provide many nutrients, substrate for the growth of microorganisms, reduce the soluble and exchangeable aluminum temporarily by forming complexes and or chelates with organic substances in acidic soils and providing favorable environment for plant growth and also improved physical, chemical and biological properties (Chettri and Bandhopadhaya, 2005)<sup>[3]</sup>.

## Materials and Methods

The details of the materials used and technologies adopted during the courses for present investigations entitled “Response of vermicompost and inorganic fertilizers on physico-chemical properties of soil, growth and yield attributes of cowpea (*Vigna unguiculata* L.) var. Ganga kanchan” The experiment was conducted during Zaid season 2023 on crop research farm of the department of Soil Science and Agricultural Chemistry, Naini, SHUATS. It is positioned at 25.57 °N Latitude and 81.5°E latitude and about 98m above sea level. The experiment was conducted in randomized block design with three replication, consisting of nine treatments T<sub>0</sub> = Control, T<sub>1</sub> = [N, P, K @ 0% + vermicompost @ 50%], [T<sub>2</sub> = N, P, K @ 0% + vermicompost @ 100%], T<sub>3</sub> = [N, P, K @ 50% + vermicompost @ 0%], T<sub>4</sub> = [N, P, K @ 50% + vermicompost @ 50%], T<sub>5</sub> = [N, P, K @ 50% + vermicompost @ 100%], T<sub>6</sub> = [N, P, K @ 100% + vermicompost @ 0%], T<sub>7</sub> = [N, P, K @ 100% + vermicompost @ 50%] and T<sub>8</sub> = [N, P, K @ 100% + vermicompost @ 100%]. The observation were recorded viz., plant height (cm), number of leaves per plant, number of pods per plant at 45 days, weight of pods per plant (kg) harvesting after 5 days and pods yield (q ha<sup>-1</sup>). Data on different aspects of cowpea crop were subjected to statistical analysis as per the procedure of randomized block design. Significance of difference between means for different factors was tested through ‘F’ test and least significant differences were calculated whenever variance ratio was found significant at five percent level for treatment effect (Panse and Sukhatme, 1967)<sup>[8]</sup>.

## Results and Discussion

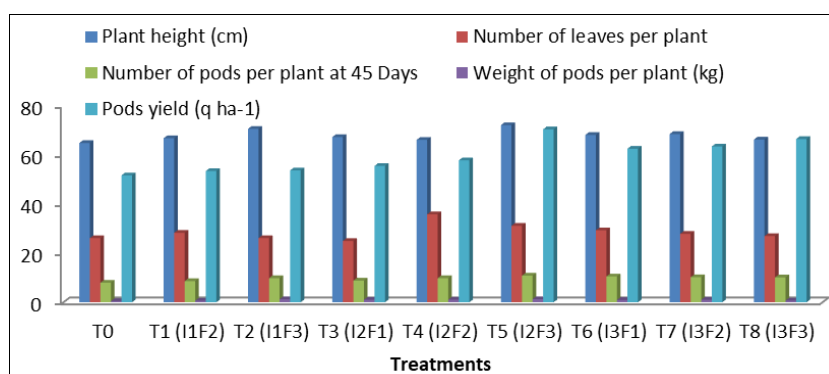
The plant height number of leaves per plant, number of pods per plant, weight of pods per plant and pods yield (q ha<sup>-1</sup>) increase significantly with the increase in the different levels of

vermicompost and inorganic fertilizers also showed significant results. the maximum plant height of cowpea at different days after sowing (DAS) at 30 DAS found in T<sub>5</sub> [N, P, K @ 50% + vermicompost @ 100%] which was (72.16cm) and the minimum plant height (64.88cm) was found in T<sub>0</sub> control. The maximum number of leaves per plant of cowpea at different days after sowing (DAS) at 45 DAS found in T<sub>5</sub>[N, P, K @ 50% + vermicompost @ 100%] which was (31.17) and the minimum number of leaves per plant (26.13) was found in T<sub>0</sub> control. The maximum number of pods per plant of cowpea at 1<sup>st</sup> harvest at 45 days found in T<sub>5</sub>[N, P, K @ 50% + vermicompost @ 100%] which was (10.87) and the minimum number of pods per plant (7.97) was found in T<sub>0</sub> control. The maximum weight of pods per plant of cowpea at 1<sup>st</sup> harvest at 45 days found in T<sub>5</sub> [N, P, K @ 50% +vermicompost @ 100%] which was (1.27kg) and the minimum weight of pods per plant (0.47kg) was found in T<sub>0</sub> control. The application of [N, P, K] @ 50% + vermicompost@ 100% recorded statistically at par values of plant height at various stages of observation. An observed improvement in overall vegetative growth of the crop with an application of N,P,K in this investigation is in conformity with those of Rajkhowa *et al.* (2002)<sup>[10]</sup>, Ramesh *et al.* (2006)<sup>[11]</sup> and (Tanwar *et al.*, 2010)<sup>[15]</sup>.

The mean pods yield (q ha<sup>-1</sup>) of cowpea was found significant at vermicompost and inorganic fertilizers. The maximum pods yield (70.45q ha<sup>-1</sup>) of cowpea was found in [N, P, K @ 50% + vermicompost @ 100%] which was and the minimum pods yield (51.70q ha<sup>-1</sup>) was found in T<sub>0</sub> control. Similar results were also reported due to application of [N, P, K @ 50% + vermicompost @ 100%] by Shukla and Dixit (1996)<sup>[14]</sup>, Rajkhowa *et al.* (2002)<sup>[10]</sup>, Goud *et al.* (2010)<sup>[5]</sup>, Chandramohan and Chandragiri (2007)<sup>[14]</sup> and Maheshbabu *et al.* (2008)<sup>[7]</sup>.

**Table 1:** Response of vermicompost and inorganic fertilizers on physico-chemical properties of soil, growth and yield attributes of cowpea (*Vigna unguiculata* L.) var. Ganga Kanchan

Treatment Symbol	Treatment combination	Plant height (cm)	Number of leaves per plant	Number of pods per plant at 45 Days	Weight of pods per plant (kg)	Pods yield (q ha <sup>-1</sup> )
T <sub>0</sub>	control	64.88	26.13	7.97	0.47	51.70
T <sub>1</sub>	[N, P, K @ 0% + vermicompost @ 50%]	66.83	28.30	8.63	0.63	53.45
T <sub>2</sub>	[N, P, K @ 0% + vermicompost@ 100%]	70.63	26.15	9.83	1.23	53.73
T <sub>3</sub>	[N, P, K @ 50% + vermicompost @ 0%]	67.30	24.97	8.83	1.00	55.53
T <sub>4</sub>	[N, P, K @ 50% + Vermicompost @ 50%]	66.17	35.84	9.83	1.05	57.83
T <sub>5</sub>	[N, P, K @ 50% + vermicompost @ 100%]	72.16	31.17	10.87	1.27	70.45
T <sub>6</sub>	[N, P, K] @ 100%+ vermicompost @ 0%]	68.16	29.30	10.53	0.93	62.54
T <sub>7</sub>	[N, P, K @ 100% + vermicompost@ 50%]	68.53	27.88	10.20	1.03	63.45
T <sub>8</sub>	[N, P, K @ 100%+vermicompost @ 100%]	66.30	26.98	10.14	0.70	66.50
	F-test	S	S	S	S	S
	C.D. at 0.05%	3.54	3.831	1.780	0.492	2.95
	S.Ed.	1.67	1.807	0.840	0.232	1.39



**Fig 1:** Response of vermicompost and inorganic fertilizers on physico-chemical properties of soil, growth and yield attributes of cowpea (*Vigna unguiculata* L.) var. Ganga kanchan

### Conclusion

To achieve higher growth and yield of rainy cowpea variety Ganga khanchan application of T<sub>5</sub> [N, P, K @ 50% + vermicompost @ 100%] was found equally effective under Prayaraj conditions.

### Acknowledgement

The authors are grateful to the Hon'ble Vice Chancellor of SHUATS and the department of soil science and agriculture chemistry, school of agriculture, Naini, SHUATS for providing their interest and encouragement to carry out the research work.

### References

1. Alababan BA, Adeoye PA, Folorunso EA. Effects of different poultry wastes on physical, chemical and biological properties of soil. *Caspian J Environ Sci.* 2009;7:31-35.
2. Aykroyd J. Health bulletin No. 23. Koonor Vegetables, production in India. Agra: Ram Prasad and Sons; c1980. p. 322.
3. Chettri M, Bandhopadhaya P. Effect of integrated nutrient management on fertilizer use efficiency and changes in soil-fertility status under rice-based cropping system. *Indian J Agril Sci.* 2005;75(9):596-599.
4. Chandramohan S, Chandaragiri KK. Effect of organic manures on growth and yield attributes in cotton + blackgram intercropping system. *Int J Plant Sci.* 2007;2:156-160.
5. Goud VV, Kale HB, Patil AN. Performance of organically grown mungbean under rainfed condition in vertisol. *J Food Leg.* 2010;23:218-222.
6. Kannan PA, Saravanan S, Krishnakumar, Natrajan SK. Biological properties of soil as influenced by different organic manure. *Res J Agric Biol Sci.* 2005;1:181-183.
7. Maheshbabu HM, Ravi H, Patil NK, Babalad HB. Effect of organic manure on plant growth, yield and quality of soybean. *Karnataka J Agric Sci.* 2008;21:219-221.
8. Panse VG, Sukhatme PV. *Statistical Methods for Agricultural Workers.* New Delhi: ICAR; 1967.
9. Parrek RD, Chandra R. Chickpea: Microbiology and nitrogen fixation. In: Masood Ali, Siv Kumar, Singh NB, editors. *Chickpea Research in India.* Lucknow: Ary Printing; c2003. p. 167-169.
10. Rajkhowa DJ, Saikia M, Rajkhowa KM. Effect of vermicompost with and without fertilizer on green gram. *Legume Res.* 2002;25:295-296.
11. Ramesh P, Singh M, Panwar NR, Singh AB, Ramana S. Response of pigeonpea (*Cajanus cajan*) varieties to organic manures and their influence on soil fertility. *Indian J Agric Sci.* 2006;76:252-254.
12. Singh KK. Kitani Mahatvapurna Hai Dalhani Faslain, Dalhan Utpadan. Technical Bulletin. Indian Institute of Pulse Research, Kanpur; c2002. p. 1-57.
13. Singh SP. Production technology of vegetable crops. Karnal: Agriculture Research Communication Centre; c1972. ARCC Service. 1:85.
14. Shukla RK, Dixit RS. Effect of rhizobium inoculation, plant population and fertilizer levels on yield, yield attributes and nutrient uptake of green gram (*Phaseolus radiatus*) and black gram (*Phaseolus mungo*). *Indian J Agron.* 1996;38:663-665.
15. Tanwar SPS, Rokadia P, Singh AK. Productivity, nutrient balance and economics of kabuli chickpea (*Cicer kabulium*) as influenced by integrated nutrient management. *Indian J*

Agron. 2010;55:51-55.