*Plant Archives* Vol. 25, Supplement 2, 2025 pp.293-295 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org
DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2025.v25.supplement-2.036

# EFFECT OF ORGANIC AND INORGANIC FERTILIZER ON YIELD PARAMETERS OF CHILLI (*CAPSICUM ANNUM.*) CV. KAVERI

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(Date of Receiving : 22-02-2025; Date of Acceptance : 06-05-2025)

**ABSTRACT**

A field experiment was conducted to assess the response of nutrient management on yield and yield attributes of Chilli (*Capsicum annum*) cv. Kaveri during the Rabi season of 2023-24 the experiment comprises treatment combinations of organic and inorganic fertilizers. Organic fertilizers enhance soil health and gradually release nutrients, whereas inorganic fertilizers offer quick nutrient availability but may degrade soil quality when over applied. The treatments combinations were $T_1$, Control; $T_2$, 70% RDF+ 30% FYM (25 t/ha); $T_3$, 40% vermi compost (2.5 t/ha) + 40% Neem cake (250 kg/ha) + 20% FYM ( 25t/ha); $T_4$ , 30% FYM ( 25 t/ha) + 40% Bio fertilizer (10g/kg seeds) + 30% RDF ; $T_5$ 30% FYM ( 25 t/ha) + 70% Bio-fertilizer (10g/kg seeds); $T_6$ , 50% vermi compost (2.5 t/ha) + 50% RDF ; $T_7$ , 30% Neem Cake (250 kg/ha) + 40% FYM (25 t/ha) + 30% RDF; $T_8$ , 40% Poultry manure (5 t/ha) + 30% Vermi compost (2.5 t/ha) + 30% FYM(25 t/ha). The experiment was outlined in Randomized Block Design with eight treatments and three replications. The data revealed that application of inorganic fertilizer with a combination of organic fertilizer and bio-fertilizer. $T_4$ (30%FYM + 40% Bio-fertilizer + 30% RDF) increases the yield and yield attributing characters of Chilli *i.e.* Total number of fruits per plant, Length of fruit, Width of fruit, Fruit set, Length of pedicle and Fruit yield per hectare.
***Keywords*** **:** Organic manure, inorganic fertilizer, yield parameter and chilli.

## Introduction

Chilli, also known as hot pepper (*Capsicum annuum* L.), is an important vegetable and cash crop in India. It belongs to the family *Solanaceae* and is believed to have originated in the tropical and subtropical regions of America (Dhaliwal, 2015). Chilli is widely recognized for its nutritional value, medicinal properties, and therapeutic uses. Additionally, it is used as a natural coloring and flavoring agent in various industries. Fresh green chilli fruits are an excellent source of vitamins A and C, providing approximately 292 IU of vitamin A and 67 mg of vitamin C per 100 grams. These nutritional benefits are attributed to the presence of various carotenoids, such as chlorophyll, pro-vitamin A, carotene, and oxygenated carotenoids like capsanthin and cryptocapsin (Deepa *et al.*, 2007). The red color of mature chilli fruits, attributed to the compound capsaicin, adds to its commercial value. India is the largest producer, consumer, and exporter of chilli, with China, Pakistan, and Bangladesh following. Together, these countries contribute nearly 50% of global chilli production. Chilli cultivation responds well to the application of both organic manures and inorganic fertilizers. Organic manures not only supply essential nutrients and trace elements but also enhance soil properties and overall soil health, which are crucial for sustained crop productivity. While the ongoing use of chemical fertilizers and pesticides threatens soil fertility and environmental well-being, organic nutrient sources present a more sustainable and environmentally friendly alternative Research has shown that a combined application of organic manures and inorganic fertilizers yields better results than the use of either alone. An integrated nutrient management approach using both organic and inorganic sources is

therefore essential for maintaining soil health and achieving sustainable productivity (Gokul *et al*., 2020).

## Materials and Method

A field experiment was conducted at Horticulture Research Farm,Kamla Nehru Institute of Physical and Social Sciences, Faridipur, Sultanpur Uttar Pradesh, INDIA. It is situated at $26^0$ 15' N Latitude and $85^0$ 05'E Longitude. This region has sub-tropical climate with extreme of summer and winter the temperature down to as low as 10 - $12^0$C during winter season especially in the month of December and January. The temperature rises up to 40- $43^0$C during summer season. The average rainfall in this area is around 800-1200mm annually. The experiment was outlined in a randomized block design with 08 treatments and 03 replications. The different treatments that were used in the experiment are as follows : $T_1$ – Control, $T_2$ - 70% RDF+ 30% FYM @ 25t $h^{-1}$ , $T_3$ - 40% Vermi compost @ 2.5t $ha^{-1}$ + 40% Neem cake @250kg $ha^{-1}$ + 20% FYM @ 25T $ha^{-1}$, $T_4$ – 30% FYM @ 25t $ha^{-1}$ + 30% RDF + 40% Bio fertilizer@10g/kg seeds, $T_5$ 30% FYM@ 25t $ha^{-1}$ + 70% Bio fertilizer@10g/kg seeds, $T_6$–50% Vermi compost @ 2.5t $ha^{-1}$ + 50% RDF, $T_7$ - 30% Neem cake @ 250 kg $ha^{-1}$ + 40% FYM@ 25t $ha^{-1}$ + 30% RDF, $T_8$ - 40% Poultry manure @ 5t $ha^{-1}$ + 30% Vermi compost @ 2.5t $ha^{-1}$ + 30% FYM @ 25t $ha^{-1}$. Transplanting was done in the month of September. The distance between row to row was 1m and plant to plant was 45cmx45cm. The organic and inorganic fertilizer were applied as par the treatment schedule. Yield and yield attributing characters viz. Total number of fruits per plant, Length of fruit (cm), Width of fruit (cm), Fruit set (%), Length of pedicle (cm) and Fruit yield per hectare (q/ha).

## Results and Discussion

Among the various treatments studied on vegetative parameters like Total number of fruits per plant, Length of fruit, Width of fruit, Fruit set, Length of pedicle and Fruit yield per hectare. The maximum total number of fruit per plant 80.00 was found in $T_4$ (30% FYM + 40% Bio-fertilizer + 30% RDF) which is at par with 79.66 in $T_7$ (30% Neem cake + 40% FYM + 30% RDF). The minimum total number of fruits per plant 66.00 was noted in $T_6$ (50% Vermi compost + 50% RDF). The data on the average fruit length were influenced by the combination of different nutrient sources. Results revealed that in $T_4$ (30% FYM + 40% Bio-fertilizer + 30% RDF) exhibit the maximum length of fruit 09.33 cm followed by 08.66 cm in $T_5$ (30% FYM + 70% Bio-fertilizer) while the minimum length of fruit 06.00 cm was observed in $T_1$ (Control). The analyzed data on width fruit influenced by various nutrient sources. The maximum width of fruit 03.00 cm was recorded in $T_4$ (30% FYM + 40% Bio-fertilizer + 30% RDF) which is at par with 02.66 cm in $T_5$ (30% FYM + 70% Bio-fertilizer). The minimum value of fruit width of 2.00 cm was observed in T1 (Control). The data collected on Fruit set in percent determined by different nutrient sources. Results revealed that $T_4$ (30% FYM + 40% Bio-fertilizer + 30% RDF) exhibit the maximum Fruit set 64.33% followed by 58.33% in $T_6$ (50% Vermi compost + 50% RDF). The lowest fruit set 38.33 % was found in $T_1$ (Control). The maximum length of pedicle 02.00 cm was collected in $T_4$ (30% FYM + 40% Bio-fertilizer + 30% RDF) which is at par with 01.83 cm in $T_3$ (40% Vermi compost + 40% Neem cake + 20% FYM). The minimum length of pedicle 01.16 cm was noted in $T_1$ (Control). The data pertaining on Fruit yield per hectare was affected by various nutrient sources. Results revealed that $T_4$ (30% FYM + 40% Bio-fertilizer + 30% RDF) exhibit maximum Fruit yield per hectare 113.33 q/ha. Followed by 68.00 q/ha. in $T_8$ (40% Poultry manure + 30% Vermi compost + 30% FYM). A minimum fruit yield of 50.00 q/ha was observed in $T_1$ (Control).

## Discussion

Although, data revealed that there is no significant variation among the treatments, but replacement of half dose of inorganic fertilizers with the organic or bio-fertilizer has sustained the growth and flowering without negative impact. It means slow releasing organic and bio-fertilizer has maintained the availability of nutrients thus increases yield and yield attributing characters. The increase in Total number of fruits per plant, fruit length, Width of fruit, Fruit set, Length of pedicle and Fruit yield per hectare may be attributed to enhanced leaf production, which leads to greater photosynthetic activity and, consequently, higher carbohydrate synthesis. These carbohydrates are then translocated from the source (leaves) to the sink (reproductive organs), resulting in increased fruit length, as observed by Shabir *et al.* (2017). This may be attributed to efforts aimed at maintaining long-term soil health and productivity. The current trend explores the possibility of supplementing chemical fertilizers with biofertilizers to achieve sustainable crop growth. Similar observations have been reported by Chatterjee *et al.* (2014) in tomato and Janaki *et al*. (2019) in chillies. But in this similar finding have significant effect on yield and yield attributing characters which may be due to organic fertilizers are slow releasing as compared to inorganic which are highly mobile. Therefore, it can be concluded that replacing the half quantity of inorganic fertiliser with the organic ones are more sustainable for the environmental and soil

factors without affecting the yield. Moreover, reducing dependency on inorganic fertilizers in favour of organic manure proved beneficial, significantly enhancing soil structure, water-holding capacity, nutrient availability, microbial activity, soil health, and reducing soil erosion.

**Table 1 :** Effect of organic and inorganic fertilizers on yield parameters

| Treatments | Total number of fruits per plant | Length of fruit (cm) | Width of fruit (cm) | Fruit set (%) | Length of pedicle (cm) | Fruit yield per hectare (q) |
|---|---|---|---|---|---|---|
| $T_1$ | 70.00 | 06.00 | 02.00 | 38.33 | 01.16 | 50.00 |
| $T_2$ | 71.00 | 08.33 | 02.33 | 38.33 | 01.16 | 60.00 |
| $T_3$ | 75.00 | 08.00 | 02.66 | 43.33 | 01.83 | 66.66 |
| $T_4$ | 80.00 | 09.33 | 03.00 | 64.33 | 02.00 | 113.33 |
| $T_5$ | 71.67 | 08.66 | 02.66 | 41.66 | 01.66 | 66.66 |
| $T_6$ | 66.00 | 08.33 | 02.33 | 58.33 | 01.30 | 70.00 |
| $T_7$ | 79.66 | 07.66 | 02.66 | 40.33 | 01.60 | 54.33 |
| $T_8$ | 78.66 | 07.33 | 02.00 | 42.00 | 02.00 | 66.00 |
| C.D | NS | NS | NS | 11.86 | NS | 28.38 |
| SE(d) | 04.52 | 01.75 | 01.17 | 05.47 | 00.69 | 13.10 |

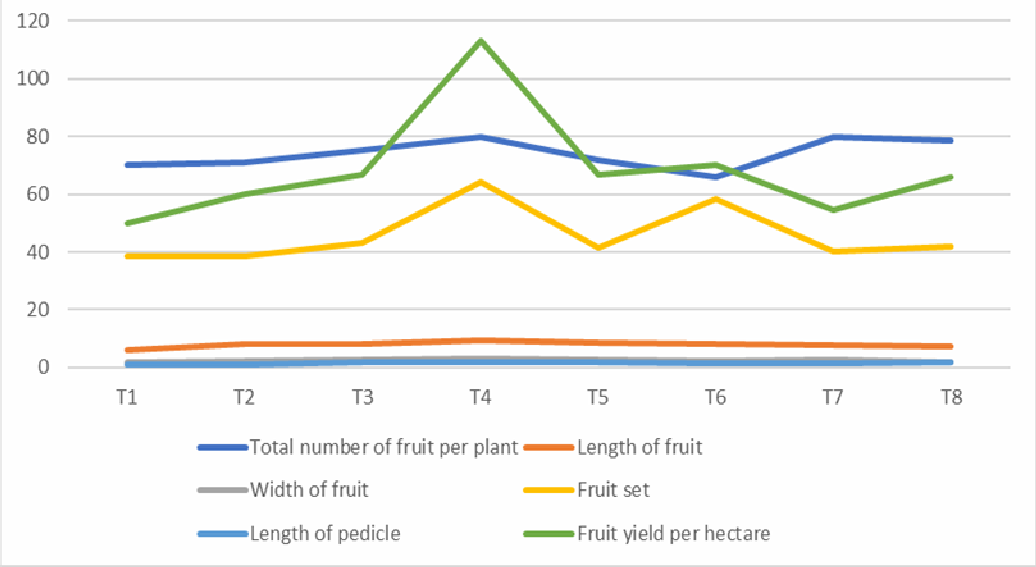


**Fig. 1:** Effect of organic and inorganic fertilizers of yield parameters

## Conclusion

The results revealed that the application of $T_4$ (30% FYM (25t/ha) + 40% Bio- fertilizer + 30% RDF) improved the yield parameters of chilli. The maximization of chilli production in this study may be due to combined of application nutrients from different sources which improves the nutrient efficiency. For yield maximization and yield attributing improvement in chilli, the farmers can follow the integrated nutrient management application from different naturally available sources leading to sustainability and profitability.

## References

Chatterjee, R. and Bandyopadhyay, S. (2014). Studies on Effect of Organic, Inorganic and Bio-fertilizers on Plant Nutrient Status and Availability of Major Nutrients in Tomato. *International Journal of Bio-resource and Stress Management,* **5**(1): 093-097.

Deepa, N., Kaur, C., George, B., Singh, B. and Kapoor, H.C. (2007). Antioxidant constituents in some sweet pepper genotype during maturity. *LWT-Food Sci Technol*., **40**, 121-129.

Dhaliwal, M.S. (2015). Handbook of Vegetable Crops. Kalyani Publications, India.

Gokul, D., Poonkodi, P. and Angayarkanni, A. (2020). Effect of integrated nutrient management on the growth and nutrient content of chilli (*Capsicum annum* L.). *Int. J. Chem, Stud*., **8**(4): 2647-2651

Janaki, D., Poorniammal, R. and Rajangam, J. (2019). Effect of organic source of fertilizers along with inorganic on growth, yield and quality of Chillies (*Capsicum annum* L) var PKM. IJCS, **7**(3), 2755-2757.

Shabir, M. (2017). Student-Teachers' Beliefs on the Use of L1 in EFL Classroom: A Global Perspective. *English language teaching*. **10**(4):45-52.