IMPACT OF ORGANIC MANURES AND INORGANIC FERTILIZERS ON GROWTH, YIELD AND IT'S ATTRIBUTING TRAITS OF CHILLI(*Capsicum annum* L.)

ABSTRACT

The experiment wascarried out to explore the "Impact of organic manures and inorganic fertilizers on growth, yield and it's attributing traits of Chilli (*Capsicum annum* L.)". The experiments were conducted during 2021-2022 at experimental farm of Department of Horticultural sciences, Naini Agriculture Institute, Prayagraj, Uttar Pradesh. RDF, vermicompost, poultry manure,farm yard manure and inorganic fertilizers were used as treatments. Eight different doses were recommended for each treatment. Experiment was conducted using Randomized Block Design (RBD). The performance of growth, yield, and quality is analysed. The Treatment T4 - 100%RDF+ (5t vermicompost +2.5t poultry manure)performed well with a better Plant height of 77 cm at 90 days, no of branches 15.32, days to 50 % flowering 36.32 days, Number of fruits per plant 75.32, fruit length 11.64cm, Number of seeds per fruit 62.66, test weight of 6.68 g and fruit yield per plant was 845.80 g. Control treatment showed the lowest growth, yield, and quality response.

Keyword:Chilli, Inorganic fertilizer, Organic manure, Vermicompost, Poultry Manure.

1. INTRODUCTION

Among the most valuable crops in the world, chilli is used both as a vegetable and a spice. It is an excellent source of vitamin A, C, and E. Capsaicin is the compound responsible for chilli's pungency. Chillies have numerous medicinal properties, especially for pain relief and cancer prevention. According to their export share, India is a major chilli producer with 25 % and China 24 %[1]. The chilli plant belongs to a group of warm humid tropics or subtropics that grows up to 600 meters above sea level. In India, major chilli-growing states are Andhra Pradesh, Karnataka, UP, Rajasthan, etc. Inorganic and organic fertilizers are applied to the soil to improve its fertility. Consequently, the soil becomes more fertile and plants become healthier. Although some fertilizers have a positive effect on crop yield when compared with others, they are not always effective. In addition, the constant use of chemical fertilizers has caused soil health to deteriorate. Due to these reasons, Integrated Nutrient Management (INM) is being given increased importance. Organic manures, as well as inorganic fertilizers, are both effective in growing chilli plants. Besides providing major nutrients and minerals, organic manures also improve many soil properties and soil health that contribute to crop production. It is therefore imperative to use organic and inorganic fertilizers along with bio-fertilizers in different combinations.Vermicompost application increases the N2-fixing bacterial and actinomycetes populations. As a result, phosphorous and nitrogen are more readily available in the soil. The process of vermicomposting converts eco-friendly humus into organic matter through aerobic, biological action. By stimulating soil microbial activity, vermicompost enhances its quality. This increases oxygen availability, keeps soil temperatures normal, improves nutrient content, increases soil porosity and water infiltration, and improves the quality and yield of plants. In addition to hummus, vermicompost contains micronutrients like nitrogen (2-3%), phosphorus (1.55-2.25%), and potassium (1.85-2.25%) bySnr et al.,[2]. Moreover, a variety of beneficial soil microbes are found, such as nitrogen-fixing bacteria and mycorrhiza fungi. Several scientific studies have shown that vermicompost is a miracle growth enhancerby Govindapillaiet al.,[3].When poultry manures are applied to the soil, a huge amount of plant nutrients such as N.P.K. and Mo are released. An important aspect of poultry manure is its slow release of nutrients and its residual effects on subsequent crops.The effects of manure

on soil properties are numerous, and it has long been considered a desirable soil amendment. Crops have historically been fed withanimal manure as a source of nutrientsby Jarvan et al.,[4].This study compared the "Impact of organic manures and inorganic fertilizers on growth, yield and it's attributing traitsof Chilli (*Capsicum annum* L.)". The current experimentation was carried with the objective to evaluate the effect of organic manures and inorganic fertilizers based on morphological and Yield parameters of chilli.

2. MATERIALS AND METHODS

Field experiment was conducted in the Experiment farm at Department of Horticultural Sciences, Sam HigginbottomUniversity Agriculture Technology and Sciences, Prayagraj (U.P.).Research farm located at a latitude and longitude of 25.87^0 North and 81.15^0East; the field is situated 78 meters above sea level. The weather in this part of Uttar Pradesh is subtropical. The chilli seeds, (*Capsicum annum* L.) sown on a seedling tray under shed then later transplanted after 4 weeks. The mean relative humidity and temperature of the study site was about 60 ± 10 % and 22 ± 2°C, respectively.Experiment was prepared using nine treatments (one control andeighttreatments) were treatments that used are Recommended Dose Fertilizer (RDF) vermicompost (VC), poultry manure (PM), and Farm Yard Manure (FYM). The eight treatments which comprised of different recommended Dose of; T0-Control[RND(RDF150:60:80kg NPK)+20t FYM], T1-100%RND through chemical fertilizer, T2-100%RDF + 10t vermicompost, T3-100%RDF + 5t poultry manure, T4-100%RDF+(5t vermicompost +2.5t poultry manure), T5-75%RDF+25%through FYM, T6-75%RDF+25%through vermiculture, T7-75%RDF+25%through poultry manure, T8-75%RDF+25%through (vermicompost +poultry manure).The mixture of fertilizers was applied again as top dress after 4 weeks of transplanting. The seedling was irrigated two times per day, during early in the morning and at late evening. The data analysiswascarried outaccording to the procedure of Randomized block design (RBD) for each parameter as Panse andSukhatme [5].

3. RESULTS AND DISSCUSSION

3.1 Growth Parameter

In the given (Table 1) shows Growth parameters that the maximum plant height at 30, 60 and 90 DAT was recorded in treatment T4 - 100%RDF+(5t vermicompost +2.5t poultry manure) (77 cm) followed by T1- 100%RND through chemical fertilizer (71.66 cm). The minimum plant height at 90 DAT was recorded in treatment combination T0 - control (51 cm).

The maximum number of branches were recorded in treatment T4 –100%RDF+(5t vermicompost +2.5t poultry manure (15.32 branches) followed by T1- 100%RND through chemical fertilizer (13.67 branches) and T6 - 75%RDF+25% through vermiculture (11.67 branches). The minimum number of branches were recorded in treatment combination T0 - control (8.66 branches). A good balance of nutrients in the vermicompost has significantly assisted plant growth when vermicompost is applied to plants. These plants exhibited enhanced growth due to improved soil health, as well as a boost in both micronutrients and microbial activity. Enhanced nutrient availability was observed due to vermicompost application. Additionally, poultry manure is an excellent source of organic matter that provides a beneficial effect on the soil's chemical and physical characteristics. This is a result of an increase in plant height, the number of leaves per plant, and the amount of leaf surface per plant in Chilli.These results demonstrate that organic manure is one of the most effective additions to soil, together with inorganic fertilizers, allowing nutrients to be more readily available. The results are in conformity with the findings of Bade KK et al.,6], A Mishra et al., [7].

3.2 Reproductive attributes

The minimum days to 50% flowering was recorded in treatment T4 - 100%RDF+(5t vermicompost +2.5t poultry manure (36.32 days) followed by T1–100%RND through chemical fertilizer (36.34 days) and T8 - 75%RDF+25%through vermicompost +poultry manure (38.67 days) and the maximum days to 50% flowering was recorded in treatment combination T0 - control (50.33 days).

3.3 Yield parameters

The maximum fruit yield per plant was recorded in treatment T4 - 100%RDF+5t vermicompost +2.5t poultry manure (845.80 gm) followed by T1- 100%RND through chemical fertilizer (750.50gm) and T7- 75%RDF+25%through poultry manure (591.10 gm). The minimum fruit yield per plant recorded in treatment combination T0 - control (263.90 gm).

As a result of adequate nutrient supply, nutrients may be transferred to the aerial parts of the plant. Additionally, it may also be explained by the fact that poultry manure contains Calcium (Ca), Magnesium (Mg), Zinc (Zn) and Manganese (Mn) at higher levels, which influenced Chilli's flower production and reduced the days to fruit set. As a result of the solubility effect of poultry manure, plants are more likely to absorb nitrogen, phosphorous, and potassium. As a result, chilli plants are more likely to produce more flowers and their days to fruit set are reduced. These results are in line with the observation made by Snr et al.,

4. CONCLUSION

The results of this study revealed that theRDF,vermicompost and poultry manure supplements increased fruit production, Growth, and Quality. Control treatment exhibits the least growth and yield. Therefore, organic fertilizer significantly influenced the growth and yielding parameters of chilli plants. By fertilizing with vermicompost and Poultry manure, plants became more productive and produced better fruit. In light of the above findings, it can be concluded that growing, yielding, and enhancing the quality of chili is possible with combination of RDF, vermicompost and Poultry manure.

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Table 1 Meanperformanceof growth andyieldparametersofchilli

Code	TREATMENTS	PH @ 30 DAT	PH @ 60DAT	PH @ 90DAT	No. Of Branches	Days To 50% Flower	No. Of Fruits/Plant	Fruit Length	No. Of Seeds/Fruit	Test Weight	Fruit Yield/Plant
T0	Control	15.67	30.32	51.00	8.66	50.33	38	4.34	39.03	3.78	263.90
T1	100%RND through chemical fertilizer	25.65	46.34	71.66	13.67	36.34	69.65	9.33	60.30	6.45	750.50
T2	100%RDF + 10t vermicompost	17.00	32.67	59.00	10.00	39.66	42.34	8.34	50.31	4.19	334.25
T3	100%RDF + 5t poultry manure	19.01	41.01	59.67	10.33	46.00	49.00	6.00	50.02	5.77	444.64
T4	100%RDF+(5t vermicompost +2.5t poultry manure)	28.32	47.66	77.00	15.32	36.32	75.32	11.64	62.66	6.68	845.80
T5	75%RDF+25%through FYM	23.00	36.33	61.66	11.33	43.66	43.34	8.00	52.01	6.20	383.61
T6	75%RDF+25%through vermiculture	20.00	40.00	62.67	11.67	40.00	51.33	6.33	51.66	4.70	457.49
T7	75%RDF+25%through poultry manure	20.00	36.67	56.32	11.00	47.00	51.68	9.00	50.67	5.45	591.10
T8	75%RDF+25%through(vermicompost +poultry manure)	22.00	35.33	57.33	11.32	38.67	64.64	7.00	38.31	5.86	552.02
MEAN		21.18	38.48	61.81	11.48	42.00	53.92	7.77	50.55	5.45	513.70
SE.M		0.89	1.25	1.34	0.66	1.54	1.30	0.50	1.44	0.40	19.65
CD (5%)		2.67	3.73	4.03	1.98	4.60	3.91	1.49	4.31	1.20	58.91
CV		7.29	5.61	3.77	9.99	6.33	4.19	11.03	4.93	12.73	6.63

Where
PH = Plant Height (cm), DAS= Days After Transplantation