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Influence of organic manure on growth of transplanted rice (*Oryza sativa* L.)

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Abstract
A field experiment was planned and conducted during 2022 at Crop Research Center, School of Agricultural Sciences, Shri Guru Ram Rai University, Pathri Bagh, Dehradun, Uttarakhand, India to investigate the "Influence of organic manure on growth of transplanted Rice (*Oryza sativa* L.,).
The experiment was laid out in randomized block design with three replications and 8 treatments. The treatments comprised following combinations of organic manure *viz*. T_0: Control, T_1: FYM (100%), T_2: Vermicompost (100%), T_3: Poultry manure (100%), T_4: FYM + Vermicompost (1:1), T_5: FYM + Poultry manure (1:1), T_6: Vermicompost+ Poultry manure (1:1) T_7: FYM + Vermicompost + Poultry manure (1:1:1). The sowing of Rice was done 10July 2022.Observations on various growth parameters were recorded. All the observations were recorded using standard method measurements. Of all the treatment of soil application, treatment T_3 (Poultry manure 100%) has shown a significant improvement in growth than other treatments. The treatment T_3 recorded highest plant height, number of tillers, dry matter accumulation, leaf area index.

Keywords: Vermicompost, compost, poultry manure, FYM, treatment

Introduction
A food crop that is extensively produced and feeds more than half of the world's population is rice (*Oryza sativa* L.). The phrase "rice is life" is the most fitting one for the entire planet, since this grain is essential to the food security of our country and employs millions of people in rural areas. The vast area dedicated to rice cultivation does not yield much rice because of several interconnected issues. An imbalance in fertilizer application and the ongoing use of inorganic fertilizers, which has decreased soil fertility, are two major contributors to low yield. The maximum yields of grain and straw were obtained when inorganic fertilizers were used in conjunction with organic resources. It would be highly promising to combine chemical and organic manure fertilizers in order to improve soil fertility and maintain output stability. For optimum growth, plants need a sufficient amount of nutrients from a variety of sources. Native sources of these nutrients include water, manure, rice straw, soil minerals, and soil organic matter; nevertheless, the amounts provided by these sources are typically insufficient to produce a high and sustainable yield. To close the gap between crop requirements and nutrient availability from the aforementioned sources, fertilizer must be administered. The season and kind of the crop determine the amount of nutrients required. However, proper crop management and efficient agronomic techniques are necessary to realize the full potential of enhanced nutrient management and efficient agronomic management are required in order to fully investigate rice's yield potential. Paddy is cultivated globally, being one of the most important cereal crops worldwide. The USDA Global rice production in 2021/22 is forecasted at a record 510.8 million tons (Milled basis) down 0.9 million tons from the previous forecast (USDA 2021). Total production of Rice during 2020-21 is estimated at record 121.46 million tones. It is higher by 9.01 million tones than the last five years' average production of 112.44 million tones. Rice is established mostly by the growing seedling in a confined space under controlled conditions followed by transplanting of 20-30 days old seedling in the main field. Transplanting is the traditional method which commonly practiced as a method of weed control in water stagnation in rainfed areas. The rice is transplanted by two methods i.e. random or in line.

Recent studies showed that the line transplanted shows slightly lower population, and fertilizer application can easily be done in line transplanting. Even through due to less labour recruitment and time during the transplanting time farmer still practice random transplanting in general, particularly in the Bundelkhand region. Organic manuring is becoming an increasingly significant part of environmentally healthy, long-term farming. Plant nutrients are replenished in agricultural soils primarily through inorganic, organic, and biofertilizers. Inorganic fertilizers are used indefinitely, causing a decline in soil chemical, physical, and biological qualities, as well as soil health. Chemical fertilizer's negative effects, combined with rising prices, have sparked a surge in interest in organic fertilizers as a nutritional source. For sustainable agricultural production, the use of organic resources as fertilizers has obtained plenty of attention. Organic materials have a plenty of potential as a source of numerous nutrients and as a method for improving soil properties. Application of organic fertilizers such as animal manure, sawdust, and others, or the combination of organic and inorganic fertilizers, can be an alternative option to reduce the utilization of inorganic fertilizers, maintain soil quality, increase soil organic matter, as well as improve soil physical and chemical properties through the decomposition of its substances. Organic matter enhances soil nutrients, plant growth regulators, and biodiversity. Thus, an integrated nutrient management system is required to maintain soil quality as well as to obtain high yield and preferred grain quality.

Materials and Methods

The field research was carried out in experimental field of Shri Guru Ram Rai University, Patel Nagar, and Dehradun, India during kharif season in 2022 to study the Influence of organic manure on growth and yield of by organically produced transplanted rice (*Oryza sativa* L.) under different organic manure. The geographical situation of the farm lies in the north-Gangetic alluvial plain at 25º 18` north latitudes 83º03` East longitude and at an altitude of 128.93 meters above the mean sea level. The following therapies were used: T_0: Control T_1, FYM (100%), T_2: Vermicompost (100%), T_3: Poultry manure (100%), T_4: FYM + Vermicompost (1:1), T_5: FYM + Poultry manure (1:1), T_6: Vermicompost + Poultry manure (1:1), T_7: FYM + Vermicompost + Poultry manure (1:1:1), T_0: Control; The experiment was laid out in randomized block design with three replications. The soil of the experimental plot was sandy loam. The land was primarily ploughed followed by two harrowing. The field was given a pre-sowing irrigation before field preparation to obtained proper germination and establishment of the crop (T_8). To determine of organic manure on growth of transplanted rice. The experiment site was sandy loam in texture with pH 6.5, organic carbon (0.42%), available nitrogen (3.52%), available phosphorus (7.1%), and available potassium (18.1%). Between germination to harvesting several plant growth parameters were recorded. In growth parameter plant height (cm), dry matter production of crop plant (g/m2), leaf area index (LAI). The data recorded for different characteristics were subjected to statistical analysis by adopted the method of ANOVA.

Results and Discussion

Effect of different treatment on growth parameters of Rice

Table 1: Effect of organic manures on plant height, No of tillers, Dry weight per plant and LAI at 60 and 90 DAS in Transplanted rice

Treatments	Plant Height (cm)		No. of Tillers		Dry weight per plant (g)		LAI	
	60 DAS	90DAS	60DAS	90DAS	60 DAS	90DAS	60 DAS	90DAS
T_1	7.53	10137	7.80	9.65	38.56	71.54	1.63	3.34
T_2	76.23	102.43	8.55	10.22	39.23	72.49	1.67	3.40
T_3	82.27	104.34	9.26	10.80	43.47	75.67	2.00	4.25
T_4	73.64	102.76	8.45	10.35	41.18	74.34	1.80	3.55
T_5	76.32	102.59	8.99	10.90	41.23	7449	1.90	3.71
T_6	81.67	104.11	8.80	10.75	41.76	72.45	1.85	3.65
T_7	72.79	102.45	9.17	11.22	41.69	74.58	1.95	3.80
T_8	72.04	102.13	6.32	7.55	37.34	68.88	1.45	3.07

Plant Height

The observation recorded in (Table no.1) clearly indicated that T_3 (82.27 cm, 104.34 cm.) at 60 and 90 DAS shows 100% significant over other treatments followed byT_7 (72.79 cm, 102.45 cm.) Poultry manure + FYM + Vermicompost (1:1:1) and T_5 (76.32 cm, 102.59 cm) FYM + Poultry Manure (1:1) were statistically at par with above treatment.

Number of tillers

At 60 and 90 DAS the maximum number of tillers in crop plant was observed in T_3 (10.8, 11.28) showing significant superiority over other treatments followed by T_7 (9.17, 11.22) Poultry manure + FYM + Vermicompost (1:1:1) and T_5 (8.99, 10.90) FYM + Poultry Manure (1:1). They were statistically at par with above treatment.

Dry weight per plant: At 60 and 90 DAS Dry weight per plant was observed showing T_3 (43.47g, 75.67g) poultry manure 100% shows significant superiority over other treatments. T_7 (41.69 g, 74.58 g) Poultry manure + FYM + Vermicompost (1:1:1) and T_5 (41.18 g, 74.49 g) FYM + Poultry Manure (1:1) were statistically at par with above treatment.

Leaf area index

At 60 and 90 DAS Leaf area index in crop plant was observed that T_3 (4.25, 4.09) poultry manure 100% shows significant superiority over other treatments. T_7 (3.80, 3.80) Poultry manure + FYM + Vermicompost (1:1:1) and T_5 (3.71, 3.74) FYM + Poultry Manure (1:1) were statistically at par with above treatment.

Conclusion

The result of all the treatments for growth parameters is summarized in Table 1 showing that T_3 (Poultry manure 100%) have shown significant growth among all the treatments. The similar result is supported by Kyi Kyi Shwe, *et al*. 2021 [1].

The aforementioned study on the impact of organic manure on transplanted rice revealed that 100% poultry manure was

the best organic manure for increasing growth parameters.

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