

Effect of different organic inputs on growth and yield of Rice

Objective : To identify the most effective organic nutrient combination for obtaining higher yield in rice.



Introduction:

Rice (*Oryza sativa* L.) is the most important staple food crop of India and plays a vital role in ensuring food security. Continuous use of chemical fertilizers over the years has led to deterioration of soil health, decline in organic matter, nutrient imbalance, and increased cost of cultivation. Although chemical fertilizers supply nutrients quickly, their indiscriminate use results in adverse effects such as soil degradation, groundwater pollution, and reduced microbial activity.

Organic farming has emerged as a sustainable alternative by improving soil fertility, enhancing microbial population, and maintaining ecological balance. Organic manures such as farmyard manure (FYM), vermicompost, and oil cakes not only supply nutrients but also improve soil physical, chemical, and biological properties. Biofertilizers like Azotobacter and Phosphate Solubilizing Bacteria (PSB) further support nutrient availability by nitrogen fixation and phosphorus solubilization.

To reduce the dependence on chemical fertilizers while sustaining yield, integrated and organic nutrient management approaches are gaining importance. Hence, the present study was conducted to study the response of paddy to different organic nutrient sources and combinations with the objective of optimizing yield and minimizing chemical input.

Experimental Details:

Crop	:	Rice
Variety	:	Ratnagiri-8

Experiment Layout	: RBD
No. of Replications	: Three
Spacing	: 20 cm x 15 cm
Plot size	: 3.30 m X 3.00 m
Date of TP	: 14/07/2024

T1- Control
T2- FYM
T3- Vermicompost
T4- Vermiwash
T5- Seaweed extract
T6- Bioloam Supreme
T7- Seaweed Granules

Methodology:

The field experiment was conducted during the **Kharif season of 2024–25** at the **ASPEE Agricultural Research & Development Foundation Farm**, located at **Village Nare, Taluka Wada, District Palghar, Maharashtra**. The experimental site represents a typical coastal agro-climatic zone characterized by high rainfall during the monsoon season and moderately fertile soil, suitable for lowland rice cultivation.

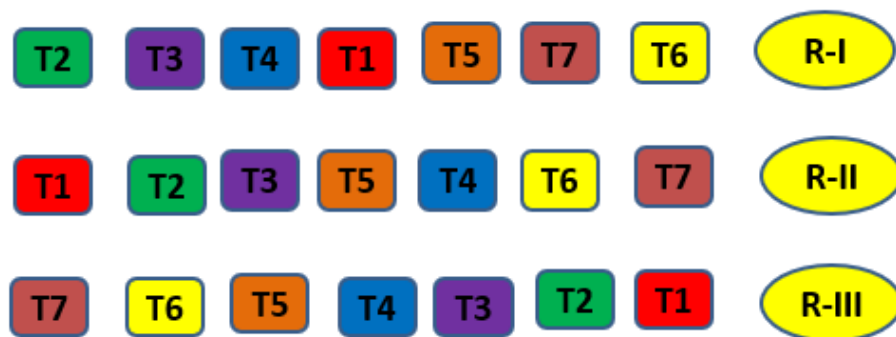
The experiment was laid out using a **Randomized Block Design (RBD)** with **three replications** to minimize experimental error due to field variability. A total of **seven treatments** consisting of different organic nutrient sources were allotted randomly within each replication. Each experimental plot measured **3.30 m × 3.00 m**, and bunds were constructed to prevent runoff and nutrient movement between plots. The organic inputs were incorporated into the soil before transplanting to allow decomposition and nutrient release. Organic chemicals were applied as foliar spray after 30 and 45 days after transplanting.

The rice variety '**Ratnagiri-8**' was used for the study. Seeds were treated with the fungicide **Thiram @ 3 g kg⁻¹ seed** to prevent seed-borne diseases. The treated seeds were raised in a nursery bed, and healthy seedlings were transplanted after **25 days**. Transplanting was carried out during the **first fortnight of July 2024** at a spacing of **20 cm × 15 cm**, maintaining uniform plant geometry across all treatments to avoid competition effects. Two seedlings per hill were transplanted.

All cultural operations such as manual weeding and pest management were applied uniformly across treatments. Plant protection measures were applied only when pest or disease incidence exceeded the economic threshold level (ETL), ensuring minimal chemical interference with organic treatments. Biometric observations were recorded at regular intervals starting from **30 days after transplanting (DAT) until harvest**. Five representative plants were randomly selected from each plot and tagged for recording observations.

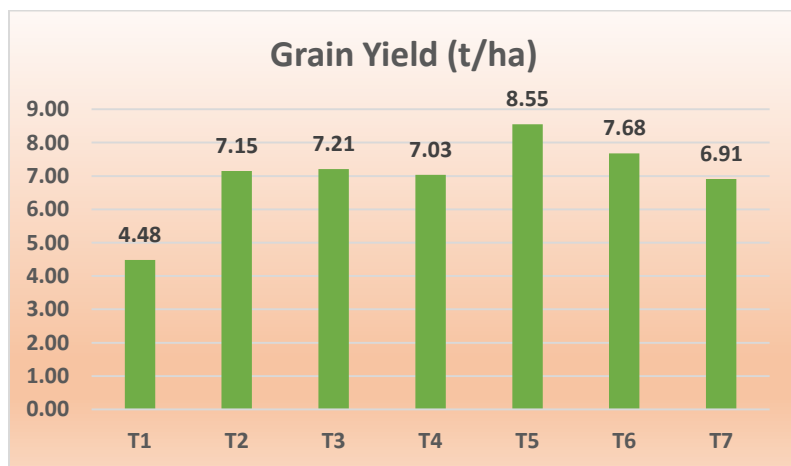
The collected data were subjected to statistical analysis using **Analysis of Variance (ANOVA)** as per the procedure applicable to a Randomized Block Design.

Layout:



Results: The application of different organic and biological inputs showed a significant effect on the growth and yield performance of paddy variety Ratnagiri-8. Among the seven treatments tested, **T₅ – Seaweed extract** recorded the best results in terms of plant vigor, yield attributes, and overall crop performance, and was found to be superior to all other treatments including the control (T₁). It was observed and recorded that in treatment T₅ the higher number of tillers per plant (13.27), number of panicles per plant (9.93), length of panicle (25.23 cm), seeds per panicle (296.33), test weight (19.63g), grain (8.55 t/ha) and straw (20.28 t/ha) yield.

Graph:



Conclusion:

The study concluded that the application of organic and biological inputs significantly influenced the growth and yield of paddy variety Ratnagiri-8. Among all treatments, **T₅ – Seaweed extract** proved to be the most effective and resulted in superior crop performance compared to other treatments and the control. Therefore, seaweed extract can be recommended as an efficient input for improving paddy productivity under similar conditions.

