Plant Archives Vol. 25, No. 2, 2025 pp. 595-601 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.no.2.080

EFFECT OF ORGANIC NUTRIENT MANAGEMENT ON THE GROWTH AND PRODUCTIVITY OF TRADITIONAL RICE VARIETIES

G. Vaishnavi[1]*, R. Raman[1], R. Krishnamoorthy[1] and C. Kathirvelu[2]

[1]Department of Agronomy, Faculty of Agriculture, Annamalai University, Annamalai Nagar – 608 002, Tamil Nadu, India.
[2]Department of Entomology, Faculty of Agriculture, Annamalai University, Annamalai Nagar – 608 002, Tamil Nadu, India.
*Corresponding author E-mail : vaishnaviguru51@gmail.com
(Date of Receiving-30-05-2025; Date of Acceptance-11-08-2025)

ABSTRACT

A field experiment was conducted at the Experimental farm, Department of Agronomy, Faculty of Agriculture, Annamalai University, Chidambaram, Tamil Nadu during the *kuruvai* season (June- September), to evaluate the effect of organic manures on the growth and yield attributes of traditional rice varieties. The experiment was carried out in a split-plot design with three replications. The main plot consists of four traditional varieties *viz*., Aruvatham kuruvai, Poongar, Navara and Ottu kichhili and sub plots consist of four organic nutrient managements namely, FYM @ 12.5 t ha^{-1} + 5 per cent jeevamirutham, vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham, enriched-FYM @ 0.75 t ha^{-1} + 5 per cent jeevamirutham, urban compost @ 10 t ha^{-1} + 5 per cent jeevamirutham and one control (no manure). Biometric observation and growth indices confirmed that Poongar performed better than the other varieties with respect to growth attributes, yield attributes and yield compared to other varieties. However, Navara registered higher plant height and thousand-grain weight and Ottu kichilli recorded maximum number of grains and filled grains per panicle. The application of vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham registered higher growth and yield attributes in all traditional rice varieties. The study confirmed that the application of vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham at 15, 30 and 45 DAT significantly enhanced the crop growth and yield of Poongar in a sustainable manner while maintaining soil health.

Key words : Vermicompost, Jeevamirutham, Traditinal rice varieties, Yield attributes.

Introduction

Rice (*Oryza sativa* L.) is one of the most important cereal crop in the world and a staple food for more than half of the world's population (Prusty *et al*., 2020). In India, rice is grown in an area of 51.42 million hectares, with the production of 150 million tonnes, and the productivity is 4.38 t ha^{-1} (USDA, 2025). In Tamil Nadu, rice is grown predominantly with an area of 2.1 million hectares, resulting in the production of 7.04 million tonnes with the productivity of 3.35 t ha^{-1} (Directorate of Economics and Statistics, 2023-24).

Traditional rice varieties are high in fibre and rich in nutrients such as calcium, riboflavin, thiamine, vitamin D and glutamic acids. It contains oryzanol, a compound that reduces fat production in the body, making it an excellent dietary choice for diabetics (Kowsalya *et al*., 2022). The traditional rice varieties occupy less area in cultivation. Though India was once home to a diverse range of landraces, only a few are cultivated today. As a result of the high-yielding varieties (HYVs) that were introduced during the Green Revolution (GR) in the 1960s, hundreds of local rice varieties have gradually disappeared. The so-called "miracle" seeds' initial high yields had impressed farmers, who had overlooked the associated costs of external inputs, the subsequent loss of non-grain biomass, the loss of desirable traits (such as resistance to pests and diseases, drought, floods, etc.) and the widespread degradation of the environment, including the soil and water (Sala *et al*., 2024). Numerous traditional cultivars can withstand drought and floods and are suitable for ill-drained and lowland cultivation. Some of them have unique qualities such as tolerance to salinity and alkalinity, as well as the ability to grow in "deep-water" inland areas. Continuous and indiscriminate application of inorganic fertilizers has had an adverse impact on the environment, soil health and soil structure destruction in recent years. Therefore, it is now necessary to find long-term solutions to encourage sustainable rice cultivation. To overcome the limitations of modern agriculture, a shift from chemically intensive agriculture to a more sustainable form of organic agriculture is preferred. The use of organic manures to improve soil fertility has become more significant in recent years because fertilizers are expensive and have negative effects. The use of organic manures, primarily compost, vermicompost, urban compost, and farmyard manure, has raised hopes for lowering cultivation costs and minimizing the harmful effects of chemical fertilizers. There is no specific nutrient recommendation for traditional rice varieties in recent times. In view of the above, the present investigation was undertaken to examine the effect of organic nutrient management on the growth and productivity of traditional rice varieties.

Materials and Methods

A field experiment was carried out at the Experimental farm, Department of Agronomy, Faculty of Agriculture, Annamalai University, Chidambaram, Tamil Nadu, India, during the *Kuruvai* season (June – September) of 2024. The experimental site was situated at an altitude of +5.79 m MSL, at 11°24'N latitude and 79°44'E longitude. The soil of the experimental site was clay loam texture with soil pH (7.65), EC (0.54 dS m^{-1}), organic carbon content (0.42%), low in available N (235.4 kg ha^{-1}), medium in P_2O_5 (20.8 kg ha^{-1}) and medium in K_2O (278.0 kg ha^{-1}). The experiment was laid out in split-plot design and replicated thrice. The experiment comprises of four traditional varieties in the main plots *viz*., M_1 - Aruvatham kuruvai, M_2 - Poongar, M_3 - Navara and M_4 - Ottu kichilli and five subplot treatments namely., S_1 - FYM @ 12.5 t ha^{-1} + 5 per cent jeevamirutham, S_2 - Vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham, S_3 - Enriched-FYM @ 0.75 t ha^{-1} + 5 per cent jeevamirutham, S_4 - Urban compost @ 10 t ha^{-1} + 5 per cent jeevamirutham and S_5 - Control (no manure). The seed rate used for transplanted short duration rice was 60 kg ha^{-1}. Separate seed beds were prepared for four different varieties (Aruvatham kuruvai, Poongar, Navara and Ottu kichilli). The main plots were puddled and prepared for transplantation. Required quantities of farmyard manure, vermicompost, enriched-FYM and urban compost were incorporated in the soil as per treatment schedule one week prior to transplanting of rice seedlings. The seedlings were transplanted in the main field on the 15 DAS (Aruvatham kuruvai, Poongar and Navara) and 18 DAS (Ottu kichilli). The 15-18 days old seedlings were transplanted @ 3 seedlings $hill^{-1}$ with a spacing of 15 × 15 cm. General cultural practices and plant protection measures were followed as per recommendation. The foliar application of jeevamirutham at 5% was done as per the treatment schedule on 15,30 and 45 DAT. Growth and yield attributes were recorded systematically. Plot-wise seed yield and straw yield were also recorded. Data recorded were compiled and tabulated for statistical analysis. Analysis of variance was evaluated by MS Office Excel 2016 and the mean differences were adjusted by multiple comparison test (Gomez and Gomez, 1991).

Results and Discussion

Growth attributes

The observations on plant height, no. of tillers and dry matter production were recorded (Table 1) at harvest stage of crop. The results showed that the the traditional rice varieties, Navara significantly registered higher plant height (108.90 cm) than other varieties. The higher plant height of Navara may be due to vigor of the variety or to better utilization of available growth resources like light and temperature, which may result in more nitrogen absorption for the synthesis of protoplasm responsible for rapid cell division, consequently increasing the plant in shape and size. The disparities in plant height among the varieties could be related to genetic variances. Similar findings were reported by Das *et al.* (2012), Ranabhat and Amgain (2016) and Singh *et al*. (2018). Among the organic nutrient management higher plant height (112.32 cm) was recorded with application of vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham. The increased plant height in response to vermicompost might be due to the presence of macro and micronutrients, which are readily available to the plant growth. Similar results were registered by Mahmud *et al*. (2016) and Ruan *et al*. (2021). The appearance of greater quantity of major nutrients in jeevamriutham also leads to the increase of plant height. Similar result was reported by Goveanthan *et al*. (2020). The treatment combination M_2S_2 (Poongar along with vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham) registered the highest plant height (111.06 cm). Differences in genetic response to the environment affect the growth patterns between varieties (Sitaresmi, 2016). After incorporation of vermicompost, the amount of nitrogen in the soil increased considerably. This led to the vigorous growth of aerial organs due to the high rate of protoplasmic protein synthesis, which increased the

Table 1 : Effect of organic nutrient management on the plant height (cm), number of tiller hill^{-1} and dry matter production of traditional rice varieties at harvest stage.

	Plant height (cm)					No. of tillers hill^{-1}					Dry matter production (kg ha^{-1})				
Main / Sub	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
S_1	97.25	100.65	110.66	102.98	102.89	11.70	15.87	12.00	15.27	13.71	4248	5725	4368	5682	5006
S_2	105.69	111.06	118.54	114.00	112.32	13.86	18.52	14.14	17.54	16.02	4855	6684	4953	6328	5705
S_3	94.66	98.27	104.88	100.25	99.52	10.80	14.64	11.08	14.35	12.72	3994	5439	4088	5198	4680
S_4	102.88	103.88	115.20	109.55	107.88	12.50	17.00	13.00	16.15	14.66	4555	6258	4619	5962	5349
S_5	81.86	87.55	95.21	89.66	88.57	8.00	10.50	9.06	10.00	9.39	2801	3458	2953	3415	3157
Mean	96.47	100.28	108.90	103.29		11.37	15.31	11.86	14.66		4091	5513	4196	5317	
	Main	Sub	M at S	S at M		Main	Sub	M at S	S at M		Main	Sub	M at S	S at M	
S.Ed	0.27	0.29	0.59	0.59	S.Ed	0.18	0.17	0.35	0.33	S.Ed	0.27	0.25	0.52	0.49	
CD (p=0.05)	0.66	0.60	1.20	1.19	CD (p =0.05)	0.45	0.34	0.71	0.68	CD (p =0.05)	0.66	0.50	1.05	1.00	

Main plots: M_1 - Aruvatham kuruvai, M_2 – Poongar, M_3 – Navara, M_4 - Ottu kichili.
Sub plots: S_1 - FYM @ 12.5 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, S_2 -Vermicompost @ 5 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, S_3 - Enriched FYM @ 0.75 t ha^{-1} + Jeevamirutha @ 5% on 15, 30 and 45 DAT, S_4 - Urban Compost @ 10 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, S_5 - No manure (Control).

size of cells within the cell wall, which in turn caused the plant to grow taller vertically. Comparable conclusion has been drawn by Manickam *et al*. (2024).

The traditional rice cultivar Poongar recorded higher number of tillers hill^{-1} and dry matter production over other varieties. The data from Tables 2 and 3 revealed that the greater number of tillers^{-1} (15.31) and dry matter production (5513 kg ha^{-1}) of Poongar (M_2) may be the result of variations in their genetic potential, nutrient-uptake capacity, competitiveness of variety for space, light, and nutrients, and plant height. These findings were in conformity with Harikesh *et al*. (2017) and Chandra *et al*. (2019). Application of vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham registered higher number of tillers^{-1} (16.02) and dry matter production (5705 kg ha^{-1}) than other treatments. The maximum tillering and dry matter production in above mentioned treatments might be attributed to the availability of more nitrogen, which played a vital role in cell division. Similar findings were reported by Jothi *et al*. (2021) and Patra *et al*. (2024). The increase in number of tillers per square meter and dry matter production might be also due to the additional availability of nitrogen by foliar application of jeevamirutham, which plays a pivotal role in cell division (Mahanta *et al*., 2021). Among the interaction, M_2S_2 (Poongar along with vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham) registered the highest number of tillers^{-1} (18.52) and dry matter production (5705 kg ha^{-1}) because of the variety's genetically intrinsic characteristics and higher plant height. When compared to non-ingested soil, the vermicompost treated soil displayed higher nutrient availability, particularly for nitrogen. Nitrogen promotes vegetative development, which in turn increases the number of tillers and dry matter production. These findings were in conformity with Anil and Siddi (2020) and Nayaka *et al*. (2021).

Yield attributes

The higher yield attributes *viz*., number of productive tillers m^{-2} (228.20), panicle length (22.73 cm) and panicle weight (2.85 g) were recorded in Poongar (Table 4). However, Ottukichilli recorded the highest number of grains (104.31 panicle^{-1}) and filled grains (83.85 panicle^{-1}) and Navara recorded the maximum 1000 grain weight (38.33) (Table 5). The differences in number of productive tillers, panicle length, panicle weight, number for grains per panicle and 1000 grain weight was due to the distinct genetic characteristics that each variety possesses. Genotypic variation in tillering pattern was also reported by Kumari and Shanmugam (2020). Among the organic nutrient management practice, application of vermicompost 5 t ha^{-1} + 5 per cent jeevamirutham recorded the maximum number of productive tillers m^{-2} (235.95), panicle length (23.65 cm), panicle weight (2.60 g), number of grains per panicle (93.80), filled grains per panicle (81.90) and 1000 grain weight (25.61) other treatments. Thakur *et al*. (2021) reported that increased

Table 2 : Effect of organic nutrient management on the plant height (cm), number of tiller hill^{-1} and dry matter production of traditional rice varieties at harvest stage.

Main / Sub	Number of productive tillers m^{-2}					Panicle length (cm)					Panicle weight (g)				
	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
S_1	168.65	241.97	178.42	224.54	203.40	18.65	22.78	17.25	19.74	19.61	1.75	3.02	1.28	2.45	2.13
S_2	202.61	275.36	205.53	260.31	235.95	22.54	26.50	21.69	23.85	23.65	2.14	3.54	1.58	3.15	2.60
S_3	154.74	210.32	162.87	206.42	183.59	17.05	20.54	16.74	18.02	18.09	1.62	2.64	1.11	1.98	1.84
S_4	195.63	255.98	198.54	248.64	224.70	20.12	24.88	19.38	21.56	21.49	1.89	3.28	1.32	2.86	2.34
S_5	116.65	157.35	132.20	152.12	139.58	16.00	18.96	15.00	16.84	16.70	1.35	1.79	1.02	1.60	1.44
Mean	167.66	228.20	175.51	218.41		18.87	22.73	18.01	20.00		1.75	2.85	1.26	2.41	
	Main	**Sub**	**M at S**	**S at M**		**Main**	**Sub**	**M at S**	**S at M**		**Main**	**Sub**	**M at S**	**S at M**	
S.Ed	1.98	2.35	4.64	4.69	**S.Ed**	0.17	0.15	0.31	0.31	**S.Ed**	0.01	0.02	0.05	0.06	
CD (p=0.05)	4.85	4.78	9.46	9.56	**CD (p =0.05)**	0.36	0.31	0.64	0.63	**CD (p =0.05)**	0.05	0.06	0.10	0.11	

Main plots: M_1 - Aruvatham kuruvai, M_2 – Poongar, M_3 – Navara, M_4 - Ottu kichili.
Sub plots: S_1 - FYM @ 12.5 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, S_2 -Vermicompost @ 5 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, S_3 - Enriched FYM @ 0.75 t ha^{-1} + Jeevamirutha @ 5% on 15, 30 and 45 DAT, S_4 - Urban Compost @ 10 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, S_5 - No manure (Control).

number of productive tillers, panicle weight and number of grains per panicle in rice might be due to phosphorus as it is an essential component of DNA and plays a crucial role in development of plants genetic material, thus the resulted higher yield attributes in rice might be due to improved phosphorus utilisation in organic manures. Incorporation of vermicompost increased availability of nutrients ensures better growth and development of rice plants, leading to healthier panicles. Similar finding was reported by Yadav *et al*. (2021). However, the organic nutrient management has no significant difference within the treatments because the test weight is mainly influenced by the inherent genetic character and is least affected by the growing conditions and other crop management practices. The results were in accordance with the findings of Vivekanandini *et al*. (2018) and Prashanthi *et al*. (2020). The interaction effect between main and sub plots were significant and the treatment combination M_2S_2 (Poongar along with vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham) recorded higher number of productive tillers m^{-2} (275.36), panicle lenght (26.50 cm) and panicle weight (2.60 g). However, M_4S_2 (Ottukichilli along with vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham) recorded the highest number of number for grains per panicle (109.46) and filled grains per panicle (93.68). Vermicompost ensures that plants have the resources they need during the flowering and reproductive stages, which directly influenced yield attributes of the varieties. Similar finding was reported by Patra *et al*. (2024) and Kumar *et al*. (2021).

Grain yield and Straw yield (kg ha^{-1})

Among the cultivars, Poongar recorded the highest gain yield (1936 kg ha^{-1}), straw yield (3681 kg ha^{-1}) and harvest index (34.16%) than other varieties. Higher yield in variety Poongar can be attributed to its grain character or type, higher dry matter production, number of tillers, test weight, panicle weight, number of filled grains panicle^{-1} and panicle length. The results are in conformity with the findings of Kant *et al*. (2018), Subedi *et al*. (2019) and Shanta *et al*. (2020). Within the organic nutrient management practices, application of vermicompost @ 5 t ha^{-1} along with 5 per cent of jeevamirutham registered maximum grain yield (1977 kg ha^{-1}), straw yield (3824 kg ha^{-1}) and harvest index (33.82%). In addition to improving the microbial population in soil and maintaining its nutrients for an extended period of time without negatively impacting the environment, vermicompost also has a high concentration of plant growth hormones and soil enzymes. The availability of all necessary nutrients in soil enhanced with vermicompost might be the reason of the maximum grain production. The beneficial effect of jeevamirutham, which causes a more robust and extensive root system in the crop, results in increased vegetative growth, which in turn leads to more efficient sink formation and larger sinks, greater carbohydrate translocation from vegetative plant parts to the grains, and higher dry matter accumulation during the grain filling period. It also

Table 3 : Effect of organic nutrient management on no. of grains panicle^{-1}, filled grains panicle^{-1} and thousand grain weight (g) of traditional rice varieties at harvest stage.

	Number of grains panicle^{-1}					Filled grains panicle^{-1}					Thousand grain weight (g)				
Main / Sub	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
S_1	88.02	92.73	70.82	103.86	88.86	72.58	77.85	57.42	83.20	72.76	21.41	22.52	38.25	19.80	25.50
S_2	92.83	97.16	75.75	109.46	93.80	81.58	86.58	65.77	93.68	81.90	21.48	22.56	38.65	19.84	25.61
S_3	81.80	88.56	69.18	101.84	85.35	68.55	72.56	53.64	79.28	68.51	21.40	22.49	38.14	19.78	25.45
S_4	91.69	94.05	71.37	107.04	91.04	75.69	81.47	60.87	88.54	76.64	21.44	22.54	38.56	19.82	25.61
S_5	80.14	85.74	67.50	99.36	83.19	60.58	66.85	50.02	74.56	63.00	21.39	22.48	38.05	19.75	25.42
Mean	86.90	91.65	70.92	104.31		71.80	77.06	57.54	83.85		21.42	22.52	38.33	19.80	
	Main	**Sub**	**M at S**	**S at M**		**Main**	**Sub**	**M at S**	**S at M**		**Main**	**Sub**	**M at S**	**S at M**	
S.Ed	0.27	0.29	0.59	0.59	**S.Ed**	0.23	0.21	0.44	0.42	**S.Ed**	0.15	0.34	0.63	0.69	
CD (p=0.05)	0.66	0.60	1.20	1.19	**CD (p =0.05)**	0.57	0.43	0.90	0.86	**CD (p =0.05)**	0.36	NS	NS	NS	

Main plots: $\mathbf{M_1}$ **-** Aruvatham kuruvai, $\mathbf{M_2}$ – Poongar, $\mathbf{M_3}$ – Navara, $\mathbf{M_4}$ **-** Ottu kichili.
Sub plots: $\mathbf{S_1}$ **-** FYM @ 12.5 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, $\mathbf{S_2}$-Vermicompost @ 5 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, $\mathbf{S_3}$ **-** Enriched FYM @ 0.75 t ha^{-1} + Jeevamirutha @ 5% on 15, 30 and 45 DAT, $\mathbf{S_4}$ **-** Urban Compost @ 10 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, $\mathbf{S_5}$ **-** No manure (Control).

Table 4 : Effect of organic nutrient management on the plant height (cm), number of tiller hill^{-1} and dry matter production of traditional rice varieties at harvest stage.

	Grain yield (kg ha^{-1})					Straw yield (kg ha^{-1})					Harvest index (%)				
Main / Sub	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
S_1	97.25	100.65	110.66	102.98	102.89	11.70	15.87	12.00	15.27	13.71	4248	5725	4368	5682	5006
S_2	105.69	111.06	118.54	114.00	112.32	13.86	18.52	14.14	17.54	16.02	4855	6684	4953	6328	5705
S_3	94.66	98.27	104.88	100.25	99.52	10.80	14.64	11.08	14.35	12.72	3994	5439	4088	5198	4680
S_4	102.88	103.88	115.20	109.55	107.88	12.50	17.00	13.00	16.15	14.66	4555	6258	4619	5962	5349
S_5	81.86	87.55	95.21	89.66	88.57	8.00	10.50	9.06	10.00	9.39	2801	3458	2953	3415	3157
Mean	96.47	100.28	108.90	103.29		11.37	15.31	11.86	14.66		4091	5513	4196	5317	
	Main	**Sub**	**M at S**	**S at M**		**Main**	**Sub**	**M at S**	**S at M**		**Main**	**Sub**	**M at S**	**S at M**	
S.Ed	0.27	0.29	0.59	0.59	**S.Ed**	0.18	0.17	0.35	0.33	**S.Ed**	0.27	0.25	0.52	0.49	
CD (p=0.05)	0.66	0.60	1.20	1.19	**CD (p =0.05)**	0.45	0.34	0.71	0.68	**CD (p =0.05)**	0.66	0.50	1.05	1.00	

Main plots: $\mathbf{M_1}$ **-** Aruvatham kuruvai, $\mathbf{M_2}$ – Poongar, $\mathbf{M_3}$ – Navara, $\mathbf{M_4}$ **-** Ottu kichili.
Sub plots: $\mathbf{S_1}$ **-** FYM @ 12.5 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, $\mathbf{S_2}$-Vermicompost @ 5 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, $\mathbf{S_3}$ **-** Enriched FYM @ 0.75 t ha^{-1} + Jeevamirutha @ 5% on 15, 30 and 45 DAT, $\mathbf{S_4}$ **-** Urban Compost @ 10 t ha^{-1} + Jeevamirutham @ 5% on 15, 30 and 45 DAT, $\mathbf{S_5}$ **-** No manure (Control).

increased biological efficiency of crop plants and enhanced the level of enzyme activities in soil and promoted the reutilizing of soil nutrients in the ecosystem, improve the absorptive power of cations and anions present on soil particle and that may be released slowly during the crop growth and improvement in soil structure to existence of favourable nutritional environment under the influence of organic liquid manures which had a positive effect on vegetative and reproductive growth which ultimately led to realization of higher values for growth attributes leading to higher yield of crop. These results were in accordance with the findings of Patel *et* *al*. (2021). The treatment combination M_2S_2 (Poongar along with vermicompost @ 5 t ha^{-1} + 5 per cent jeevamirutham) recorded higher grain yield (2436 kg ha^{-1}), straw yield (4355 kg ha^{-1})and harvest index (35.87%). Singh *et al*. (2017) evaluated various rice varieties under organic farming and stated that the differences observed in yield of rice varieties could be attributed to the genetic character as well as their adaptation potential under low input organic conditions.

Conclusion

From the results of the field investigation, it can be concluded that the application of vermicompost @ 5 t ha^{-1} + 5 per cent jeevamurtham on 15, 30 and 45 DAT showed a remarkable effect on growth, yield attributes and yield of traditional rice varieties. Also, the study confirmed that the application of organic inputs consistently enhanced the crop yield in a sustainable manner while maintaining soil health.

References

Anil, D. and Siddi S. (2020). Evaluation of pre-released rice (*Oryza sativa* L.) genotypes under different sowing dates in rainy season. *Curr. J. Appl. Sci. Technol*., **39**, 74–84.

Chandra, M.S., Kumar K.A., Madhavi M. and Chary D.S. (2019). Dry matter production and nutrient uptake of rice (*Oryza sativa* L.) varieties under alternate wetting and drying in puddled soil. *Int. J. Curr. Microbiol. Appl. Sci*., **8(8)**, 2302–2313.

Das, B., Mannan M.A. and Das P.K. (2012). Performance study of three high-yielding varieties of Bangladesh and one exotic rice variety. *B.Sc. Ag. Thesis*, Agrotechnology Discipline, Khulna University, Khulna, pp. 19–27.

Directorate of Economics and Statistics (2023–2024). Government of Tamil Nadu.

Gomez, K.A. and Gomez A.A. (1991). *Statistical procedure for agricultural research*. II edn. John Wiley and Sons, New York, 680 p.

Goveanthan, A.S., Sugumaran M.P., Gudimetha G.K., Akila S.K., Suganya K. and Somasundaram E. (2020). Studies on organic inputs (Jeevamritham and Beejamruth) and their efficacy on fenugreek. *Pharma Innov. J*., **9(11)**, 92–94.

Harikesh, A.A., Singh G., Kumar S., Shivam R., Yadav P., Tiwari A., Kumar A. and Yadav A. (2017). Effect of integrated nutrient management and plant geometry on soil properties and availability of nutrients under SRI technique of rice. *J. Pharmacogn. Phytochem*., **6(5)**, 86–89.

Jothi, M., Manivannan V., Mohamed Yassin M. and Ganesan K. (2021). Effect of organic manure and microbial nutrient spray on yield attributes and yield of organic rice (*Oryza sativa* L.). *Pharma Innov. J*., **10(10)**, 2331–2336.

Kant, K., Bora P.K., Telkar S.G. and Gogoi M. (2018). Performance of various rice cultivars under variable nitrogen levels. *J. Pharmacogn. Phytochem*., **7(5)**, 1378–1382.

Kowsalya, P., Sharanyakanth P.S. and Mahendran R. (2022). Traditional rice varieties: A comprehensive review on its nutritional, medicinal, therapeutic and health benefit potential. *J. Food Compos. Anal*., **114(11)**.

Kumar, A., Meena R.N., Yadav L. and Gilotia Y.K. (2012). Effect of organic and inorganic sources of nutrients on yield, yield attributes and nutrient uptake of rice, Cv. PRH-10. *J. Life Sci*., **9(2)**, 595–597.

Kumari, K.V. and Shanmugam P.M. (2020). Evaluation of rice (Oryza sativa) varieties suitable for organic farming. *Indian J. Agric. Res*., **54(1)**, 71–76.

Mahanta, B.S., Abraham T., Singh V. and Achary D.G.S. (2021). Organic source of nutrients effect on growth, yield, quality and economy of black rice (*Oryza sativa* L.) varieties. *J. Pharmacogn. Phytochem*., **10(4)**, 218–221.

Mahmud, A.J., Shamsuddoha A.T.M. and Haque M.N. (2016). Effect of organic and inorganic fertilizer on the growth and yield of rice (*Oryza sativa* L.). *Nature Sci*., **14(2)**, 45–54.

Ranabhat and Amgain (2016). (Incomplete – please provide full reference).

Ruan, S., Wu F., Lai R., Tang X., Luo H. and He L. (2021). Preliminary application of vermicompost in rice production: Effects of nursery raising with vermicompost on fragrant rice performances. *Agronomy*, **11**, 1253.

Manickam, S., Suganthy M., Sunitha R., Jansirani R., Krishnan R. and Ganesh R. (2024). Evaluation of traditional varieties of rice (*Oryza sativa* L.) for yield under organic production system. *Indian J. Agric. Res*., **58(6)**, 1187–1192.

Nayaka, G.V., Reddy G.P. and Kumar R.M. (2021). Dry matter production and partitioning in different plant parts of rice cultivars under irrigation regimes and systems of cultivation. *Indian J. Agric. Res*., **55(3)**, 347–352.

Patel, S.P., Malve S.H., Chavda M.H. and Vala Y.B. (2021). Effect of Panchagavya and Jeevamrut on growth, yield attributes and yield of summer pearl millet. *Pharma Innov. J*., **10(12)**, 105–109.

Patra, P.S., Saha R., Ahmed A.S., Kanjilal B., Debnath M.K., Paramanik B., Hoque A., Kundu A., Adhikary P., Biswas A., Dey P. and Biswas A. (2024). Enhancing aromatic rice production through agronomic and nutritional management for improved yield and quality. *Sci. Rep*., **14**.

Prashanthi, B., Suresh K., Ramulu V. and Sridevi S. (2020). Yield, quality and economics of various rice varieties of Telangana as affected by saline irrigation water under different agronomic management options. *Int. J. Plant Soil Sci*., **32(4)**, 25–34.

Prusty, A.K., Panigrahi R.S., Padhy C. and Rout S. (2020). Knowledge level of farmers regarding System of Rice Intensification (SRI) method in Puri district of Odisha. *Indian J. Pure Appl. Biosci*., **8(3)**, 270–277.

Sala, M., Chandrika R., Usharani K.S., Manju P., Sasikumar K.

and Nandhikumar R. (2024). Nutrient diversity and therapeutic use of traditional landraces: A review. *Plant Archives*, **24(2)**, 36–40

Shanta, C.M., Ramesha Y.M., Krishnamurthy D., Umesh M.R. and Bhanuvally M. (2020). Growth and yield response of direct seeded rice (*Oryza sativa* L.) to dates of sowing and varieties. *J. Curr. Microbiol. Appl. Sci*., **8(4)**, 295–299.

Singh, D.K., Gupta S., Nanda G., Sharma Y., Singh V.V. and Bisarya D. (2017). Evaluation of rice varieties for yield under organic farming in tarai region of Uttarakhand, India. *Int. J. Curr. Microbiol. Appl. Sci*., **6(4)**, 734–738.

Singh, N.P., Singh M.K., Tyagi S. and Singh S.S. (2018). Effect of integrated nutrient management on growth and yield of rice (*Oryza sativa* L.). *Int. J. Curr. Microbiol. Appl. Sci*., **7**, 3671–368.

Sitaresmi, T. (2016). The influence of genotype × environment interaction on the results of rice field expectancy results. *J. Agric. Food Res*., **35(2)**, 42–55.

Subedi, P., Sah S.K., Marahattha S. and Yadav D.R. (2019). Effects of need-based nitrogen management and varieties on growth and yield of dry-direct seeded rice. *Pertanika J. Trop. Agric. Sci*., **42(2)**, 77–80.

Thakur, R., Shrivastava A.K., Sarvade S., Rai S.K., Koutu G.K., Bisen N.K. and Khan M.I. (2021). Response of integrated application of inorganic fertilizers and vermicompost on rice productivity at farmer field. *Int. J. Plant Soil Sci*., **33(4)**, 25–31.

USDA (2025). *World agriculture production*. Foreign Agricultural Services, Office of Global Analysis Report: USA. Circular Series WAP 4–22, May.

Vivekanandhini, A., Ravi V. and Subrahmaniyan K. (2018). Performance of different crop establishment methods on growth, weed dynamics and yield in rice–rice cropping sequence. *Field Crops Res*., **8(6)**, 7–11.

Yadav, D.K., Yadav S., Anshuman K., Rao A., Srivastava A., Dev A. and Prakash V. (2021). Studies on the effect of integrated nutrient management practices (INM) on yield and economics of aromatic rice (*Oryza sativa* L.). *Pharma Innov. J*., **10(4)**, 600–603.