Effect of Verities and Organic manure on growth and yield of rice (*oryza sativa* L.)

Abstract:

The field experiment was conducted during *kharif* 2022 at Crop Research Farm, Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P). The soil of experimental plot was sandy loam intexture, nearly neutral in soil reaction (pH 7.1), low in organic carbon (0.36 %), available N (171.48 kg/ha), available P (15.2 kg/ha) and available K (232.5 kg/ha). The experiment was laid out in Randomized Block Design with nine treatments including control each replicated thrice on the basis of one year experimentation. The treatments consist of T1: NDR 359 + FYM 10t/ha, T2: NDR 359 + Poultry manure 2t/ha, T3: NDR 359 + Vermicompost 5t/ha, T4: Sahbhgi Dhan + FYM 10t/ha, T5: Sahbhgi Dhan + Poultry manure 2t/ha, T6: Sahbhgi Dhan + Vermicompost 5t/ha, T7: Arize 6444 + FYM 10t/ha, T8: Arize 6444 + Poultry manure 2t/ha, T9: Arize 6444 + Vermicompost 5t/ha are used. The application of NDR 359 + Poultry manure 2t/ha recorded significantly higher Plant height (107.67 cm), Number of tillers/hill (15.90), Plant dry weight (88.03 g/hill), maximum panicles/hill (10.67), number of grains/panicle (98.70), Test weight (20.68 g), grain yield (5.40 t/ha), straw yield (7.07 t/ha), Harvest index (43.31 %). Higher gross returns (1,66,674.00 INR/ha), net return (1,10,314.2 INR/ha) and benefit cost ratio (1.96) was obtained in the treatment of NDR 359 + Poultry manure 2t/ha. The abstract is very good.

Key words: FYM, Vermicompost, Poultry manure, Rice.

-Introduction:

Rice is the seed of the grass species Oryza sativa (Asian rice) or less commonly Oryza glaberrima (African rice). As a cereal grain, domesticated rice is the most widely consumed staple food for over half of the world's human population, especially in Asia and Africa. It is the agricultural commodity with the third-highest worldwide production after sugarcane and maize. Rice is the most important food crop with regard to human nutrition and caloric intake, providing more than one-fifth of the calories consumed worldwide by humans. Rice, a monocot, is normally grown as an annual plant, although in tropical areas it can survive as a perennial and can produce a ratoon crop for up to 30 years. The cultivated rice plant is an annual grass and grows to about 1.2 metres (4 feet) in height. The leaves are long and flattened and are borne on hollow stems. The fibrous root system is often broad and spreading. The panicle, or

inflorescence (flower cluster), is made up of spikelets bearing flowers that produce the fruit, or grain.

Developing rice cultivars with increased yield potential is the goal of rice breeding programs in Nepal. Many rice cultivars have been developed and adapted to the country's diverse agroecosystems (Joshi, 2017). Breeders use a variety of methods to identify superior rice varieties. Among these methods, multivariate analysis is the most commonly used approach to assess genetic diversity. Genetic diversity is essential to sustain high levels of productivity (Tripathi *et al.*, 2013). This is the breeder's most important tool when choosing suitable parents for a hybridization program. It is a smart idea to use genetic differences to select parents for a successful mating and breeding program. According to Kwon *et al.* (2002), identifying parents based on divergence studies is more beneficial for breeding programs.

Fertilizers are organic substances that are basically of plant origin and generally derived from animal waste, with the exception of green manure, which can be used as a source of organic nutrients in the soil. These are relatively cheap and environmentally friendly inputs. These have great potential to maintain nutrient supply and reduce farmers' reliance on the use of chemical fertilizers. Farm fertilizers have been used as fertilizers in agriculture for centuries. FYM helps improve soil structure and soil biomass (Dauda *et al.* 2008). FYM also helps improve soil physical properties. It also improves soil chemistry by increasing soil organic carbon, nitrogen, phosphorus and potassium levels (Bayu *et al.* 2006). Therefore, reducing the use of synthetic fertilizers and conserving natural resources while maintaining crop production are key current challenges that can only be enabled by the introduction of nutrient supply systems that involve the integrated utilization of nutrient sources (Merentola *et al.* 2012). The use of organic fertilizers in combination with chemical fertilizers offers great opportunities to improve yields and soil productivity.

Vermicompost is a nutrient-organic fertilizer-rich, microbiologically active peat-like material commonly used for biodegradable organic waste decomposition and organic waste treatment by humification. This is done by microorganisms present in the soil and in the gut of earthworms. Vermicompost improves plant growth and development beyond what is normally observed solely through nutrient conversion and availability in the soil. These plant productivity increases have been attributed to improved soil structure and soil microbial populations exhibiting higher levels of activity and greater production of biological metabolites such as plant growth regulators. The introduction is also good.

Material and Methods:

The field experiment was conducted during *Khairf* 2022 at Crop Research Farm, Department of

Agronomy, SHUATS, Prayagraj (U.P). The experiment was laid out in Randomized Block Design with nine treatments including control each replicated thrice on the basis of one year experimentation. The treatments consists of T1: NDR 359 + FYM 10 t/ha, T2: NDR 359 + Poultry manure 2 t/ha, T3: NDR 359 + Vermicompost 5 t/ha, T4: Sahbhgi Dhan + FYM 103t/ha, T5: Sahbhgi Dhan + Poultry manure 2 t/ha, T6: Sahbhgi Dhan + Vermicompost 5 t/ha, T7: Arize 6444 + FYM 10t/ha, T8: Arize 6444 + Poultry manure 2 t/ha, T9: Arize 6444 + Vermicompost 5 t/ha are used. It will better for him to add the statistical tools used in analyzing the data.

Results

Pre - harvest Parameters:

The perusal of data indicate that plant height measured at (i.e., 60 DAS), At 60 DAT, highest plant height (53.50 cm) has been recorded with the application of NDR 359 + Poultry manure 2t/ha, minimum plant height was recorded in NDR 359 + FYM 10t/ha (47.20 cm) and NDR 359 + Vermicompost 5t/ha (52.80 cm), Sahbhgi Dhan + Poultry manure 2t/ha (51.20 cm) and Sahbhgi Dhan + Vermicompost 5t/ha (50.90 cm) which were statistically at par to NDR 359 + Poultry manure 2t/ha. At 60 DAT, highest tillers/hill (17.00) has been recorded with the application of NDR 359 + Poultry manure 2t/ha, minimum plant height was recorded in NDR 359 + FYM 10t/ha (14.67) and NDR 359 + Vermicompost 5t/ha (16.00) which was statistically at par to NDR 359 + Poultry manure 2t/ha. At 60 DAT, highest plant dry weight (50.24) has been recorded with the application of NDR 359 + Poultry manure 2t/ha, minimum plant height was recorded in NDR 359 + FYM 10t/ha (46.78) and NDR 359 + Vermicompost 5t/ha (48.91) which was statistically at par to NDR 359 + Poultry manure 2t/ha.

Post - harvest Parameters:

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Significantly higher number of panicles/hill (10.67) were recorded in with application of NDR 359 + Poultry manure 2t/ha, minimum was recorded in NDR 359 + FYM 10t/ha (8.13) whereas with application of NDR 359 + Vermicompost 5t/ha (10.00) were found to be statistically at par with the highest. Significantly higher number of grains/panicles (98.70) were recorded in with application of NDR 359 + Poultry manure 2t/ha, minimum was recorded in NDR 359 + FYM 10t/ha (91.52) whereas with application of NDR 359 + Vermicompost 5t/ha (98.13) were found to be statistically at par with the highest. Significantly higher test weight (20.68 g) is recorded in with application of NDR 359 + Poultry manure 2t/ha, minimum was recorded in NDR 359 + FYM 10t/ha (18.00 g) whereas with application of NDR 359 + Vermicompost 5t/ha (20.42 g) were found to be statistically at par with the highest.

Discussions:

The combined application of chicken manure and chemical fertilizer increased up to 12% grain yield over control. The chemical fertilizer application only increased7% than control. The application of chicken manure increased 6% compared to control. The application of chicken manure and chemical fertilizer increased the grain yield from 6-12% than control. The application of organic manure and chemical fertilizers increased the grain and straw yields of rice. It is clear that organic manure in combination with inorganic fertilizers increased the vegetative growth of plants and thereby increased straw yield of rice (Rahman et al., 2009). Different nutrients in the post-harvest soil increased slightly with the application of PM in the experimental plots. Irrespective of rate of poultry manure, the percent organic carbon and nitrogen were increased insignificantly in the plots compared to control plot. Zaman et al., (2002) reported that the organic matter and residual N remaining in the soil was greater with poultry manure than with chemical fertilizer. The soil available P was increased significantly after application of 3 t ha-1 PM in the soil over control. Hossain et al., (2010) found that nitrogen based manure or compost application resulted in available soil P levels that were significantly greater than those for the P-based manure or compost application

Conclusion:

It is concluded that application of NDR 359 + Poultry manure 2t/ha was recorded significantly higher grain yield (5.40 t/ha), and benefit cost ratio (1.96) as compared to other treatments. Since, the finding based on the research done in one season.

Table 1: Influence of varieties and organic manures on growth and Yield attributes and their combination of Rice at 60 DAS.

Treatments	Plant Height	Number of tillers/plants	Dry weight	Number of panicle/hills	Number of grains/hills	Test weight
T1	47.20	14.67	46.78	8.13	91.52	18.00
T2	53.50	17.00	50.24	10.67	98.70	20.68
T3	52.80	16.00	48.91	10.00	98.13	20.42
T4	48.30	14.67	47.16	8.47	92.40	18.04
T5	51.20	15.33	49.63	10.60	97.33	20.30
T6	50.90	15.00	49.00	10.27	95.13	20.18
T7	49.00	15.00	47.55	7.80	91.60	18.13
T8	49.70	15.40	47.94	9.53	93.20	19.07
T9	49.00	15.10	45.14	8.47	93.53	18.16
F – Test	S	S	S	S	S	S
SEm	0.71	0.20	0.67	0.59	1.36	0.61
CD (p=0.05)	2.12	0.60	2.01	1.79	4.08	1.84

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